2005 ANO NRC RO/SRO Written Examination
Post-Exam Changes

#16 RO and SRO QID #0554 (RO Tier 1 Group 1)

Following further review of the reference material, it was determined there are two correct answers to this question, "A" and "C". The question reference, 1203.028 step 10.A, refers to the primary reason for slowly restoring SW to the DH cooler (i.e., water hammer), but it also refers to thermal shock as a secondary concern in the note. Credit will therefore be given to all who chose "A" or "C". The question will be corrected prior to future use.

#73 RO and SRO QID #0579 (RO Tier 3)

After class review of the exam, it was determined that there was no correct answer due to a typo. The typo was in the correct answer "C" which states "HPI" vs. the system in the reference, 1202.010 step 13, which is "LPI". The question was therefore dropped from the exam. The question will be corrected prior to future use.

#94 SRO QID #0601 (SRO Tier 3)

No misses, however, a comment was made on this question during the exam. The comment suggested that since the Tech Spec 3.2.4, Required Action A.1.2.2, states $\geq 2\%$, then both "C" and "D" are correct. Answer "C" was listed as the correct answer as the QPT given exceeds the limit by 3% and 3 x 2 = 6. However, answer "D" is also correct since 8% is greater than 6%. The question will be corrected prior to future use.

SECTION 4 -- LOSS OF SERVICE WATER FLOW

10. WHEN SW is regained,
THEN restore SW flow to DH cooler as follows:

A. Station operator at cooler to listen for evidence of water hammer during next step.

> **NOTE**
> If SW side of DH cooler has reached saturation temp, slowly cutting in SW will minimize thermal shock and water hammer.

B. Slowly open applicable SW Inlet to E-35A or E-35B DH Cooler manually:

E-35A	E-35B
CV-3822	CV-3821

1) **IF** water hammer is observed,
THEN open SW Inlet more slowly.

C. **WHEN** SW valve is fully open,
THEN close associated supply breaker:

CV-3822	CV-3821
B-5182	B-6183

END

INSTRUCTIONS | **CONTINGENCY ACTIONS**

NOTE

Aligning Pressurizer AUX Spray to LPI system before going on sump recirc reduces personnel exposure should the lineup be required for boron precipitation mitigation at a later time. Transfer to RB Sump suction must commence when BWST level reaches 6', even if this alignment is not complete.

13. Dispatch an operator to align Pressurizer AUX Spray to LPI system using Decay Heat Removal Operating Procedure (1104.004), "DH System AUX Spray Alignment Prior to RB Sump Recirc" section.

A. **IF** BWST level reaches 6' before alignment is complete,
THEN notify dispatched operator to exit the Aux Bldg, regardless of alignment status, until transfer to RB sump suction is complete and radiation levels can be determined.

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 limits specified in the COLR.	A.1.1 Perform SR 3.2.5.1.	Once per 2 hours
	OR	
	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.	2 hours OR 2 hours after last performance of SR 3.2.5.1
	AND	
	A.1.2.2 Reduce 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.	10 hours OR 10 hours after last performance of SR 3.2.5.1
	AND	

U.S. Nuclear Regulatory Commission

Site-Specific RO Written Examination

Applicant Information	
Name:	
Date: 9/9/2005	Facility/Unit: Arkansas Nuclear One Unit 1
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. Examination papers will be collected 6 hours after the examination begins.

Applicant Certification

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

_____
Applicant's Signature

Results

Examination Value	75 Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

ANO Unit 1 - 2005 RO NRC Written Examination

Question No. 1 **QID: 0608**

With the plant at 100% power, what is the relationship between a Reactor Trip signal and the closing of the SU #1 feeder breakers for the A1/A2 and H1/H2 buses?

A. Reactor trip causes a Generator Lockout which closes SU #1 feeder breakers as long as the SU #2 feeder breakers are open.

B. Reactor trip confirm signal opens the Unit Aux. feeder breakers, the SU #1 feeder breakers close because the Unit Aux. breakers are open.

C. Reactor trip causes a Unit Aux Lockout which opens the Unit Aux. feeder breakers, the SU #1feeder breakers close due to undervoltage on the buses.

D. Reactor trip confirm signal closes the SU #1 feeder breakers, with both feeder breakers closed simultaneously the Unit Aux. feeder breakers will open after a short time delay.

Question No. 2 **QID: 0324**

Given:

- ESAS actuated on low RCS pressure.
- RCS Tave 560 °F and stable
- Pressurizer level off-scale high
- RCS pressure 1400 psig and rising rapidly
- RB sump level 55% and rising
- Fuel failure of 1% is indicated

Considering the above conditions, which of the following methods, and reason behind the method, will be used to mitigate the RCS pressure transient in accordance with RT-14?

A. Cycle ERV as required to quickly and effectively control the pressure rise.

B. Raise PZR spray to condense steam in PZR vapor space.

C. Throttle HPI flow to reduce input of mass into RCS and match RCS leakage.

D. Raise letdown flow to lower RCS mass and reduce pressure.

Question No. 3 **QID: 0368**

A reactor trip has occurred from 100% power.

The following conditions have existed for three minutes:

- RCS temperature = 590 degrees F.
- RCS pressure = 1700 psig.

Which of the following operator actions will be performed?

A. Trip all running RCPs.

B. Verify EFW flow to each Steam Generator is ~320 gpm.

C. Verify Reflux Boiling setpoint is selected on both EFIC trains.

D. Go to Overheating EOP, 1202.004.

Question No. 4 **QID: 0198**

Given:
- A large break LOCA has occurred.
- Offsite power has been lost.

Why must Reactor Building Spray flow be throttled to 1050-1200 gpm prior to transferring to Reactor Building sump suction?

A. To ensure adequate NPSH for ECCS pumps.

B. To prevent pump runout on the Spray pumps.

C. To lower load on the EDGs.

D. To limit corrosion of reactor building equipment.

Question No. 5 **QID: 0609**

Which of the following is a condition that requires stopping of a Reactor Coolant Pump?

A. Seal cavity pressures oscillating >600 psi peak to peak

B. Seal bleedoff temperature 160°F

C. Seal beedoff temperature 60°F above 1st stage seal temperature

D. Failure of one stage as indicated by zero stage DP

Question No. 6 **QID: 0610**

Given:

- Plant at 100% power.
- Makeup pump P-36B has tripped.

Why does the AOP isolate Letdown for these conditions?

A. Prevent overheating of the Letdown Demeralizers.

B. Prevent emptying the Makeup Tank.

C. Reduce heat load on Nuclear ICW system.

D. Maintain RCS inventory.

Question No. 7 **QID: 0611**

Given:

- Plant is in Mode 5.
- "A" Decay Heat Removal system is in service.
- RB sump level 40% and rising.

Annunciators K09-C7 "TRAIN A RCS LEVEL LO" and K09-D7 "TRAIN B RCS LEVEL LO" alarm.

Which of the following actions should be performed?

A. Start P-34B Decay Heat pump and secure P-34A.

B. Stop P-34A Decay Heat pump and close CV-1404.

C. Stop P-34A Decay Heat pump and close CV-1434.

D. Fill RCS by starting P-34B using LPI flowpath.

Question No. 8 **QID: 0007**

The plant is operating at 100% power and "A" RCP experiences a simultaneous loss of seal cooling and seal injection flow.
This occurred at 1715.
Attempts to restore seal cooling and/or seal injection flow to the pump are unsuccessful.

The AOP specifies a time limit to take action with this RCP to prevent damage to the RCP seal due to overheating.

What is the LATEST time at which action should be taken per the AOP?

A. 1719

b. 1718

c. 1717

d. 1716

Question No. 9 **QID: 0395**

The plant is shutdown and cooled down.
RCS pressure is 220 psig.
I&C is performing calibration checks on "A" RPS channel.

Why will I&C request the Pzr Control Pressure Selector, HS-1038, be placed in the "Y" position?

a. To allow remote indications to be checked during calibration.

b. To prevent the ERV opening, causing a rapid depressurization of the RCS.

c. To maintain pressurizer heaters off during testing.

d. To allow the ERV low setpoint to be checked.

Question No. 10 **QID: 0612**

Given:
- A tube rupture has occurred on the "A" SG.
- Reactor has been tripped and cooldown started.

In accordance with the Tube Rupture EOP, which of the following parameters indicates that it is permissible to isolate the bad SG?

A. T-hot indicates 485°F

B. CETs indicate 495°F

C. T-hot indicates 505°F

D. CETs indicate 510°F

Question No. 11 **QID: 0551**

Which of the following would invoke Pressurized Thermal Shock (PTS) limits during a Steam Line Rupture?

A. HPI on with all RCPs off

B. RCS cooldown rate 110°F/hr with Tcold 360°F

C. RCS cooldown rate 75°F/hr with Tcold 310°F

D. SG Tube to shell DT 150°F tubes colder

Question No. 12 **QID: 0552**

Which of the following would cause entry into 1202.008, Blackout?

A. All 6900V busses de-energized, 4160V busses A1 and A2 de-energized

B. All 4160V busses de-energized

C. All 6900V busses de-energized, all 4160V busses de-energized except A4 bus

D. All 6900V busses de-energized

Question No. 13 **QID: 0553**

A Degraded Power event occurred.
Both EDG's are supplying associated ES buses.
You are directed to actuate MSLI for both SGs and verify proper EFW actuation and control per RT-6.

Which of the following would be a verification of primary to secondary heat transfer per RT-6?

A. Core exit temperature 600 °F and rising slowly.

B. T-hot/T-cold delta T 55°F and rising slowly.

C. T-cold 545°F dropping slowly and SG pressures 990 psig dropping slowly.

D. Core exit temperature 595 °F rising slowly with T-hot 580°F dropping slowly.

Question No. 14 **QID: 0339**

Inverters are aligned with Y-25 supplying RS-4 and Y-22 supplying RS-2.
Shifting the manual output transfer switch (S-2) on the Y-25 inverter to the "System Output To Y-22" position would:

a. power RS-2 from Y-25.

b. de-energize RS-4.

c. parallel RS-2 and RS-4.

d. damage the Y-25 inverter.

Question No. 15 **QID: 0613**

Given:

- Plant is at 100% power,
- D02 Undervoltage (K01-A8),
- D02 Trouble (K01-D8),
- Loss of breaker position indicator lights for plant buses on right side of C10.

Which action, with the correct reason for the action, should be performed?

A. Verify reactor is tripped due to loss of power to RCP underpower monitor circuit.

B. Trip the Generator Output Breakers to prevent the Main Generator from motoring.

C. Verify #2 EDG has automatically started and tied on to A4 ES bus due to undervoltage.

D. Line up Battery Charger D04A or D04B to the D02 Bus to restore DC power.

Question No. 16 **QID: 0554**

Plant heat up is in progress with RCS temperature at 215 degrees F.
Service water is lost to the in-service DH cooler.

What action is required during the re-establishment of SW flow through the DH cooler and why?

A. Establish SW slowly to prevent DH cooler water hammer.

B. Establish SW slowly to prevent SW pump runout.

C. Establish SW slowly to prevent DH cooler thermal shock.

D. Establish SW quickly to prevent RCS heat up.

Question No. 17 **QID: 0555**

A Loss of Instrument Air pressure has occurred.
Suddenly Instrument Air pressure quickly degrades to 35 psig.

Which of the following actions should be taken?

A. Open the Unit One to Unit Two Instrument Air Cross-connect.

B. Shutdown at greater than or equal to 10%/min. per 1203.045, Rapid Plant Shutdown.

C. Shutdown at greater than or equal to 5%/min. per 1203.045, Rapid Plant Shutdown.

D. Trip the reactor and go to 1202.001, Reactor Trip.

Question No. 18 **QID: 0614**

An Overheating event is in progress.
Subcooling margin remains adequate.

The running RCP should be tripped when tube to shell delta T reaches:

A. 40°F (tubes hotter)

B. 60°F (tubes hotter)

C. 40°F (tubes colder)

D. 60°F (tubes colder)

Question No. 19 **QID: 0557**

Given:
- The CRD system is in automatic and the plant is at 100% power.
- A dropped rod in Group 7 results in an asymmetric rod runback.

Group 7 rods will drive "in" when a Group 7 "in limit" is ON because:

A. In automatic, a Group 7 "out limit" bypasses the "in limit".

B. In automatic, an asymmetric rod runback bypasses the group "in limit".

C. The dropped rod's relative position is aligned with the group.

D. The "in limit" is only functional when the Diamond is in manual.

Question No. 20 **QID: 0495**

Given:

- Reactor is tripped from 100% power
- Four CRDM's fail to insert according to indications in the control room
- The CRS directs you to initiate Emergency Boration in accordance with RT-12 "Emergency Boration"

You should set the INITIAL batch setting of the boric acid controller to:

A. The batch size required to maintain make up tank level between 55 and 86 inches while maintaining pressurizer level >100 inches.

B. The batch size required in order to obtain a shutdown margin of 1.5% delta K/K as determined by a reactivity balance calculation.

C. The maximum batch size setting and commence adding boric acid to the make up tank.

D. The batch size determined by the plant computer boron program to offset the reactivity worth of the four stuck rods.

Question No. 21 **QID: 0216**

Given:

- A 15 gpm Steam Generator tube leak cooldown is in progress.
- Normal cooldown limits are being used with the good OTSG.
- RCS pressure is 1000 psig, Tave is 405°F.

The CBOR is maintaining the RCS at about 140°F subcooled.

Why are the CBOR's actions incorrect for this accident?

a. Tube to shell Delta T limits are being exceeded.

b. A high primary to secondary Delta P is increasing primary coolant loss.

c. Excessive thermal stresses are being imposed on the Rx vessel.

d. Overfill could cause the ruptured SG main steam safeties to lift.

Question No. 22 **QID: 0025**

The following plant conditions existed just prior to an automatic reactor trip:

- Reactor power at 50%
- Loss of Bus H-1 due to an electrical fault
- "B" Main Feedwater Pump tripped
- Condenser vacuum at 23.5 inches Hg
- RCS pressure at 1950 psig

Which of the following was the cause of the automatic reactor trip?

a. Main Turbine Anticipatory trip.

b. Power to Pumps trip.

c. Variable Low Pressure trip.

d. Main Feedwater Anticipatory trip.

Question No. 23 **QID: 0606**

Which of the following actions with reasons will NOT occur if Gaseous Radwaste radiation monitor, RE-4830, is in a high alarm condition?

A. Gaseous Radwaste Discharge Isolation valve, CV-4830, closes to isolate any releases from the Aux. Bldg. vent header.

B. Gaseous Radwaste Discharge Flow Control valve, CV-4820, closes to isolate any Decay Tank release in progress.

C. RB Vent Header Isolation to T-17, CV-4804, closes to isolate any additions to system from RB vent header.

D. AB Vent Header Diversion to T-17 valve, CV-4806, opens to send Decay Tank release back to surge tank.

Question No. 24 **QID: 0558**

Given:
- An immediate Control Room evacuation is in progress due to a fire in the Cable Spreading Room.
- All Control Room actions have been completed.
- It is approximately 40 minutes into the event.

How is feedwater being supplied to the OTSGs?

A. Motor driven EFW pump P-7B is initially used and then automatic control of steam driven EFW pump P-7A is established.

B. Steam driven EFW pump P-7A with automatic control of P-7A flow control valves.

C. Motor driven EFW pump P-7B with automatic control of P-7B flow control valves.

D. Motor driven EFW pump P-7B is initially used and then local control of steam driven EFW pump P-7A is established.

Question No. 25 **QID: 0162**

Reactor power is 90% and generated megawatts is 800. After a runback for loss of one main feedwater pump, the ICS should stabilize the plant at _____.

A. 360 Mwe

b. 340 Mwe

c. 45% Reactor Power

d. 50% Reactor Power

Question No. 26 **QID: 0276**

Given:

- A loss of offsite power has occurred.
- Annunciator K01-B1, "EDG 1 BRKR AUTO CLOSE FAILURE", is in alarm.

What action will close EDG #1 output breaker (A-308)?

a. Place EDG #1 output breaker in PULL-TO-LOCK and release.

b. Depress EDG #1 start push-button.

c. Reset A1 Lockout relay.

d. Place EDG #1 output breaker handswitch on C-10 in the CLOSE position.

Question No. 27 **QID: 0421**

Given a Rx trip has occurred and one minute later the following conditions are observed:

- RCS pressure is stable 1700 psig.
- CET average temperature is 600 degrees F.

Which Emergency Operating Procedure contains mitigating actions for this event?

a. Loss of Subcooling Margin (1202.002)

b. ESAS (1202.010)

c. Overheating (1202.004)

d. Inadequate Core Cooling (1202.005)

Question No. 28 **QID: 0615**

Given:
- Plant heatup in progress from refueling outage.
- P-32B, P-32C, P-32D RCPs are running.
- Seal injection flow has been balanced and is in auto at 16 gpm total flow.
- Non-nuclear ICW to RCP motor cooling flow is 245 gpm.
- Nuclear ICW to RCP seal cooling flow is 35 gpm.
- RCS loop A & B cold leg temps are 380°F.

A start of RCP P-32A is attempted but is unsuccessful. Why?

A. Nuclear ICW to RCP seal cooling flow is low.

B. Seal injection flow is low.

C. Non-nuclear ICW to RCP motor cooling flow is low.

D. RCS cold leg temps are low.

Question No. 29 **QID: 0432**

Unit One is operating at 100% power.
An ICW problem causes Letdown temperature to rise to 148°F.

What is the effect on the Pressurizer level control system during this transient?

A. PZR level will continue to drop during this event.

B. PZR level will continue to rise during this event.

C. Makeup flow will rise and restore Pressurizer level to setpoint.

D. Makeup flow will drop and restore Pressurizer level to setpoint.

Question No. 30 **QID: 0091**

Given:

- Plant cooldown in progress
- "A" DH Removal pump in service
- "A" and "C" RCPs running

What is the maximum allowable cooldown rate in this condition?

A. 25°F/hr

B. 50°F/hr

C. 75°F/hr

D. 100°F/hr

Question No. 31 **QID: 0560**

Given the following plant conditions:

---Plant is in Mode 5.

---RCS temperature 180 degrees F.

---RCS pressure 30 psig.

Identify the correct valve alignment for starting a Decay Heat pump:

A. Cooler outlet valve 50% open, cooler bypass valve shut, injection block valve 100% open.

B. Cooler outlet valve shut, cooler bypass valve 75% open, injection block valve shut.

C. Cooler outlet valve shut, cooler bypass valve 75% open, injection block valve 100% open.

D. Cooler outlet valve 50% open, cooler bypass valve shut, injection block valve 50% open.

Question No. 32 **QID: 0197**

The plant is operating at 100% power. The Core Flood system is properly aligned with the following CFT parameters:

T-2A level	- 12.9 feet	T-2B level	- 13.1 feet
T-2A pressure	- 632 psig	T-2B pressure	- 615 psig

The Core Flood system parameters are unacceptable because:

A. Levels may preclude having sufficient N2 volume to fully inject the CFT contents into the vessel.

B. High N2 pressure could cause RCS inventory to be lost out of the break in the event of a LOCA.

C. Levels may not be sufficient to reflood the vessel following a LOCA.

D. N2 pressure may not be sufficient to fully inject the CFT contents into the vessel during a LOCA.

Question No. 33 **QID: 0071**

Given:

- HPI pump P-36B out of service
- LOCA in progress
- RCS pressure 1425 psig and dropping slowly
- 4160v bus A4 de-energized
- HPI flows: A = 190 gpm
  B = 100 gpm
  C = 105 gpm
  D = 90 gpm

Which of the following actions is required?

A. Throttle all to within 20 gpm of each other

B. Throttle "A" flow to within 20 gpm of "C"

C. Throttle "A" flow to within 20 gpm of "D"

D. Throttle "A flow to within 20 gpm of "B"

Question No. 34 **QID: 0561**

A plant startup is in progress with a steam bubble being drawn in the Pressurizer.
- Initial Quench Tank pressure is 3 psig.
- RCS pressure 65 psig.
- Pressurizer temperature 312°F.

Which of the following assures that venting and steam bubble formation is complete in the Pressurizer?

A. Quench Tank pressure 7.6 psig after a 3 minute blow of the ERV.

B. Quench Tank pressure 6.2 psig after a 3 minute blow of the ERV.

C. Quench Tank pressure 4.8 psig after a 3 minute blow of the ERV.

D. Quench Tank pressure 3.5 psig after a 3 minute blow of the ERV.

Question No. 35 **QID: 0294**

Why is a minimum water level maintained in the Quench Tank?

a. Ensure adequate NPSH for the transfer pump.

b. Provide sufficient cooling-quench water during pressurizer operations.

c. Maintain a reference water level for level indication.

d. Maintain a loop seal on the relief lines.

Question No. 36 **QID: 0562**

Which of the following identifies the correct power supplies to the Intermediate Cooling Water Pumps (P-33A, P-33B, P-33C)?

A. P33A and P33B are powered from B-12 while P33C is powered from B-22.

B. P33A is powered from B-12 while P33B and P33C are powered from B-22.

C. P33A, P33B and P33C are powered from B-12, B-22 and B32 respectively.

D. P33A, P33B and P33C are powered from B-11, B-12 and B-13 respectively.

Question No. 37 **QID: 0072**

Given:

- RCS pressure 1950 psig and decreasing
- "RELIEF VALVE OPEN", K09-A1, in alarm
- ERV indicates closed
- Acoustic monitor indicates ERV is leaking

You immediately close ERV Isolation valve, CV-1000.
RCS pressure continues to drop with all PZR heaters ON.

What should your next action be?

a. Begin plant runback

b. Cycle the ERV

c. Initiate full HPI

d. Trip the reactor

Question No. 38 **QID: 0306**

Which of the following conditions would result in the Reactor Protection System initiating a reactor trip designed to protect the fuel clad from DNB?

A. Ejected rod accident during startup

B. Loss of both Main Feedwater Pumps at 100 % power

C. Boron dilution accident while operating at 100% power

D. Two Reactor Coolant Pumps trip at 100% power

Question No. 39 **QID: 0307**

Given:

- Plant is at 100% power.
- "B" Reactor Protection System channel is inoperable due to NI-6 failed high.
- A surveillance test on "D" Reactor Protection System channel is in progress.

What is the Reactor Protection System bistable trip logic under these conditions?

a. One out-of-two

b. One out-of-three

c. Two out-of-two

d. Two out-of-four

Question No. 40 **QID: 0266**

Given:

- All controls are in automatic
- RCS pressure 135 psig, slowly dropping
- Reactor Building pressure is 28 psia
- "A" and "B" OTSG levels at 415 inches

Which pair of pumps should be pumping fluid as designed (not recircing)?

A. HPI pumps and LPI pumps

B. RB spray pumps and LPI pumps

C. RB spray pumps and EFW pumps

D. HPI pumps and EFW pumps

Question No. 41 **QID: 0564**

Given:

- Plant is in cold shutdown.
- All necessary components have been aligned per 1305.006, Integrated ES System Test.
- All ES EVEN Digital Channels actuated per procedure using RB pressure transmitters.
- Annunciator "RB SPRAY P35B ES FAILURE" K11-C7 is in alarm.

Which of the following is a proper response to this alarm (K11-C7)?

A. No response required, the Spray pump breaker is racked down for this test.

B. Raise RB Spray flow using CV-2400, RB Spray Block valve.

C. Raise RB Spray flow using DH-9, DH-10 Bypass valve.

D. No response needed, expected alarm due to no flow through the flow transmitter.

Question No. 42 **QID: 0135**

A LOCA has occurred.
Reactor Building (RB) pressure is 47 psia.

Which ESAS channels have actuated the RB cooling units and what is the correct RB cooling alignment?

A. ES channels 3 & 4, VSF-1A, 1B, 1C, & 1D running with service water aligned to the cooling coils.

B. ES channels 3 & 4, VSF-1A, 1B, 1C, 1D, & 1E running with chilled water aligned to the cooling coils.

C. ES channels 5 & 6, VSF-1A, 1B, 1C, & 1D running with service water aligned to the cooling coils.

D. ES channels 5 & 6, VSF-1A, 1B, 1C, 1D, & 1E running with chilled water aligned to the cooling coils.

Question No. 43 **QID: 0444**

In post accident conditions, the RB Spray System (both trains) will provide what percentage of the required RB cooling and iodine removal?

a. 100% Cooling/100% Iodine

b. 200% Cooling/100% Iodine

c. 100% Cooling/200% Iodine

d. 200% Cooling/200% Iodine

Question No. 44 **QID: 0314**

Given:

- A loss of offsite power
- No failures exist other than those which caused the loss of offsite power condition
- EDG's supplying vital buses

Ten (10) minutes into this event, what pressure are the OTSG's designed to be controlled at?

a. 895 psig

b. 995 psig

c. 1020 psig

d. 1050 psig

Question No. 45 **QID: 0565**

Given:

- 100% power
- ICS in full automatic

The CBOR places the ICS Delta T-Cold Hand Auto Station meter selection switch in "POS" (position). The meter reads 46%.

What does this mean in terms of ICS control of main feed water?

A. The average of feedwater loop A and feedwater loop B demand is 46%.

B. Feedwater loop B demand is greater than feedwater loop A demand.

C. The feedwater loop A demand is being boosted by a 4 °F Delta T-Cold error.

D. Feedwater loop A demand is greater than feedwater loop B demand.

Question No. 46 **QID: 0195**

Unit 1 is operating at 100% power with no abnormal conditions or alignments.
'B' MFP SUCT PRESS LO (K07-C8) annunciator is received.

Where can the Control Room Operators read the 'B' MFW pump suction pressure WITHOUT leaving the control room?

a. The 'B' MFP Lovejoy Operator Control Station (OCS).

b. 'B' MFP Suction Pressure (PI-2830) indicator.

c. 'B' MFP Suction Pressure computer point (P2830)

d. The Operator Information Touchscreen (OIT).

Question No. 47 **QID: 0566**

Given:
- A Degraded Power condition exists on both units.
- #1 EDG did not start.
- P-7A tripped and will not reset.

Why does the EOP direct cross-tieing of the A3 and A4 buses?

A. To run two HPI pumps for HPI cooling per RT-4.

B. To have atmospheric dump control on both SGs.

C. To start EFW Pump P-7B.

D. To restore Instrument Air for ADV control.

Question No. 48 **QID: 0140**

Initial conditions:

- 100% power
- P-36C is the operating makeup pump
- ICW pumps P-33A and P-33C in service

What RCP support system would be most affected by a loss of bus A4 and which procedural actions are used to mitigate the loss of this support system?

A. Loss of Seal Injection, verify seal cooling is maintained.

B. Loss of RCP Motor Cooling, trip reactor and trip all RCPs.

C. Normal Seal Bleedoff flowpath isolated, open alternate bleedoff path to Quench Tank.

D. Loss of AC Oil Lift pumps, verify emergency DC lift pumps start.

Question No. 49 **QID: 0616**

The CBOT notices on C10 that all of the 161 KV ring bus breakers have opened.

Which of the following will be de-energized as a result of the above indications?

A. Startup #1 Transformer

B. Startup #2 Transformer

C. Auto transformer

D. Startup #3 Transformer

Question No. 50 **QID: 0617**

Given:

-The plant is at 55% power.
- RCP P-32A is stopped for maintenance.

What would be the effect if DC panel RA-1 were de-energized?

A. ICS runback to 45% power.

B. RPS Channel "A" would trip.

C. P-32A could not be re-started.

D. Reactor would trip.

Question No. 51 **QID: 0568**

Given:

- #1 EDG has one Air Start Compressor and it's associated Air Receiver Tanks tagged out.
- The remaining Air Start Compressor on #1 EDG trips while running.
- The Air Receiver Tanks' pressure is 176 psig.

What is the maximum number of start attempts assured with the above #1 EDG conditions?

A. One

B. Three

C. Five

D. Seven

Question No. 52 **QID: 0089**

Given:

- Treated Waste Monitor Tank, T16A, release in progress
- "PROC MONITOR RADIATION HIGH", K10-B2, in alarm
- Liquid Radwaste Process Monitor, RI-4642, in alarm

What should your FIRST action be?

A. Verify no flow on Discharge to Flume, FI-4642.

B. Trip the running Radwaste Transfer pump, P-53A/B.

C. Close Liquid Waste to Flume valve, CV-4642.

D. Verify proper setting on RI-4642 per the release permit.

Question No. 53 **QID: 0211**

Given:

- The unit is operating at 100% power.
- Service water pumps P-4A and P-4B are in service.
- A loss of P-4A occurs.

What is required of the operator to restore service water to the required Technical Specifications configuration?
(Note: Actions must be performed in correct sequence.)

a. Swap P-4B MOD (A6) to the A3 supply and start P-4C.

b. Start P-4C, stop P-4B, swap P-4B MOD (A6) to the A4 supply and start P-4B.

c. Stop P-4B, swap P-4B MOD (A6) to the A3 supply and start P-4B and P-4C.

d. Start P-4C, stop P-4B, swap P-4B MOD (A6) to the A3 supply and start P-4B.

Question No. 54 **QID: 0227**

Instrument Air pressure has dropped to 58 psig.
Field operators can not find an Inst. Air leak on Unit One.

Which of the following is the appropriate response for the given plant conditions to restore or conserve Instrument Air pressure?

A. Verify Service Air to Instrument Air cross-connect automatically opens.

B. Close Unit 1 to Unit 2 Instrument Air cross-connect.

c. Trip Reactor, actuate EFW and MSLI on both SGs.

d. If ICW available, isolate Seal Injection by closing CV-1206.

Question No. 55 **QID: 0569**

With the plant in Mode 2, what type of occurrence would make it necessary to use AOP 1203.005, Loss of Reactor Building Integrity?

A. Failure to perform a LLRT on personnel hatch within 5 days after opening.

B. Failure to perform a LLRT on emergency hatch within 7 days after opening.

C. "A" LPI RB sump suction is inoperable, closed, and de-energized.

D. The Ops Manager's permission is given to open both doors on personnel hatch to allow for ventilation motor entry.

Question No. 56 **QID: 0262**

Given:

- The plant is at 100 %.
- CRDs are at the normal rod index.
- The EHC controller is in manual.
- RCS boron concentration is 812 ppm.
- 1 ppm RCS boration requires 7.8 gallons of Boric Acid.

The CBOR is making a RCS addition with no concentration change and adds 92 gallons of boric acid and 8 gallons of DI water.

What effect will this have, without any further operator action?

A. Rods go full out, Tave stays the same, power goes down.

B. Rods go in ~10%, Tave stays the same, power goes down.

C. Rods go in ~10%, Tave goes down, power stays the same.

D. Rods go full out, Tave goes down, power stays the same.

Question No. 57 **QID: 0604**

A reactor trip has occurred and the CRS is directing actions per 1202.001, Reactor Trip.

Assume all actions have been performed when required by system parameters.

The CBOR reports that Pressurizer level has fallen to 30" and continuing to drop. Pressurizer Level Control (CV-1235) is in Auto and fully open.

Which of the following is the proper response?

A Initiate HPI per RT-2.

B. Reduce Letdown by closing Orifice Bypass (CV-1223).

C. Isolate Letdown by closing Letdown Cooler Outlet (CV-1221).

D. Operate CV-1235 in HAND to control PZR level 90 to 110".

Question No. 58 **QID: 0571**

If at 90% power, NI channel 6 slowly fails to 103% power, which one of the following would occur?

A. ICS would insert control rods and runback feedwater.

B. RPS channel B would trip.

C. ICS would insert control rods and raise feedwater.

D. SASS would select NI channel 5.

Question No. 59 **QID: 0572**

Which of the following indications would cause entry into a Technical Specification?

A. Plant Monitoring System date and time is not updating.

B. Both Incore SPND Backup Recorders not printing or indicating point values.

C. Neither ICCMDS train's mimic display or local displays are updating.

D. Neither SPDS computer's date & time updating for greater than one hour.

Question No. 60 **QID: 0573**

What is the flowpath for the purification of the Fuel Transfer Canal and Reactor Vessel when using the Spent Fuel Cooling System?

A. Taking a suction on DHR, through the purification loop and then discharging to the Spent Fuel Pool.

B. Taking a suction on the Fuel Transfer Canal, through the purification loop and then discharging to the DHR system.

C. Taking a suction on the Spent Fuel Pool, through the purification loop and then discharging to the DHR system.

D. Taking a suction on DHR, through the purification loop and then discharging to the Fuel Transfer Canal.

Question No. 61 **QID: 0201**

Startup Transformer #1 has locked out following a reactor trip from 100% power. Steam generator levels will be fed up to which of the following levels (assume no operator actions)?

a. 20-40 inches.

b. 100-150 inches.

c. 300-340 inches.

d. 370-410 inches.

Question No. 62 **QID: 0574**

Given:

- Normal startup with reactor power at 10%.
- Main Turbine is in Operator Auto.
- Both turbine bypass valves (TBVs) for the "A" SG fail open.

With NO operator action, which of the following will be the final reactor power?

A. ~14%

B. ~18%

C. ~22%

D. ~25%

Question No. 63 **QID: 0575**

Given:

- All ICS H/A stations are in automatic.
- Reactor power is 100%.
- Main Turbine trips.
- Normal post-trip response.

What is the expected OTSG pressure and RCS Tavg?

A. 895 psig and 532°F

B. 945 pisg and 538°F

C. 995 psig and 547°F

D. 1020 psig and 550°F

Question No. 64 **QID: 0196**

While performing a reactor building purge evolution, the operator notes all four RB Purge Isolation Valves go closed. What is the most likely cause?

a. An ESAS actuation of channels 1 and 2 has closed the valves.

b. A loss of load center B-5 has occurred causing the valves to fail closed.

c. A high radiation setpoint has been exceeded on SPING 1.

d. RB Purge Exhaust Fan (VEF-15) has tripped causing the valves to close.

Question No. 65 **QID: 0619**

The smoke detector string for the Cable Spreading Room has a trouble relay that is de-energized in it's respective ZIU.

Considering this, which of the following can actuate the deluge system for the Cable Spreading Room?

A. Take the Inhibit switch out of "Inhibit" on the Cable Spreading Room on C463.

B. Automatic actuation via smoke detector and protectowire detector for the Cable Spreading Room.

C. Automatic actuation of a protectowire detector for the Cable Spreading Room.

D. Manually operate the Operate switch for the Cable Spreading Room on C463.

Question No. 66 **QID: 0620**

The plant is shutdown and a cooldown is in progress due to a tube leak in the "A" OTSG.

- RCS T-hot is 520 °F and lowering
- BWST level is at 35 ft and lowering
- A OTSG level is 405 inches and rising
- Dose rates at site boundary are at Alert level

Which of the following procedural RCS cooldown limits are in effect for the above conditions?

A. Less than or equal to 50 °F/hour

B. Less than or equal to 100 °F/hour

C. Less than or equal to 240 °F/hour

D. Less than or equal to 520 °F/hour

Question No. 67 **QID: 0079**

Given:

- Unit is in Mode 5
- Reactor Building pressure is 15.9 psia and stable
- No other abnormal conditions exist

Which of the following procedural actions is required to establish RB purge with these conditions?

a. Open RB purge inlets first, then open outlets.

b. Vent RB via H2 sample lines.

c. Vent RB via RB leak detector.

d. Open RB purge outlets first, then open inlets.

Question No. 68 **QID: 0576**

Which one of the following conditions would place the unit in Mode 4?

A. The reactor must be subcritical by at least 1.5% Delta k/k

B. RCS temperature is between 200 °F and 280 °F

C. K effective is >0.99

D. RCS temperature is 300 °F

Question No. 69 **QID: 0116**

During an INITIAL approach to criticality, if criticality is NOT achieved within _____ of the ECP, insert _____ and _____ .

A. Plus or minus 1.0% delta k/k
control rods to achieve 1.5% SD margin
establish hot shutdown conditions

b. Plus or minus 1.0% delta k/k
regulating groups to achieve 1.0% SD margin
notify Reactor Engineering

c. plus or minus 0.5% delta k/k
control rods to achieve 1.5% SD margin
verify calculation

d. plus or minus 0.5% delta k/k
regulating groups to achieve 1.0% SD margin
verify calculation

Question No. 70 **QID: 0621**

During the hanging of tagouts, the _____ is responsible for the following:

-Reviews tagout detail of the tagout.

-Ensures components are positioned in accordance with the Tag Hang sheet.

-Ensures components are restored to their normal positions in accordance with Tagout Tags To Be Removed sheet.

-Ensures the tag(s) have been hung or removed.

A. Tagout Holder

B. Verifier

C. Preparer

D. Reviewer

Question No. 71 **QID: 0390**

Given:

- A startup is in progress.
- All safety groups are 100% withdrawn.
- The group 6 rods' RPI were not re-zeroed prior to startup.
- The CBOR is continuing with the startup with group 5 rods.

Which of the following results?

a. Auto inhibit.

b. Asymmetric rod alarm.

c. Out inhibit.

d. Sequence inhibit.

Question No. 72 **QID: 0605**

Which of the following describes the authorizations needed in order for an individual's exposure to reach 3300 mrem in a year?

A. Individual's supervisor approves.

B. Individual's supervisor recommends and RP supervision approves

C. Individual's supervisor recommends, RP Manager approves, and Plant General Manager concurs

D. Individual's supervisor recommends, Plant General Manager concurs, and Site Vice President approves

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Question No. 73 **QID: 0579**

During performance of the ESAS procedure with BWST level at 8 ft., which of the following actions is performed specifically to reduce plant personnel exposure?

A. Notifying RP to begin monitoring BWST suction line for back-leakage.

B. Throttling RB Spray flow 1050 to 1200 gpm per train.

C. Aligning HPI to provide PZR Aux Spray.

D. Removing all but C & D condensate polishers from service.

Question No. 74 **QID: 0580**

Given:

- Reactor trip from 100% power.
- Normal post-trip plant parameters.

The CRS asks for critical parameters.

Which of the following is NOT a critical parameter for the above conditions?

A. Subcooling margin

B. RCS pressure

C. Pressurizer level

D. RCS Tavg

Question No. 75 **QID: 0128**

Which of the following would be classified as a fission product barrier failure?

A. RCS leakage indicates greater than 50 gpm.

B. RCS pressure 2450 psig with ERV controlling pressure.

C. CNTMT pressure indicates 17 psia.

D. Engineering Assessment of core damage indicates 0.1% fuel cladding failure.

ANO Unit One
2005
Initial License Examination
RO Handout

ENTERGY OPERATIONS INCORPORATED
ARKANSAS NUCLEAR ONE

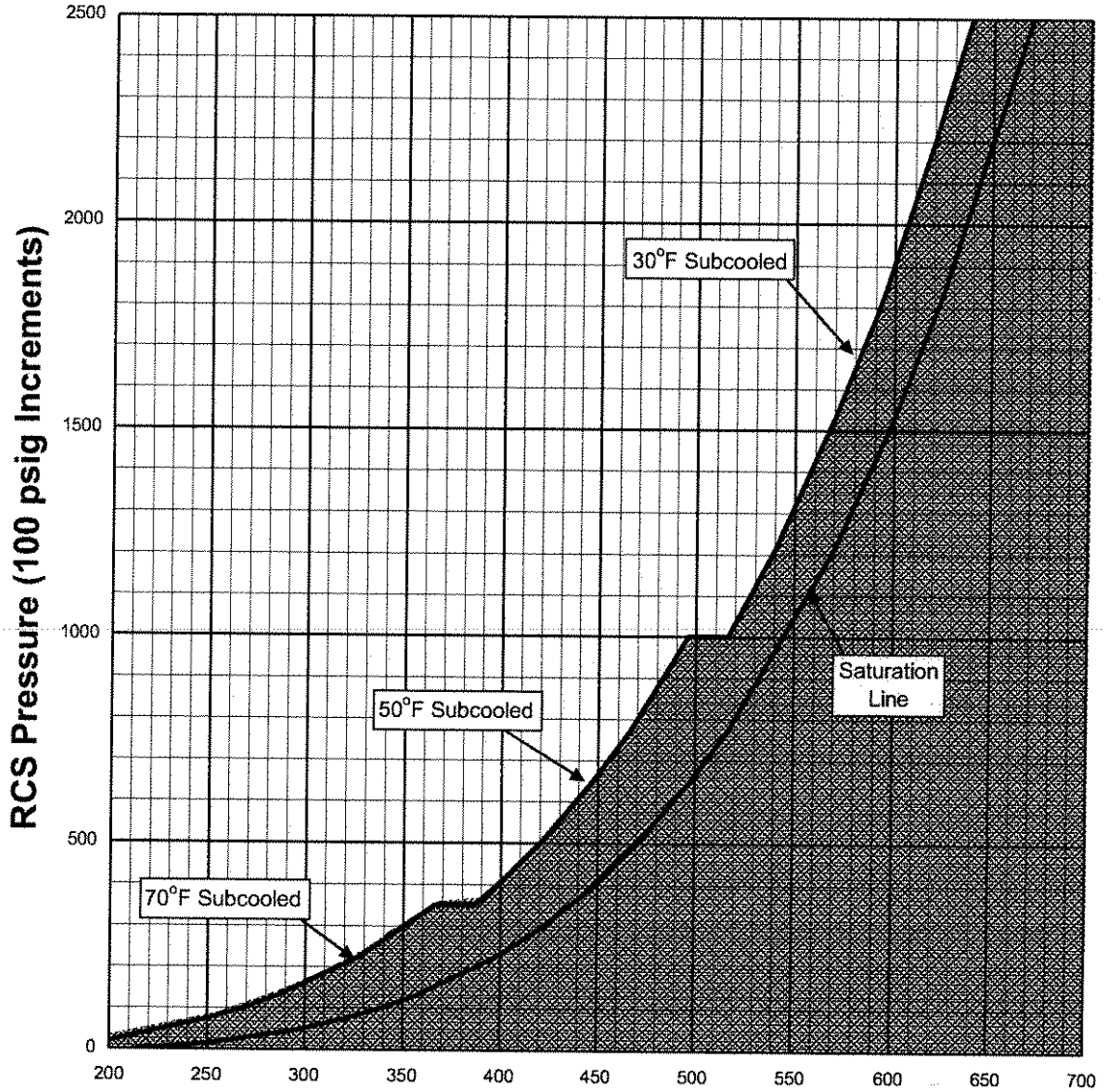
TITLE: **EOP FIGURES**	DOCUMENT NO. **1202.013**	CHANGE NO. **004-00-0**
	WORK PLAN EXP. DATE **N/A**	TC EXP. DATE **N/A**
SET #	SAFETY-RELATED ☒YES ☐NO	IPTE ☐YES ☒NO
	TEMP ALT ☐YES ☒NO	

When you see these ***TRAPS***	Get these ***TOOLS***
Time Pressure	**Effective Communication**
Distraction/Interruption	**Questioning Attitude**
Multiple Tasks	**Placekeeping**
Over Confidence	**Self Check**
Vague or Interpretive Guidance	**Peer Check**
First Shift/Last Shift	**Knowledge**
Peer Pressure	**Procedures**
Change/Off Normal	**Job Briefing**
Physical Environment	**Coaching**
Mental Stress (Home or Work)	**Turnover**

VERIFIED BY	DATE	TIME

FORM TITLE:	FORM NO.	CHANGE NO.
VERIFICATION COVER SHEET	**1000.006A**	**050-00-0**

FIGURE 1
Saturation and Adequate SCM



RCS Pressure	Adequate SCM
>1000 psig	≥30°F
350 to 1000 psig	≥50°F
<350 psig	≥70°F

FIGURE 2
SG Pressure vs T-sat

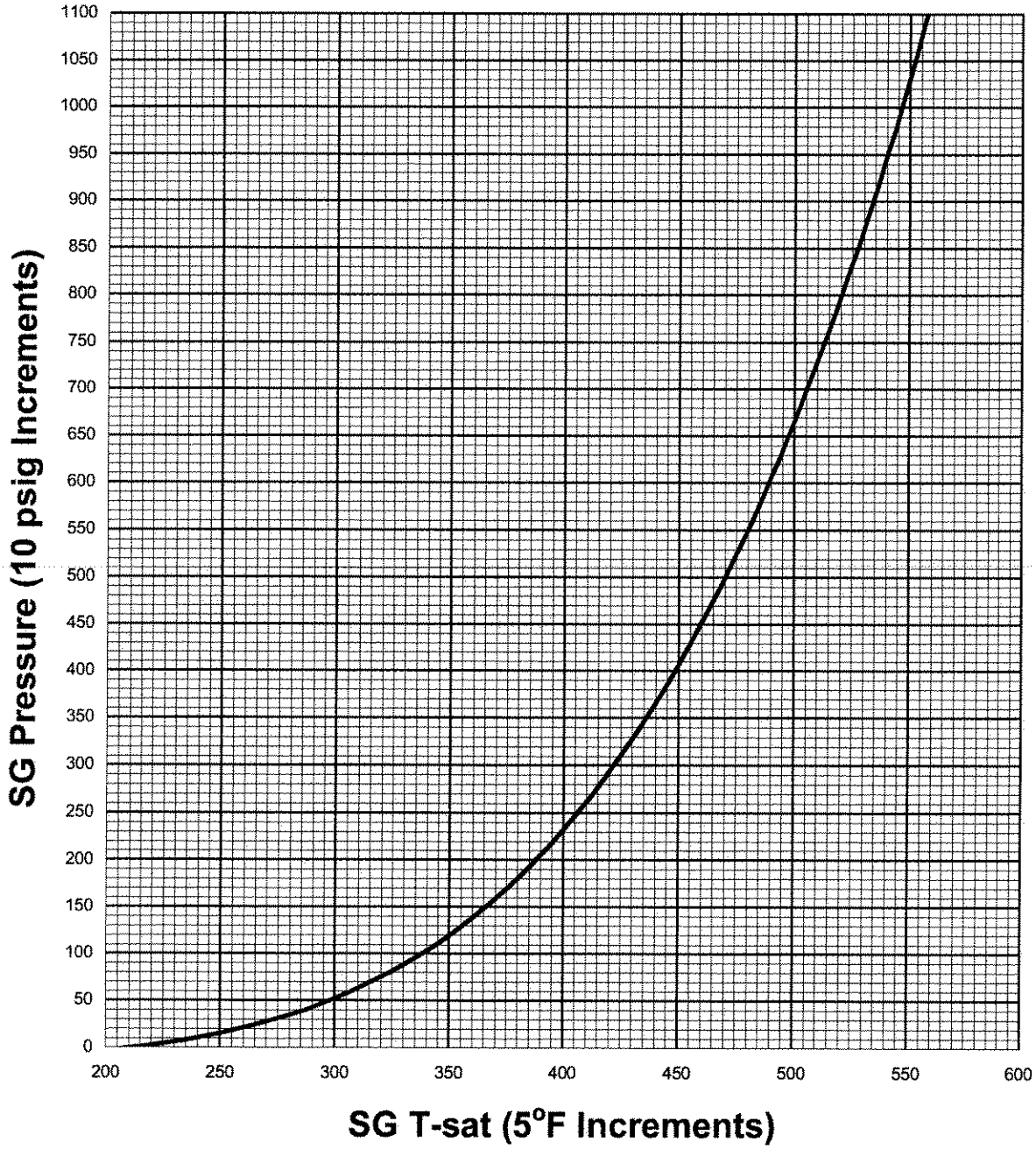


FIGURE 3
RCS Pressure vs Temperature Limits

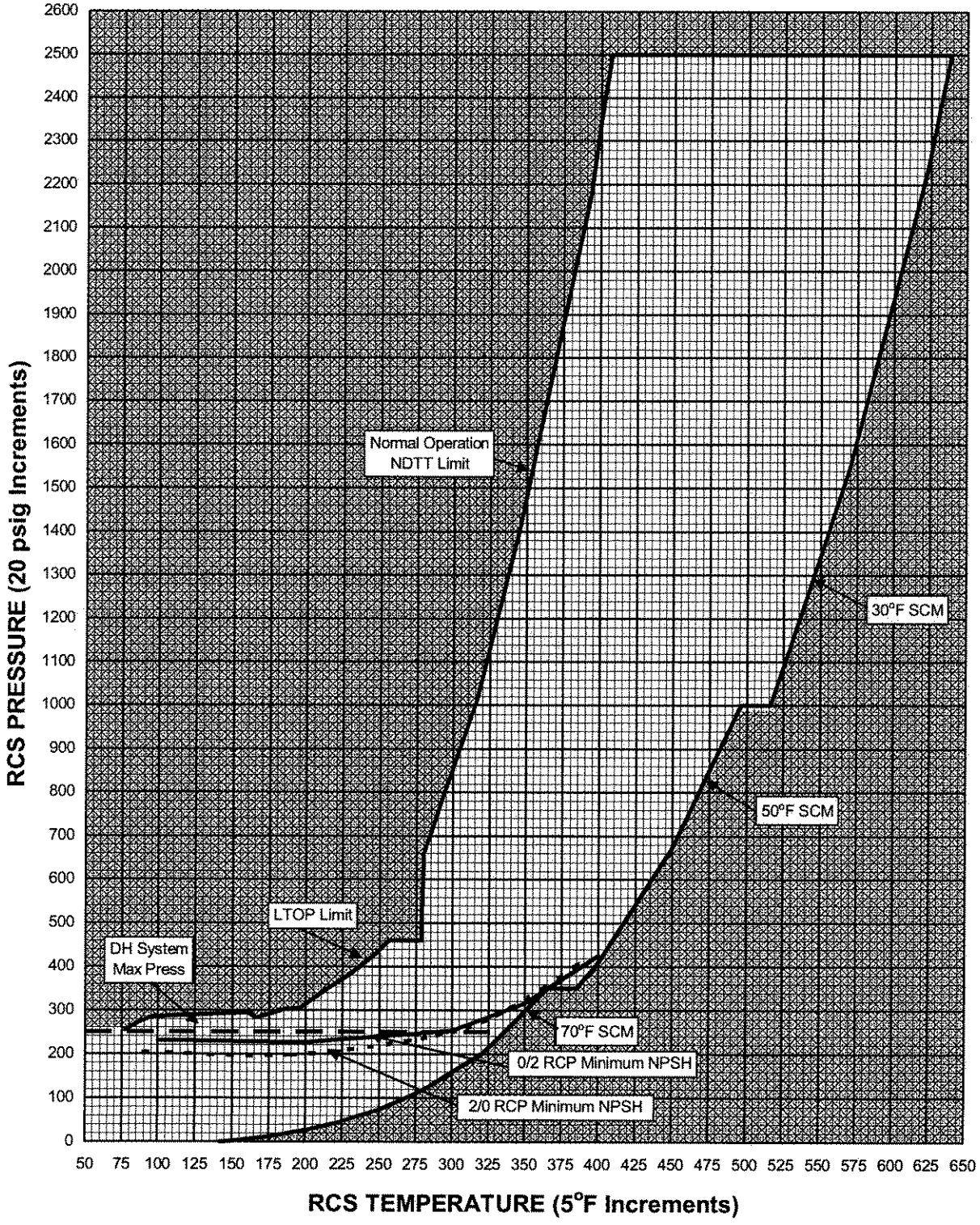


FIGURE 4
Core Exit Thermocouple for Inadequate Core Cooling

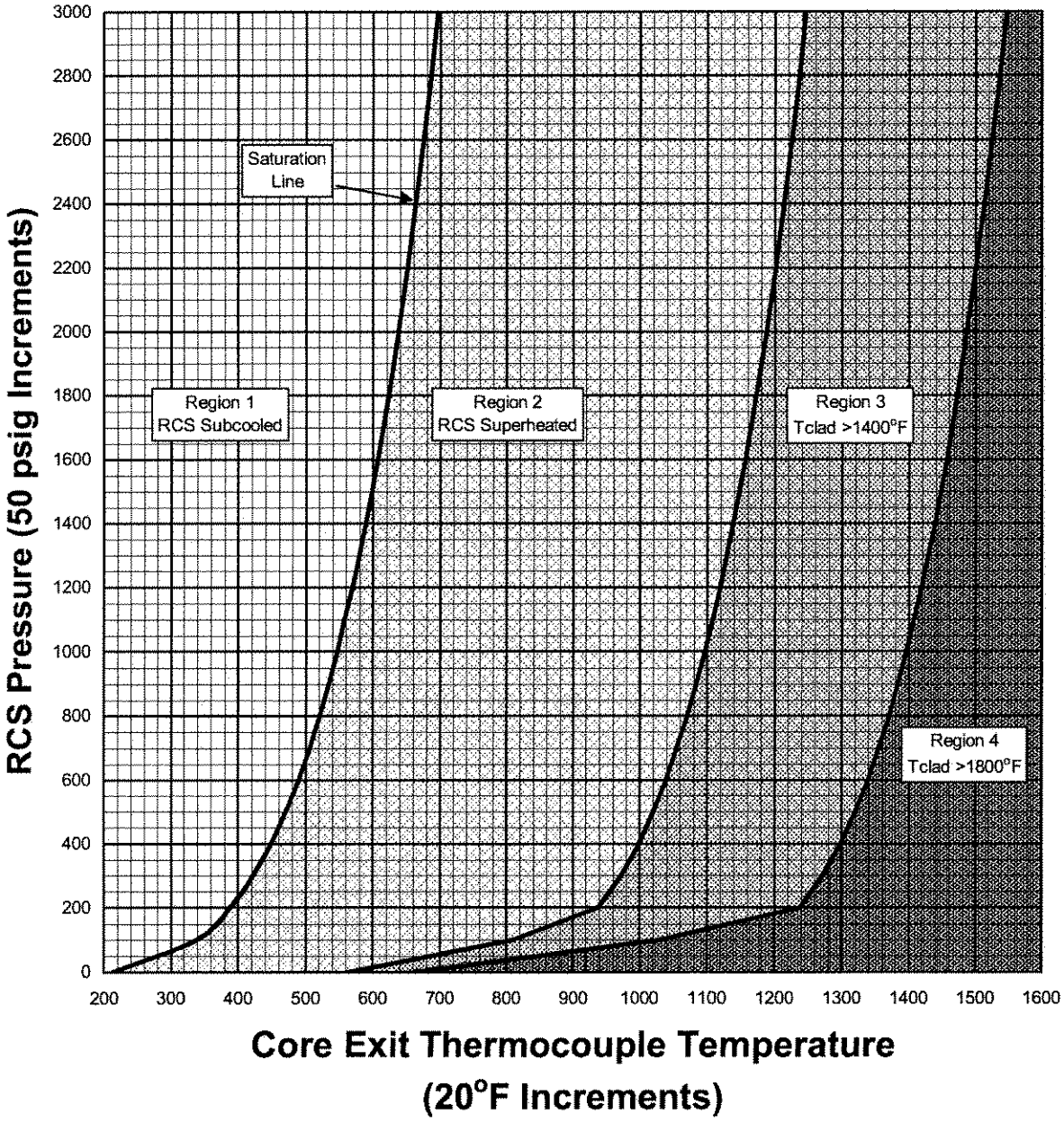


FIGURE 5

SG Pressure to Establish 40° to 60°F Primary to Secondary ΔT

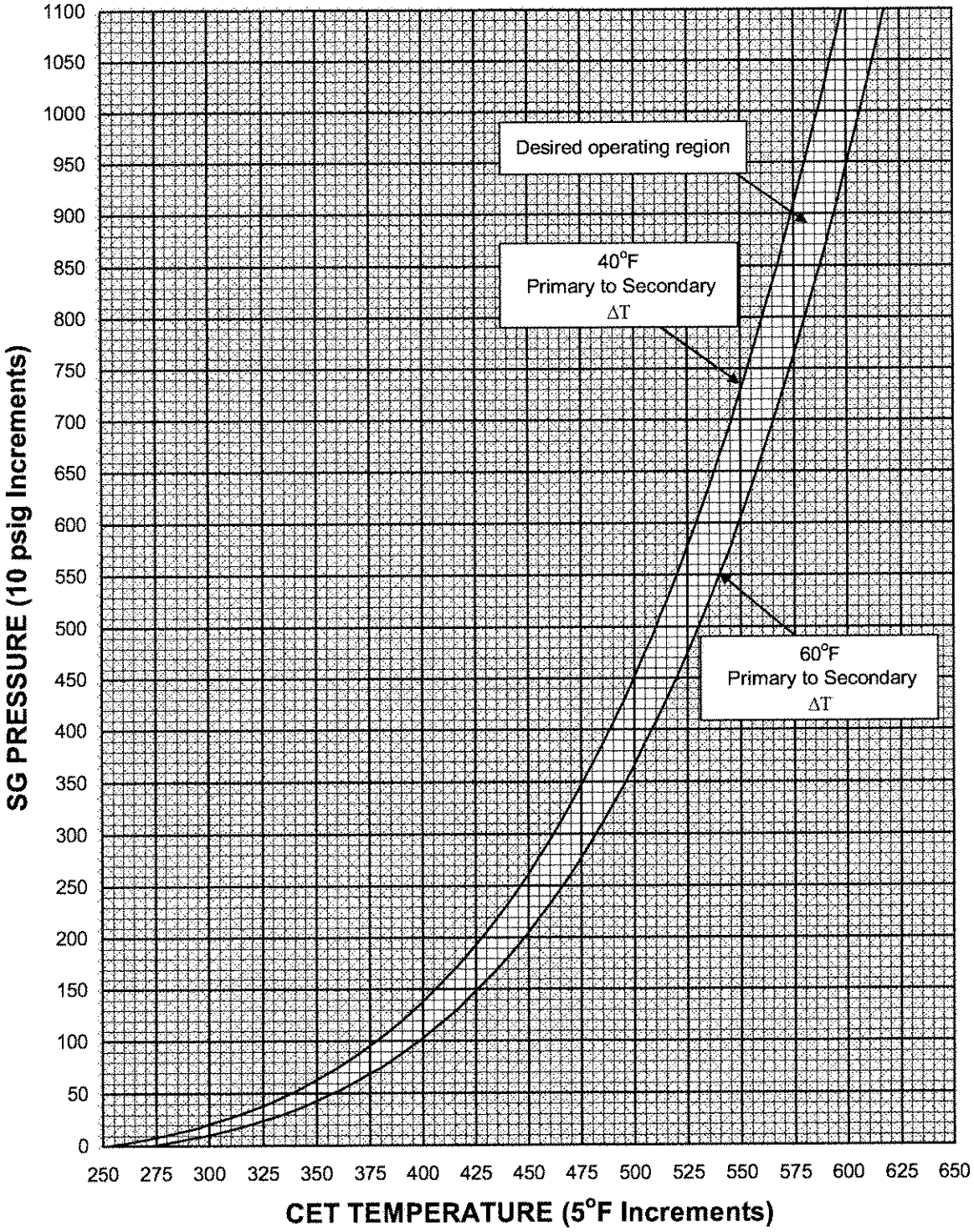
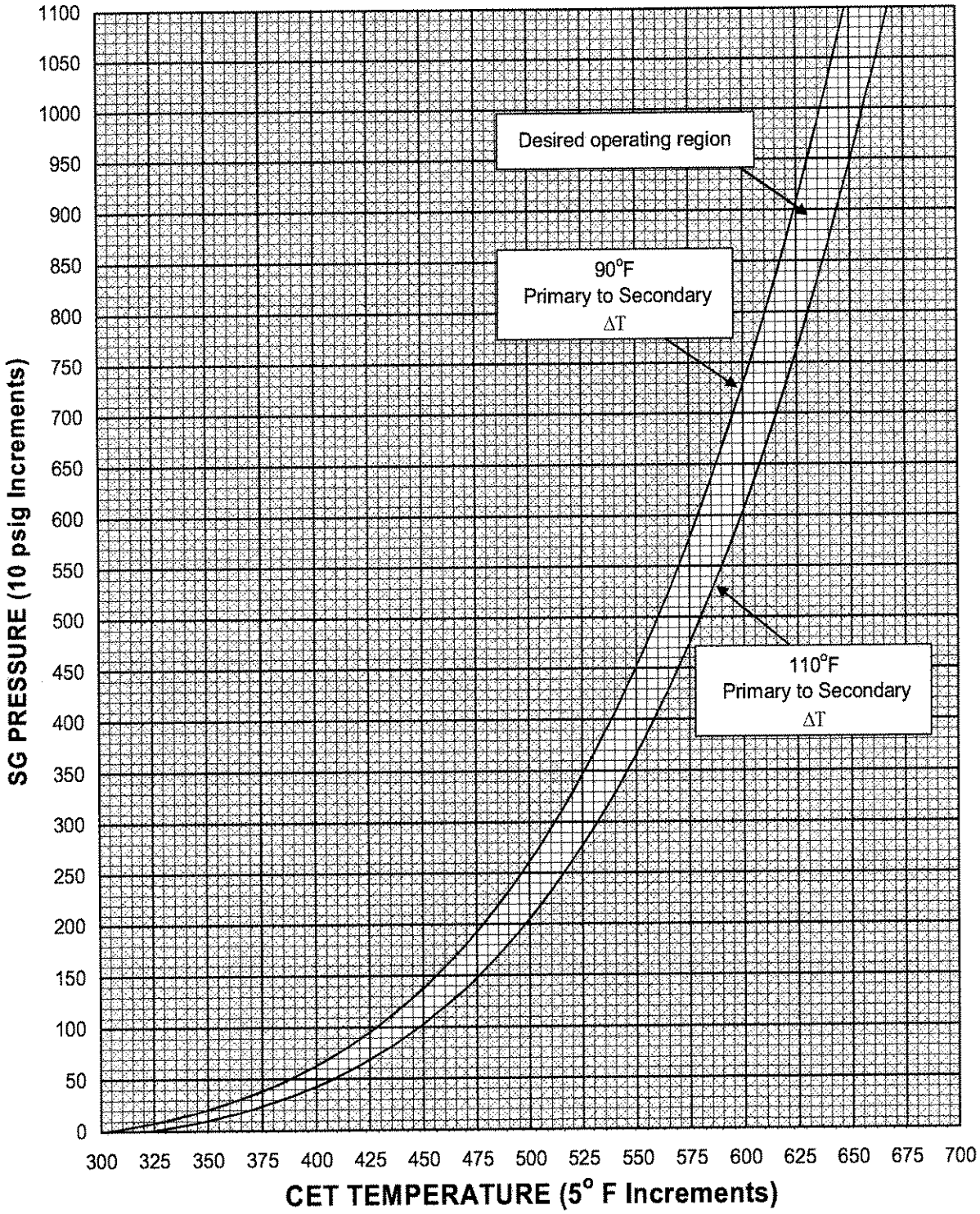


FIGURE 6

SG Pressure to Establish 90° to 110°F Primary to Secondary ΔT



ANO Unit 1 - 2005 RO NRC Written Exam KEY

Question No. 1 **QID: 0608** **Point Value: 1**

Answer:

A. Reactor trip causes a Generator Lockout which closes SU #1 feeder breakers as long as the SU #2 feeder breakers are open.

Question No. 2 **QID: 0324** **Point Value: 1**

Answer:

A. Cycle ERV as required to quickly and effectively control the pressure rise.

Question No. 3 **QID: 0368** **Point Value: 1**

Answer:

C. Verify Reflux Boiling setpoint is selected on both EFIC trains.

Question No. 4 **QID: 0198** **Point Value: 1**

Answer:

A. To ensure adequate NPSH for ECCS pumps.

Question No. 5 **QID: 0609** **Point Value: 1**

Answer:

C. Seal beedoff temperature 60°F above 1st stage seal temperature

Question No. 6 **QID: 0610** **Point Value: 1**

Answer:

D. Maintain RCS inventory.

Question No. 7 **QID: 0611** **Point Value: 1**

Answer:

B. Stop P-34A Decay Heat pump and close CV-1404.

ANO Unit 1 - 2005 RO NRC Written Exam KEY

Question No. 8 **QID: 0007** **Point Value: 1**

Answer:
c. 1717

Question No. 9 **QID: 0395** **Point Value: 1**

Answer:
b. To prevent the ERV opening, causing a rapid depressurization of the RCS.

Question No. 10 **QID: 0612** **Point Value: 1**

Answer:
A. T-hot indicates 485°

Question No. 11 **QID: 0551** **Point Value: 1**

Answer:
A. HPI on with all RCPs off

Question No. 12 **QID: 0552** **Point Value: 1**

Answer:
B. All 4160V busses de-energized

Question No. 13 **QID: 0553** **Point Value: 1**

Answer:
C. T-cold 545°F dropping slowly and SG pressures 990 psig dropping slowly.

Question No. 14 **QID: 0339** **Point Value: 1**

Answer:
b. de-energize RS-4.

ANO Unit 1 - 2005 RO NRC Written Exam KEY

Question No. 15 **QID: 0613** **Point Value: 1**

Answer:

A. Verify reactor is tripped due to loss of power to RCP underpower monitor circuit.

Question No. 16 **QID: 0554** **Point Value: 1**

Answer:

A. Establish SW slowly to prevent DH cooler water hammer.

Question No. 17 **QID: 0555** **Point Value: 1**

Answer:

D. Trip the reactor and go to 1202.001, Reactor Trip.

Question No. 18 **QID: 0614** **Point Value: 1**

Answer:

B. 60°F (tubes hotter)

Question No. 19 **QID: 0557** **Point Value: 1**

Answer:

B. In automatic, an asymmetric rod runback bypasses the group "in limit".

Question No. 20 **QID: 0495** **Point Value: 1**

Answer:

C. The maximum batch size setting and commence adding boric acid to the make up tank.

Question No. 21 **QID: 0216** **Point Value: 1**

Answer:

b. A high primary to secondary DP is increasing primary coolant loss.

ANO Unit 1 - 2005 RO NRC Written Exam KEY

Question No. 22 **QID: 0025** **Point Value: 1**

Answer:

a. Main Turbine Anticipatory trip.

Question No. 23 **QID: 0606** **Point Value: 1**

Answer:

C. RB Vent Header Isolation to T-17, CV-4804, closes to isolate any additions to system from RB vent header.

Question No. 24 **QID: 0558** **Point Value: 1**

Answer:

D. Motor driven EFW pump P-7B is initially used and then local control of steam driven EFW pump P-7A is established.

Question No. 25 **QID: 0162** **Point Value: 1**

Answer:

a. 360 MWe

Question No. 26 **QID: 0276** **Point Value: 1**

Answer:

a. Place EDG #1 output breaker in PULL-TO-LOCK and release.

Question No. 27 **QID: 0421** **Point Value: 1**

Answer:

a. Loss of Subcooling Margin (1202.002)

Question No. 28 **QID: 0615** **Point Value: 1**

Answer:

C. Non-nuclear ICW to RCP motor cooling flow is low.

ANO Unit 1 - 2005 RO NRC Written Exam KEY

Question No. 29 **QID: 0432** **Point Value: 1**

Answer:

B. PZR level will continue to rise during this event.

Question No. 30 **QID: 0091** **Point Value: 1**

Answer:

B. 50°F/hr

Question No. 31 **QID: 0560** **Point Value: 1**

Answer:

B. Cooler outlet valve shut, cooler bypass valve 75% open, injection block valve shut.

Question No. 32 **QID: 0197** **Point Value: 1**

Answer:

B. High N2 pressure could cause RCS inventory to be lost out of the break in the event of a LOCA.

Question No. 33 **QID: 0071** **Point Value: 1**

Answer:

B. Throttle "A" flow to within 20 gpm of "C"

Question No. 34 **QID: 0561** **Point Value: 1**

Answer:

D. Quench Tank pressure 3.5 psig after a 3 minute blow of the ERV.

Question No. 35 **QID: 0294** **Point Value: 1**

Answer:

b. Provide sufficient cooling-quench water during pressurizer operations.

ANO Unit 1 - 2005 RO NRC Written Exam KEY

Question No. 36 **QID: 0562** **Point Value: 1**

Answer:

B. P33A is powered from B-12 while P33B and P33C are powered from B-22.

Question No. 37 **QID: 0072** **Point Value: 1**

Answer:

d. Trip the reactor

Question No. 38 **QID: 0306** **Point Value: 1**

Answer:

D. Two Reactor Coolant Pumps trip at 100% power

Question No. 39 **QID: 0307** **Point Value: 1**

Answer:

a. One out-of-two

Question No. 40 **QID: 0266** **Point Value: 1**

Answer:

A. HPI pumps and LPI pumps

Question No. 41 **QID: 0564** **Point Value: 1**

Answer:

C. Raise RB Spray flow using DH-9, DH-10 Bypass valve.

Question No. 42 **QID: 0135** **Point Value: 1**

Answer:

c. ES channels 5 & 6, VSF-1A, 1B, 1C, & 1D running with service water aligned to the cooling coils.

ANO Unit 1 - 2005 RO NRC Written Exam KEY

Question No. 43 **QID: 0444** **Point Value: 1**

Answer:
c. 100% Cooling/200% Iodine

Question No. 44 **QID: 0314** **Point Value: 1**

Answer:
c. 1020 psig

Question No. 45 **QID: 0565** **Point Value: 1**

Answer:
B. Feedwater loop B demand is greater than feedwater loop A demand.

Question No. 46 **QID: 0195** **Point Value: 1**

Answer:
c. 'B' MFP Suction Pressure computer point (P2830)

Question No. 47 **QID: 0566** **Point Value: 1**

Answer:
C. To start EFW Pump P-7B.

Question No. 48 **QID: 0140** **Point Value: 1**

Answer:
A. Loss of Seal Injection, verify seal cooling is maintained

Question No. 49 **QID: 0616** **Point Value: 1**

Answer:
B. Startup #2 Transformer

ANO Unit 1 - 2005 RO NRC Written Exam KEY

Question No. 50 **QID: 0617** **Point Value: 1**

Answer:
D. Reactor would trip.

Question No. 51 **QID: 0568** **Point Value: 1**

Answer:
C. Five

Question No. 52 **QID: 0089** **Point Value: 1**

Answer:
A. Verify no flow on Discharge to Flume, FI-4642

Question No. 53 **QID: 0211** **Point Value: 1**

Answer:
d. Start P-4C, stop P-4B, swap P-4B MOD (A6) to the A3 supply and start P-4B.

Question No. 54 **QID: 0227** **Point Value: 1**

Answer:
b. Close Unit 1 to Unit 2 Instrument Air cross-connect.

Question No. 55 **QID: 0569** **Point Value: 1**

Answer:
B. Failure to perform a LLRT on emergency hatch within 7 days after opening.

Question No. 56 **QID: 0262** **Point Value: 1**

Answer:
d. Rods go full out, Tave goes down, power stays the same.

ANO Unit 1 - 2005 RO NRC Written Exam KEY

Question No. 57 **QID: 0604** **Point Value: 1**

Answer:
A Initiate HPI per RT-2.

Question No. 58 **QID: 0571** **Point Value: 1**

Answer:
C. ICS would insert control rods and raise feedwater.

Question No. 59 **QID: 0572** **Point Value: 1**

Answer:
C. Neither ICCMDS train's mimic display or local displays are updating.

Question No. 60 **QID: 0573** **Point Value: 1**

Answer:
B. Taking a suction on the Fuel Transfer Canal, through the purification loop and then discharging to the DHR system.

Question No. 61 **QID: 0201** **Point Value: 1**

Answer:
c. 300-340 inches.

Question No. 62 **QID: 0574** **Point Value: 1**

Answer:
B. ~18%

Question No. 63 **QID: 0575** **Point Value: 1**

Answer:
C. 995 psig and 547°F

ANO Unit 1 - 2005 RO NRC Written Exam KEY

Question No. 64 **QID: 0196** **Point Value: 1**

Answer:

c. A high radiation setpoint has been exceeded on SPING 1.

Question No. 65 **QID: 0619** **Point Value: 1**

Answer:

D. Manually operate the Operate switch for the Cable Spreading Room on C463.

Question No. 66 **QID: 0620** **Point Value: 1**

Answer:

C. Less than or equal to 240 °F/hour

Question No. 67 **QID: 0079** **Point Value: 1**

Answer:

d. Open RB purge outlets first, then open inlets.

Question No. 68 **QID: 0576** **Point Value: 1**

Answer:

B. RCS temperature is between 200 °F and 280 °F

Question No. 69 **QID: 0116** **Point Value: 1**

Answer:

c. plus or minus 0.5% delta k/k
control rods to achieve 1.5% SD margin
verify calculation

Question No. 70 **QID: 0621** **Point Value: 1**

Answer:

B. Verifier

Question No. 71 **QID: 0390** **Point Value: 1**

Answer:
d. Sequence inhibit.

Question No. 72 **QID: 0605** **Point Value: 1**

Answer:
C. Individual's supervisor recommends, RP Manager approves, and Plant General Manager concurs

Question No. 73 **QID: 0579** **Point Value: 1**

Answer:
C. Aligning HPI to provide PZR Aux Spray

Question No. 74 **QID: 0580** **Point Value: 1**

Answer:
D. RCS Tavg

Question No. 75 **QID: 0128** **Point Value: 1**

Answer:
A. RCS leakage indicates greater than 50 gpm.

U.S. Nuclear Regulatory Commission

Site-Specific SRO Written Examination

Applicant Information	
Name:	
Date: 9/9/2005	Facility/Unit: Arkansas Nuclear One Unit 1
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 your 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	_75_ / _25_ / _100_ Points
Applicant's Scores	_____ / _____ / _____ Points
Applicant's Grade	_____ / _____ / _____ Percent

ANO Unit 1 - 2005 RO NRC Written Examination

Question No. 1 **QID: 0608**

With the plant at 100% power, what is the relationship between a Reactor Trip signal and the closing of the SU #1 feeder breakers for the A1/A2 and H1/H2 buses?

A. Reactor trip causes a Generator Lockout which closes SU #1 feeder breakers as long as the SU #2 feeder breakers are open.

B. Reactor trip confirm signal opens the Unit Aux. feeder breakers, the SU #1 feeder breakers close because the Unit Aux. breakers are open.

C. Reactor trip causes a Unit Aux Lockout which opens the Unit Aux. feeder breakers, the SU #1feeder breakers close due to undervoltage on the buses.

D. Reactor trip confirm signal closes the SU #1 feeder breakers, with both feeder breakers closed simultaneously the Unit Aux. feeder breakers will open after a short time delay.

Question No. 2 **QID: 0324**

Given:

- ESAS actuated on low RCS pressure.
- RCS Tave 560 °F and stable
- Pressurizer level off-scale high
- RCS pressure 1400 psig and rising rapidly
- RB sump level 55% and rising
- Fuel failure of 1% is indicated

Considering the above conditions, which of the following methods, and reason behind the method, will be used to mitigate the RCS pressure transient in accordance with RT-14?

A. Cycle ERV as required to quickly and effectively control the pressure rise.

B. Raise PZR spray to condense steam in PZR vapor space.

C. Throttle HPI flow to reduce input of mass into RCS and match RCS leakage.

D. Raise letdown flow to lower RCS mass and reduce pressure.

Question No. 3 **QID: 0368**

A reactor trip has occurred from 100% power.

The following conditions have existed for three minutes:

- RCS temperature = 590 degrees F.
- RCS pressure = 1700 psig.

Which of the following operator actions will be performed?

A. Trip all running RCPs.

B. Verify EFW flow to each Steam Generator is ~320 gpm.

C. Verify Reflux Boiling setpoint is selected on both EFIC trains.

D. Go to Overheating EOP, 1202.004.

Question No. 4 **QID: 0198**

Given:
- A large break LOCA has occurred.
- Offsite power has been lost.

Why must Reactor Building Spray flow be throttled to 1050-1200 gpm prior to transferring to Reactor Building sump suction?

A. To ensure adequate NPSH for ECCS pumps.

B. To prevent pump runout on the Spray pumps.

C. To lower load on the EDGs.

D. To limit corrosion of reactor building equipment.

Question No. 5 **QID: 0609**

Which of the following is a condition that requires stopping of a Reactor Coolant Pump?

A. Seal cavity pressures oscillating >600 psi peak to peak

B. Seal bleedoff temperature 160°F

C. Seal beedoff temperature 60°F above 1st stage seal temperature

D. Failure of one stage as indicated by zero stage DP

Question No. 6 **QID: 0610**

Given:

- Plant at 100% power.
- Makeup pump P-36B has tripped.

Why does the AOP isolate Letdown for these conditions?

A. Prevent overheating of the Letdown Demeralizers.

B. Prevent emptying the Makeup Tank.

C. Reduce heat load on Nuclear ICW system.

D. Maintain RCS inventory.

Question No. 7 **QID: 0611**

Given:

- Plant is in Mode 5.
- "A" Decay Heat Removal system is in service.
- RB sump level 40% and rising.

Annunciators K09-C7 "TRAIN A RCS LEVEL LO" and K09-D7 "TRAIN B RCS LEVEL LO" alarm.

Which of the following actions should be performed?

A. Start P-34B Decay Heat pump and secure P-34A.

B. Stop P-34A Decay Heat pump and close CV-1404.

C. Stop P-34A Decay Heat pump and close CV-1434.

D. Fill RCS by starting P-34B using LPI flowpath.

Question No. 8 **QID: 0007**

The plant is operating at 100% power and "A" RCP experiences a simultaneous loss of seal cooling and seal injection flow.
This occurred at 1715.
Attempts to restore seal cooling and/or seal injection flow to the pump are unsuccessful.

The AOP specifies a time limit to take action with this RCP to prevent damage to the RCP seal due to overheating.

What is the LATEST time at which action should be taken per the AOP?

A. 1719

b. 1718

c. 1717

d. 1716

Question No. 9 **QID: 0395**

The plant is shutdown and cooled down.
RCS pressure is 220 psig.
I&C is performing calibration checks on "A" RPS channel.

Why will I&C request the Pzr Control Pressure Selector, HS-1038, be placed in the "Y" position?

a. To allow remote indications to be checked during calibration.

b. To prevent the ERV opening, causing a rapid depressurization of the RCS.

c. To maintain pressurizer heaters off during testing.

d. To allow the ERV low setpoint to be checked.

Question No. 10 **QID: 0612**

Given:
- A tube rupture has occurred on the "A" SG.
- Reactor has been tripped and cooldown started.

In accordance with the Tube Rupture EOP, which of the following parameters indicates that it is permissible to isolate the bad SG?

A. T-hot indicates 485°F

B. CETs indicate 495°F

C. T-hot indicates 505°F

D. CETs indicate 510°F

Question No. 11 **QID: 0551**

Which of the following would invoke Pressurized Thermal Shock (PTS) limits during a Steam Line Rupture?

A. HPI on with all RCPs off

B. RCS cooldown rate 110°F/hr with Tcold 360°F

C. RCS cooldown rate 75°F/hr with Tcold 310°F

D. SG Tube to shell DT 150°F tubes colder

Question No. 12 **QID: 0552**

Which of the following would cause entry into 1202.008, Blackout?

A. All 6900V busses de-energized, 4160V busses A1 and A2 de-energized

B. All 4160V busses de-energized

C. All 6900V busses de-energized, all 4160V busses de-energized except A4 bus

D. All 6900V busses de-energized

Question No. 13 **QID: 0553**

A Degraded Power event occurred.
Both EDG's are supplying associated ES buses.
You are directed to actuate MSLI for both SGs and verify proper EFW actuation and control per RT-6.

Which of the following would be a verification of primary to secondary heat transfer per RT-6?

A. Core exit temperature 600 °F and rising slowly.

B. T-hot/T-cold delta T 55°F and rising slowly.

C. T-cold 545°F dropping slowly and SG pressures 990 psig dropping slowly.

D. Core exit temperature 595 °F rising slowly with T-hot 580°F dropping slowly.

Question No. 14 **QID: 0339**

Inverters are aligned with Y-25 supplying RS-4 and Y-22 supplying RS-2.
Shifting the manual output transfer switch (S-2) on the Y-25 inverter to the "System Output To Y-22" position would:

a. power RS-2 from Y-25.

b. de-energize RS-4.

c. parallel RS-2 and RS-4.

d. damage the Y-25 inverter.

Question No. 15 **QID: 0613**

Given:

- Plant is at 100% power,
- D02 Undervoltage (K01-A8),
- D02 Trouble (K01-D8),
- Loss of breaker position indicator lights for plant buses on right side of C10.

Which action, with the correct reason for the action, should be performed?

A. Verify reactor is tripped due to loss of power to RCP underpower monitor circuit.

B. Trip the Generator Output Breakers to prevent the Main Generator from motoring.

C. Verify #2 EDG has automatically started and tied on to A4 ES bus due to undervoltage.

D. Line up Battery Charger D04A or D04B to the D02 Bus to restore DC power.

Question No. 16 **QID: 0554**

Plant heat up is in progress with RCS temperature at 215 degrees F.
Service water is lost to the in-service DH cooler.

What action is required during the re-establishment of SW flow through the DH cooler and why?

A. Establish SW slowly to prevent DH cooler water hammer.

B. Establish SW slowly to prevent SW pump runout.

C. Establish SW slowly to prevent DH cooler thermal shock.

D. Establish SW quickly to prevent RCS heat up.

Question No. 17 **QID: 0555**

A Loss of Instrument Air pressure has occurred.
Suddenly Instrument Air pressure quickly degrades to 35 psig.

Which of the following actions should be taken?

A. Open the Unit One to Unit Two Instrument Air Cross-connect.

B. Shutdown at greater than or equal to 10%/min. per 1203.045, Rapid Plant Shutdown.

C. Shutdown at greater than or equal to 5%/min. per 1203.045, Rapid Plant Shutdown.

D. Trip the reactor and go to 1202.001, Reactor Trip.

Question No. 18 **QID: 0614**

An Overheating event is in progress.
Subcooling margin remains adequate.

The running RCP should be tripped when tube to shell delta T reaches:

A. 40°F (tubes hotter)

B. 60°F (tubes hotter)

C. 40°F (tubes colder)

D. 60°F (tubes colder)

Question No. 19 **QID: 0557**

Given:
- The CRD system is in automatic and the plant is at 100% power.
- A dropped rod in Group 7 results in an asymmetric rod runback.

Group 7 rods will drive "in" when a Group 7 "in limit" is ON because:

A. In automatic, a Group 7 "out limit" bypasses the "in limit".

B. In automatic, an asymmetric rod runback bypasses the group "in limit".

C. The dropped rod's relative position is aligned with the group.

D. The "in limit" is only functional when the Diamond is in manual.

Question No. 20 **QID: 0495**

Given:

- Reactor is tripped from 100% power
- Four CRDM's fail to insert according to indications in the control room
- The CRS directs you to initiate Emergency Boration in accordance with RT-12 "Emergency Boration"

You should set the INITIAL batch setting of the boric acid controller to:

A. The batch size required to maintain make up tank level between 55 and 86 inches while maintaining pressurizer level >100 inches.

B. The batch size required in order to obtain a shutdown margin of 1.5% delta K/K as determined by a reactivity balance calculation.

C. The maximum batch size setting and commence adding boric acid to the make up tank.

D. The batch size determined by the plant computer boron program to offset the reactivity worth of the four stuck rods.

Question No. 21 **QID: 0216**

Given:

- A 15 gpm Steam Generator tube leak cooldown is in progress.
- Normal cooldown limits are being used with the good OTSG.
- RCS pressure is 1000 psig, Tave is 405°F.

The CBOR is maintaining the RCS at about 140°F subcooled.

Why are the CBOR's actions incorrect for this accident?

a. Tube to shell Delta T limits are being exceeded.

b. A high primary to secondary Delta P is increasing primary coolant loss.

c. Excessive thermal stresses are being imposed on the Rx vessel.

d. Overfill could cause the ruptured SG main steam safeties to lift.

Question No. 22 **QID: 0025**

The following plant conditions existed just prior to an automatic reactor trip:

- Reactor power at 50%
- Loss of Bus H-1 due to an electrical fault
- "B" Main Feedwater Pump tripped
- Condenser vacuum at 23.5 inches Hg
- RCS pressure at 1950 psig

Which of the following was the cause of the automatic reactor trip?

a. Main Turbine Anticipatory trip.

b. Power to Pumps trip.

c. Variable Low Pressure trip.

d. Main Feedwater Anticipatory trip.

Question No. 23 **QID: 0606**

Which of the following actions with reasons will NOT occur if Gaseous Radwaste radiation monitor, RE-4830, is in a high alarm condition?

A. Gaseous Radwaste Discharge Isolation valve, CV-4830, closes to isolate any releases from the Aux. Bldg. vent header.

B. Gaseous Radwaste Discharge Flow Control valve, CV-4820, closes to isolate any Decay Tank release in progress.

C. RB Vent Header Isolation to T-17, CV-4804, closes to isolate any additions to system from RB vent header.

D. AB Vent Header Diversion to T-17 valve, CV-4806, opens to send Decay Tank release back to surge tank.

Question No. 24 **QID: 0558**

Given:
- An immediate Control Room evacuation is in progress due to a fire in the Cable Spreading Room.
- All Control Room actions have been completed.
- It is approximately 40 minutes into the event.

How is feedwater being supplied to the OTSGs?

A. Motor driven EFW pump P-7B is initially used and then automatic control of steam driven EFW pump P-7A is established.

B. Steam driven EFW pump P-7A with automatic control of P-7A flow control valves.

C. Motor driven EFW pump P-7B with automatic control of P-7B flow control valves.

D. Motor driven EFW pump P-7B is initially used and then local control of steam driven EFW pump P-7A is established.

Question No. 25 **QID: 0162**

Reactor power is 90% and generated megawatts is 800. After a runback for loss of one main feedwater pump, the ICS should stabilize the plant at _____.

A. 360 Mwe

b. 340 Mwe

c. 45% Reactor Power

d. 50% Reactor Power

Question No. 26 **QID: 0276**

Given:

- A loss of offsite power has occurred.
- Annunciator K01-B1, "EDG 1 BRKR AUTO CLOSE FAILURE", is in alarm.

What action will close EDG #1 output breaker (A-308)?

a. Place EDG #1 output breaker in PULL-TO-LOCK and release.

b. Depress EDG #1 start push-button.

c. Reset A1 Lockout relay.

d. Place EDG #1 output breaker handswitch on C-10 in the CLOSE position.

Question No. 27 **QID: 0421**

Given a Rx trip has occurred and one minute later the following conditions are observed:

- RCS pressure is stable 1700 psig.
- CET average temperature is 600 degrees F.

Which Emergency Operating Procedure contains mitigating actions for this event?

a. Loss of Subcooling Margin (1202.002)

b. ESAS (1202.010)

c. Overheating (1202.004)

d. Inadequate Core Cooling (1202.005)

Question No. 28 **QID: 0615**

Given:
- Plant heatup in progress from refueling outage.
- P-32B, P-32C, P-32D RCPs are running.
- Seal injection flow has been balanced and is in auto at 16 gpm total flow.
- Non-nuclear ICW to RCP motor cooling flow is 245 gpm.
- Nuclear ICW to RCP seal cooling flow is 35 gpm.
- RCS loop A & B cold leg temps are 380°F.

A start of RCP P-32A is attempted but is unsuccessful. Why?

A. Nuclear ICW to RCP seal cooling flow is low.

B. Seal injection flow is low.

C. Non-nuclear ICW to RCP motor cooling flow is low.

D. RCS cold leg temps are low.

Question No. 29 **QID: 0432**

Unit One is operating at 100% power.
An ICW problem causes Letdown temperature to rise to 148°F.

What is the effect on the Pressurizer level control system during this transient?

A. PZR level will continue to drop during this event.

B. PZR level will continue to rise during this event.

C. Makeup flow will rise and restore Pressurizer level to setpoint.

D. Makeup flow will drop and restore Pressurizer level to setpoint.

Question No. 30 **QID: 0091**

Given:

- Plant cooldown in progress
- "A" DH Removal pump in service
- "A" and "C" RCPs running

What is the maximum allowable cooldown rate in this condition?

A. 25°F/hr

B. 50°F/hr

C. 75°F/hr

D. 100°F/hr

Question No. 31 **QID: 0560**

Given the following plant conditions:

---Plant is in Mode 5.

---RCS temperature 180 degrees F.

---RCS pressure 30 psig.

Identify the correct valve alignment for starting a Decay Heat pump:

A. Cooler outlet valve 50% open, cooler bypass valve shut, injection block valve 100% open.

B. Cooler outlet valve shut, cooler bypass valve 75% open, injection block valve shut.

C. Cooler outlet valve shut, cooler bypass valve 75% open, injection block valve 100% open.

D. Cooler outlet valve 50% open, cooler bypass valve shut, injection block valve 50% open.

Question No. 32 **QID: 0197**

The plant is operating at 100% power. The Core Flood system is properly aligned with the following CFT parameters:

T-2A level	- 12.9 feet	T-2B level	- 13.1 feet
T-2A pressure	- 632 psig	T-2B pressure	- 615 psig

The Core Flood system parameters are unacceptable because:

A. Levels may preclude having sufficient N2 volume to fully inject the CFT contents into the vessel.

B. High N2 pressure could cause RCS inventory to be lost out of the break in the event of a LOCA.

C. Levels may not be sufficient to reflood the vessel following a LOCA.

D. N2 pressure may not be sufficient to fully inject the CFT contents into the vessel during a LOCA.

Question No. 33 **QID: 0071**

Given:

- HPI pump P-36B out of service
- LOCA in progress
- RCS pressure 1425 psig and dropping slowly
- 4160v bus A4 de-energized
- HPI flows: A = 190 gpm
  B = 100 gpm
  C = 105 gpm
  D = 90 gpm

Which of the following actions is required?

A. Throttle all to within 20 gpm of each other

B. Throttle "A" flow to within 20 gpm of "C"

C. Throttle "A" flow to within 20 gpm of "D"

D. Throttle "A flow to within 20 gpm of "B"

Question No. 34 **QID: 0561**

A plant startup is in progress with a steam bubble being drawn in the Pressurizer.
- Initial Quench Tank pressure is 3 psig.
- RCS pressure 65 psig.
- Pressurizer temperature 312°F.

Which of the following assures that venting and steam bubble formation is complete in the Pressurizer?

A. Quench Tank pressure 7.6 psig after a 3 minute blow of the ERV.

B. Quench Tank pressure 6.2 psig after a 3 minute blow of the ERV.

C. Quench Tank pressure 4.8 psig after a 3 minute blow of the ERV.

D. Quench Tank pressure 3.5 psig after a 3 minute blow of the ERV.

Question No. 35 **QID: 0294**

Why is a minimum water level maintained in the Quench Tank?

a. Ensure adequate NPSH for the transfer pump.

b. Provide sufficient cooling-quench water during pressurizer operations.

c. Maintain a reference water level for level indication.

d. Maintain a loop seal on the relief lines.

Question No. 36 **QID: 0562**

Which of the following identifies the correct power supplies to the Intermediate Cooling Water Pumps (P-33A, P-33B, P-33C)?

A. P33A and P33B are powered from B-12 while P33C is powered from B-22.

B. P33A is powered from B-12 while P33B and P33C are powered from B-22.

C. P33A, P33B and P33C are powered from B-12, B-22 and B32 respectively.

D. P33A, P33B and P33C are powered from B-11, B-12 and B-13 respectively.

Question No. 37 **QID: 0072**

Given:

- RCS pressure 1950 psig and decreasing
- "RELIEF VALVE OPEN", K09-A1, in alarm
- ERV indicates closed
- Acoustic monitor indicates ERV is leaking

You immediately close ERV Isolation valve, CV-1000.
RCS pressure continues to drop with all PZR heaters ON.

What should your next action be?

a. Begin plant runback

b. Cycle the ERV

c. Initiate full HPI

d. Trip the reactor

Question No. 38 **QID: 0306**

Which of the following conditions would result in the Reactor Protection System initiating a reactor trip designed to protect the fuel clad from DNB?

A. Ejected rod accident during startup

B. Loss of both Main Feedwater Pumps at 100 % power

C. Boron dilution accident while operating at 100% power

D. Two Reactor Coolant Pumps trip at 100% power

Question No. 39 **QID: 0307**

Given:

- Plant is at 100% power.
- "B" Reactor Protection System channel is inoperable due to NI-6 failed high.
- A surveillance test on "D" Reactor Protection System channel is in progress.

What is the Reactor Protection System bistable trip logic under these conditions?

a. One out-of-two

b. One out-of-three

c. Two out-of-two

d. Two out-of-four

Question No. 40 **QID: 0266**

Given:

- All controls are in automatic
- RCS pressure 135 psig, slowly dropping
- Reactor Building pressure is 28 psia
- "A" and "B" OTSG levels at 415 inches

Which pair of pumps should be pumping fluid as designed (not recircing)?

A. HPI pumps and LPI pumps

B. RB spray pumps and LPI pumps

C. RB spray pumps and EFW pumps

D. HPI pumps and EFW pumps

Question No. 41 **QID: 0564**

Given:

- Plant is in cold shutdown.
- All necessary components have been aligned per 1305.006, Integrated ES System Test.
- All ES EVEN Digital Channels actuated per procedure using RB pressure transmitters.
- Annunciator "RB SPRAY P35B ES FAILURE" K11-C7 is in alarm.

Which of the following is a proper response to this alarm (K11-C7)?

A. No response required, the Spray pump breaker is racked down for this test.

B. Raise RB Spray flow using CV-2400, RB Spray Block valve.

C. Raise RB Spray flow using DH-9, DH-10 Bypass valve.

D. No response needed, expected alarm due to no flow through the flow transmitter.

Question No. 42 **QID: 0135**

A LOCA has occurred.
Reactor Building (RB) pressure is 47 psia.

Which ESAS channels have actuated the RB cooling units and what is the correct RB cooling alignment?

A. ES channels 3 & 4, VSF-1A, 1B, 1C, & 1D running with service water aligned to the cooling coils.

B. ES channels 3 & 4, VSF-1A, 1B, 1C, 1D, & 1E running with chilled water aligned to the cooling coils.

C. ES channels 5 & 6, VSF-1A, 1B, 1C, & 1D running with service water aligned to the cooling coils.

D. ES channels 5 & 6, VSF-1A, 1B, 1C, 1D, & 1E running with chilled water aligned to the cooling coils.

Question No. 43 **QID: 0444**

In post accident conditions, the RB Spray System (both trains) will provide what percentage of the required RB cooling and iodine removal?

a. 100% Cooling/100% Iodine

b. 200% Cooling/100% Iodine

c. 100% Cooling/200% Iodine

d. 200% Cooling/200% Iodine

Question No. 44 **QID: 0314**

Given:

- A loss of offsite power
- No failures exist other than those which caused the loss of offsite power condition
- EDG's supplying vital buses

Ten (10) minutes into this event, what pressure are the OTSG's designed to be controlled at?

a. 895 psig

b. 995 psig

c. 1020 psig

d. 1050 psig

Question No. 45 **QID: 0565**

Given:

- 100% power
- ICS in full automatic

The CBOR places the ICS Delta T-Cold Hand Auto Station meter selection switch in "POS" (position). The meter reads 46%.

What does this mean in terms of ICS control of main feed water?

A. The average of feedwater loop A and feedwater loop B demand is 46%.

B. Feedwater loop B demand is greater than feedwater loop A demand.

C. The feedwater loop A demand is being boosted by a 4 °F Delta T-Cold error.

D. Feedwater loop A demand is greater than feedwater loop B demand.

Question No. 46 **QID: 0195**

Unit 1 is operating at 100% power with no abnormal conditions or alignments.
'B' MFP SUCT PRESS LO (K07-C8) annunciator is received.

Where can the Control Room Operators read the 'B' MFW pump suction pressure WITHOUT leaving the control room?

a. The 'B' MFP Lovejoy Operator Control Station (OCS).

b. 'B' MFP Suction Pressure (PI-2830) indicator.

c. 'B' MFP Suction Pressure computer point (P2830)

d. The Operator Information Touchscreen (OIT).

Question No. 47 **QID: 0566**

Given:
- A Degraded Power condition exists on both units.
- #1 EDG did not start.
- P-7A tripped and will not reset.

Why does the EOP direct cross-tieing of the A3 and A4 buses?

A. To run two HPI pumps for HPI cooling per RT-4.

B. To have atmospheric dump control on both SGs.

C. To start EFW Pump P-7B.

D. To restore Instrument Air for ADV control.

Question No. 48 **QID: 0140**

Initial conditions:

- 100% power
- P-36C is the operating makeup pump
- ICW pumps P-33A and P-33C in service

What RCP support system would be most affected by a loss of bus A4 and which procedural actions are used to mitigate the loss of this support system?

A. Loss of Seal Injection, verify seal cooling is maintained.

B. Loss of RCP Motor Cooling, trip reactor and trip all RCPs.

C. Normal Seal Bleedoff flowpath isolated, open alternate bleedoff path to Quench Tank.

D. Loss of AC Oil Lift pumps, verify emergency DC lift pumps start.

Question No. 49 **QID: 0616**

The CBOT notices on C10 that all of the 161 KV ring bus breakers have opened.

Which of the following will be de-energized as a result of the above indications?

A. Startup #1 Transformer

B. Startup #2 Transformer

C. Auto transformer

D. Startup #3 Transformer

Question No. 50 **QID: 0617**

Given:

-The plant is at 55% power.
- RCP P-32A is stopped for maintenance.

What would be the effect if DC panel RA-1 were de-energized?

A. ICS runback to 45% power.

B. RPS Channel "A" would trip.

C. P-32A could not be re-started.

D. Reactor would trip.

Question No. 51 **QID: 0568**

Given:

- #1 EDG has one Air Start Compressor and it's associated Air Receiver Tanks tagged out.
- The remaining Air Start Compressor on #1 EDG trips while running.
- The Air Receiver Tanks' pressure is 176 psig.

What is the maximum number of start attempts assured with the above #1 EDG conditions?

A. One

B. Three

C. Five

D. Seven

Question No. 52 **QID: 0089**

Given:

- Treated Waste Monitor Tank, T16A, release in progress
- "PROC MONITOR RADIATION HIGH", K10-B2, in alarm
- Liquid Radwaste Process Monitor, RI-4642, in alarm

What should your FIRST action be?

A. Verify no flow on Discharge to Flume, FI-4642.

B. Trip the running Radwaste Transfer pump, P-53A/B.

C. Close Liquid Waste to Flume valve, CV-4642.

D. Verify proper setting on RI-4642 per the release permit.

Question No. 53 **QID: 0211**

Given:

- The unit is operating at 100% power.
- Service water pumps P-4A and P-4B are in service.
- A loss of P-4A occurs.

What is required of the operator to restore service water to the required Technical Specifications configuration?
(Note: Actions must be performed in correct sequence.)

a. Swap P-4B MOD (A6) to the A3 supply and start P-4C.

b. Start P-4C, stop P-4B, swap P-4B MOD (A6) to the A4 supply and start P-4B.

c. Stop P-4B, swap P-4B MOD (A6) to the A3 supply and start P-4B and P-4C.

d. Start P-4C, stop P-4B, swap P-4B MOD (A6) to the A3 supply and start P-4B.

Question No. 54 **QID: 0227**

Instrument Air pressure has dropped to 58 psig.
Field operators can not find an Inst. Air leak on Unit One.

Which of the following is the appropriate response for the given plant conditions to restore or conserve Instrument Air pressure?

A. Verify Service Air to Instrument Air cross-connect automatically opens.

B. Close Unit 1 to Unit 2 Instrument Air cross-connect.

c. Trip Reactor, actuate EFW and MSLI on both SGs.

d. If ICW available, isolate Seal Injection by closing CV-1206.

Question No. 55 **QID: 0569**

With the plant in Mode 2, what type of occurrence would make it necessary to use AOP 1203.005, Loss of Reactor Building Integrity?

A. Failure to perform a LLRT on personnel hatch within 5 days after opening.

B. Failure to perform a LLRT on emergency hatch within 7 days after opening.

C. "A" LPI RB sump suction is inoperable, closed, and de-energized.

D. The Ops Manager's permission is given to open both doors on personnel hatch to allow for ventilation motor entry.

Question No. 56 **QID: 0262**

Given:

- The plant is at 100 %.
- CRDs are at the normal rod index.
- The EHC controller is in manual.
- RCS boron concentration is 812 ppm.
- 1 ppm RCS boration requires 7.8 gallons of Boric Acid.

The CBOR is making a RCS addition with no concentration change and adds 92 gallons of boric acid and 8 gallons of DI water.

What effect will this have, without any further operator action?

A. Rods go full out, Tave stays the same, power goes down.

B. Rods go in ~10%, Tave stays the same, power goes down.

C. Rods go in ~10%, Tave goes down, power stays the same.

D. Rods go full out, Tave goes down, power stays the same.

Question No. 57 **QID: 0604**

A reactor trip has occurred and the CRS is directing actions per 1202.001, Reactor Trip.

Assume all actions have been performed when required by system parameters.

The CBOR reports that Pressurizer level has fallen to 30" and continuing to drop.
Pressurizer Level Control (CV-1235) is in Auto and fully open.

Which of the following is the proper response?

A Initiate HPI per RT-2.

B. Reduce Letdown by closing Orifice Bypass (CV-1223).

C. Isolate Letdown by closing Letdown Cooler Outlet (CV-1221).

D. Operate CV-1235 in HAND to control PZR level 90 to 110".

Question No. 58 **QID: 0571**

If at 90% power, NI channel 6 slowly fails to 103% power, which one of the following would occur?

A. ICS would insert control rods and runback feedwater.

B. RPS channel B would trip.

C. ICS would insert control rods and raise feedwater.

D. SASS would select NI channel 5.

Question No. 59 **QID: 0572**

Which of the following indications would cause entry into a Technical Specification?

A. Plant Monitoring System date and time is not updating.

B. Both Incore SPND Backup Recorders not printing or indicating point values.

C. Neither ICCMDS train's mimic display or local displays are updating.

D. Neither SPDS computer's date & time updating for greater than one hour.

Question No. 60 **QID: 0573**

What is the flowpath for the purification of the Fuel Transfer Canal and Reactor Vessel when using the Spent Fuel Cooling System?

A. Taking a suction on DHR, through the purification loop and then discharging to the Spent Fuel Pool.

B. Taking a suction on the Fuel Transfer Canal, through the purification loop and then discharging to the DHR system.

C. Taking a suction on the Spent Fuel Pool, through the purification loop and then discharging to the DHR system.

D. Taking a suction on DHR, through the purification loop and then discharging to the Fuel Transfer Canal.

Question No. 61 **QID: 0201**

Startup Transformer #1 has locked out following a reactor trip from 100% power. Steam generator levels will be fed up to which of the following levels (assume no operator actions)?

a. 20-40 inches.

b. 100-150 inches.

c. 300-340 inches.

d. 370-410 inches.

Question No. 62 **QID: 0574**

Given:

- Normal startup with reactor power at 10%.
- Main Turbine is in Operator Auto.
- Both turbine bypass valves (TBVs) for the "A" SG fail open.

With NO operator action, which of the following will be the final reactor power?

A. ~14%

B. ~18%

C. ~22%

D. ~25%

Question No. 63 **QID: 0575**

Given:

- All ICS H/A stations are in automatic.
- Reactor power is 100%.
- Main Turbine trips.
- Normal post-trip response.

What is the expected OTSG pressure and RCS Tavg?

A. 895 psig and 532°F

B. 945 pisg and 538°F

C. 995 psig and 547°F

D. 1020 psig and 550°F

Question No. 64 **QID: 0196**

While performing a reactor building purge evolution, the operator notes all four RB Purge Isolation Valves go closed. What is the most likely cause?

a. An ESAS actuation of channels 1 and 2 has closed the valves.

b. A loss of load center B-5 has occurred causing the valves to fail closed.

c. A high radiation setpoint has been exceeded on SPING 1.

d. RB Purge Exhaust Fan (VEF-15) has tripped causing the valves to close.

Question No. 65 **QID: 0619**

The smoke detector string for the Cable Spreading Room has a trouble relay that is de-energized in it's respective ZIU.

Considering this, which of the following can actuate the deluge system for the Cable Spreading Room?

A. Take the Inhibit switch out of "Inhibit" on the Cable Spreading Room on C463.

B. Automatic actuation via smoke detector and protectowire detector for the Cable Spreading Room.

C. Automatic actuation of a protectowire detector for the Cable Spreading Room.

D. Manually operate the Operate switch for the Cable Spreading Room on C463.

Question No. 66 **QID: 0620**

The plant is shutdown and a cooldown is in progress due to a tube leak in the "A" OTSG.

- RCS T-hot is 520 °F and lowering
- BWST level is at 35 ft and lowering
- A OTSG level is 405 inches and rising
- Dose rates at site boundary are at Alert level

Which of the following procedural RCS cooldown limits are in effect for the above conditions?

A. Less than or equal to 50 °F/hour

B. Less than or equal to 100 °F/hour

C. Less than or equal to 240 °F/hour

D. Less than or equal to 520 °F/hour

Question No. 67 **QID: 0079**

Given:

- Unit is in Mode 5
- Reactor Building pressure is 15.9 psia and stable
- No other abnormal conditions exist

Which of the following procedural actions is required to establish RB purge with these conditions?

a. Open RB purge inlets first, then open outlets.

b. Vent RB via H2 sample lines.

c. Vent RB via RB leak detector.

d. Open RB purge outlets first, then open inlets.

Question No. 68 **QID: 0576**

Which one of the following conditions would place the unit in Mode 4?

A. The reactor must be subcritical by at least 1.5% Delta k/k

B. RCS temperature is between 200 °F and 280 °F

C. K effective is >0.99

D. RCS temperature is 300 °F

Question No. 69 **QID: 0116**

During an INITIAL approach to criticality, if criticality is NOT achieved within _____ of the ECP, insert _____ and _____ .

A. Plus or minus 1.0% delta k/k
control rods to achieve 1.5% SD margin
establish hot shutdown conditions

b. Plus or minus 1.0% delta k/k
regulating groups to achieve 1.0% SD margin
notify Reactor Engineering

c. plus or minus 0.5% delta k/k
control rods to achieve 1.5% SD margin
verify calculation

d. plus or minus 0.5% delta k/k
regulating groups to achieve 1.0% SD margin
verify calculation

Question No. 70 **QID: 0621**

During the hanging of tagouts, the _____ is responsible for the following:

-Reviews tagout detail of the tagout.

-Ensures components are positioned in accordance with the Tag Hang sheet.

-Ensures components are restored to their normal positions in accordance with Tagout Tags To Be Removed sheet.

-Ensures the tag(s) have been hung or removed.

A. Tagout Holder

B. Verifier

C. Preparer

D. Reviewer

Question No. 71 **QID: 0390**

Given:

- A startup is in progress.
- All safety groups are 100% withdrawn.
- The group 6 rods' RPI were not re-zeroed prior to startup.
- The CBOR is continuing with the startup with group 5 rods.

Which of the following results?

a. Auto inhibit.

b. Asymmetric rod alarm.

c. Out inhibit.

d. Sequence inhibit.

Question No. 72 **QID: 0605**

Which of the following describes the authorizations needed in order for an individual's exposure to reach 3300 mrem in a year?

A. Individual's supervisor approves.

B. Individual's supervisor recommends and RP supervision approves

C. Individual's supervisor recommends, RP Manager approves, and Plant General Manager concurs

D. Individual's supervisor recommends, Plant General Manager concurs, and Site Vice President approves

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Question No. 73 **QID: 0579**

During performance of the ESAS procedure with BWST level at 8 ft., which of the following actions is performed specifically to reduce plant personnel exposure?

A. Notifying RP to begin monitoring BWST suction line for back-leakage.

B. Throttling RB Spray flow 1050 to 1200 gpm per train.

C. Aligning HPI to provide PZR Aux Spray.

D. Removing all but C & D condensate polishers from service.

Question No. 74 **QID: 0580**

Given:

- Reactor trip from 100% power.
- Normal post-trip plant parameters.

The CRS asks for critical parameters.

Which of the following is NOT a critical parameter for the above conditions?

A. Subcooling margin

B. RCS pressure

C. Pressurizer level

D. RCS Tavg

Question No. 75 **QID: 0128**

Which of the following would be classified as a fission product barrier failure?

A. RCS leakage indicates greater than 50 gpm.

B. RCS pressure 2450 psig with ERV controlling pressure.

C. CNTMT pressure indicates 17 psia.

D. Engineering Assessment of core damage indicates 0.1% fuel cladding failure.

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Question No. 76 **QID: 0581**

Given:
- Unit is in Mode 5.
- DH has been isolated from RCS due to a LOCA in RCS.
- RCS CET temps are 175°F and rising.
- RCS pressure is 110 psig.
- RCS is intact with loops NOT filled.
- Time to Steam Release is 90 minutes.

Which of the following portions of 1203.028, Loss of Decay Heat Removal, should be in use?

A. Section 1, Loss of Inventory

B. Attachment G, Containment Closure

C. Section 2, DH Removal System Leak

D. Section 8, Loss of Both DH Systems -- RCS Pressure Boundary Intact

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Question No. 77 **QID: 0331**

Following a controlled plant shutdown per 1202.006, Tube Rupture, the following conditions exist:

- RCS temperature is 460 °F
- RCS pressure is 900 psig
- Both OTSGs have ruptured tubes
- Both OTSGs have been isolated.
- BWST level drops below 23'

What is the final Emergency Operating Procedure the CRS will be using?

A. 1202.002, Loss of Subcooling Margin

b. 1202.010, ESAS

c. 1202.011, HPI Cooldown

d. 1202.006, Tube Rupture

Question No. 78 **QID: 0584**

A steam line rupture has occurred in the Reactor Building with the following conditions now present:
- ESAS actuated on channels 1 thru 6.
- All RCPs secured per RT-10.
- RB pressure 19 psig and dropping.
- HPI throttled due to existence of adequate SCM.
- RCS pressure is 1050 psig.
- T-hot is 490°F.
- EOP actions have terminated the overcooling.

The SE recommends to the CRS to restore normal operating pressure per RT-14 in order to reset ESAS and re-start RCPs.
As CRS, does this recommendation follow the EOP mitigation strategies?

A. Yes, overcooling event has been terminated.

B. No, this could overstress reactor vessel.

C. Yes, adequate SCM has been restored.

D. No, RB pressure is not within normal limits.

Question No. 79 **QID: 0586**

Given:
- Plant is at 100% power with no failed equipment.
- A loss of the 161 KV ring bus occurs (de-energized).
- Autotransformer is energized from the 500 KV ring bus.

Providing the 161 KV ring bus remains de-energized, when is the plant required to be in Mode 3?

A. Within 24 hours

B. Within 36 hours

C. Within 72 hours

D. Within 84 hours

Question No. 80 **QID: 0587**

Given:
- Plant is at 100% power.
- Inverter Y-15 is tagged out for maintenance.

Subsequently, the annunciator K01-B5 "RS3 INVERTER TROUBLE" alarms.
A local investigation reveals the local alarms are "LOW INVERTER VOLTAGE" and "STATIC SWITCH TRANSFER".

Which of the following Technical Specification conditions should be entered?

A. 3.8.7 Condition "A"

B. 3.8.7 Condition "D"

C. 3.8.9 Condition "B"

D. 3.8.9 Condition "F"

Question No. 81 **QID: 0588**

Given:

- Reactor tripped due to a loss of both MFWPs approximately 20 minutes ago.
- Annunciator K02-B6 "A3 L.O. RELAY TRIP" is in alarm.
- AFW pump, P-75, is tagged out for maintenance.
- Steam Driven EFW Pump, P-7A, has tripped on overspeed.
- RCS pressure is 2000 psig.
- CETs are 612°F.
- Both OTSG levels are 30".

Which of the following procedures should be in use for the above conditions?

A. 1202.002, Loss of Subcooling Margin

B. 1202.004, Overheating

C. 1202.011, HPI Cooldown

D. 1203.037, Abnormal ES Bus Voltage

Question No. 82 **QID: 0589**

What are the required action(s) per Technical Specifications for the following conditions?

- Plant is at 40% power.
- Group 4, Rod 4 is stuck and is mis-aligned from the group by 7.5%.
- The rod can not be re-aligned with the group.

Subsequently Group 7 Rod 6 drops to 0% withdrawn.

A. Immediately trip the reactor.

B. Borate to restore SDM within 1 hour and perform Linear Heat Rate surveillance, SR 3.2.5.1, within 6 hours.

C. Borate to restore SDM within 1 hour and verify the potential ejected rod worth is within the assumptions
of the rod ejection analysis within 6 hours.

D. Borate to restore SDM within 1 hour and place the plant in Mode 3 within 6 hours.

Question No. 83 **QID: 0590**

Given:

- Plant startup in progress.
- Channel 1 Source Range, NI-501 at 9 E4 cps
- Channel 2 Source Range, NI-502 at 1 E5 cps
- Reactor power Wide Range recorder, NR-502, is operable and at 5 E -2% power
- Intermediate Range Channel NI-3 at 2 E -11 amps
- Intermediate Range Channel NI-4 at 5 E -11 amps
- Power Range Channels NI-5 thru 8 at 0%

Which of the following actions are procedurally required and ensure compliance with Technical Specification 3.3.10, Intermediate Range Neutron Flux?

A. Trip the reactor immediately and refer to 1202.001, Reactor Trip.

B. Immediately suspend positive reactivity additions and initiate a shutdown so that all CRD breakers are open within one hour.

C. Lower power until Source Range is on scale and corrective maintenance is performed on appropriate IR channel(s).

D. Since NR-502 is operable, continue with plant operations until Power Range channels come on-scale.

Question No. 84 **QID: 0591**

Given:

- Pressurizer Level Control Valve CV-1235 indicates 50% open.
- RC Pump Seals Total Inj Flow valve CV-1207 indicates 50% open.
- Letdown flow indication is zero.
- Letdown pressure indication is zero.
- Letdown Orifice Bypass valve CV-1223 indicates 50% open.
- RCS pressure is 2210 psig and slowly rising.
- Pressurizer Spray valve CV-1008 indicates closed.

What procedure should be in use due to the above conditions?

A. 1203.015, Pressurizer Systems Failure

B. 1203.024, Loss of Instrument Air

C. 1203.047, Loss of NNI Power

D. 1203.012B, ACA for K10-A8 "LETDOWN TEMP HI"

Question No. 85 **QID: 0592**

Given:
- Rx shutdown using 1203.039, Excess RCS Leakage, and 1203.045, Rapid Plant Shutdown, due to RCS leak into 2 RCP seal coolers.
- "C" & "B" RCPs are running
- RCS pressure 1720 psig and lowering slowly
- HPI flow 150 gpm
- A & B SG pressure 910 psig
- RCS cooldown rate 35°F per hour
- All Turbine bypass valves closed

Which procedure should be in use?

A. 1202.001, Reactor Trip

B. 1203.041, Small Break LOCA cooldown

C. 1203.040, Forced Flow cooldown

D. 1202.010, ESAS

Question No. 86 **QID: 0594**

Given:

- RCS pressure is 200 psig.
- RCS temperature is 150°F.
- "A" DH pump is in service.
- I&C is performing "A" RPS channel pressure calibration.

Subsequently RCS pressure is observed to be dropping rapidly.

Which of the following procedures should be used to mitigate this transient?

A. 1203.015, Pressurizer Systems Failure

B. 1203.012H, K09-D8 "DECAY HEAT VORTEX WARNING"

C. 1203.028, Loss of Decay Heat Removal

D. 1203.012H, K09-B7 "CV-1050 AUTO CLOSE"

Question No. 87 **QID: 0607**

Given:

- P-36A is the in-service Makeup Pump.
- Pressurizer level has dropped from 220" to 218" in 10 minutes.
- P-36A suction pressure is 40 psig and going down slowly.
- Makeup Tank level is 78" and trending down slowly.
- Seal Injection flow is oscillating from 38 to 43 gpm.
- MU-34D HPI temperature TE-1069A is reading 255°F.
- Aux. Building sump level is going up.

Considering the above conditions which procedure will direct the Makeup Pump to be secured?

A. 1203.039, Excess RCS Leakage

B. 1203.026, Loss of Reactor Coolant Makeup, Section 1 - Loss of HPI Pump

C. 1203.026, Loss of Reactor Coolant Makeup, Section 2 - Large Makeup and Purification System Leak

D. 1203.032, HPI Line Temperature High

Question No. 88 **QID: 0596**

Given:

- Plant is at 100% power.
- RB Cooling Supply Fan VSF-1B is tagged out due to a faulty motor.

During the surveillance on EDG #2, the diesel's output breaker failed to close.

Regarding Reactor Building Spray and Cooling Systems, what are the required actions in Tech Specs?

A. 3.6.5 Required Action B.1

B. 3.6.5 Required Action C.1

C. 3.6.5 Required Action E.1

D. 3.6.5 Required Action G.1

Question No. 89 **QID: 0597**

Given:
- Reactor in cold shutdown.
- SPING #3 detector is in alarm showing high stack activity.
- Local radiation monitors alarming on 404' in Aux. Bldg.
- Core off load is in progress.
- Bubbles near upender in Aux. Bldg.

Which procedures contain guidance to combat the above conditions?

A. Control of Unit 1 Refueling, 1502.004, and High Activity in Reactor Coolant, 1203.019.

B. Refueling Abnormal Operations, 1203.042, and Annunciator Corrective Action, 1203.012

C. Control of Fuel and Control Component Handling in Unit 1 Spent Fuel Area, 1502.010, and
Annunciator Corrective Action, 1203.012

D. Fuel and Control Component Handling, 1506.001, and Moderator Dilution, 1203.017

Question No. 90 **QID: 0598**

Unit at 100%.

While performing Loss of Service Water AOP 1203.030, Service Water Loop 1 has been declared inoperable.

What is the required action with the shortest time duration per the affected Tech Spec actions?

A. Perform action for TS 3.7.7, condition B.1

B. Perform action for TS 3.8.1, condition B.2

C. Perform SR 3.8.1.1

D. Perform actions for TS 3.4.6, condition A.1

Question No. 91 **QID: 0570**

The plant was at 80% power when only one failure caused the following:

- Plant running back
- Tavg Control swaps to Loop "A"
- "A" Main Feedwater flow rapidly rising
- "B" Main Feedwater flow rapidly dropping
- Feedwater pumps' discharge crosstie valve shut

Which one of the following procedures would be used in response to the above conditions?

A. 1203.022, Reactor Coolant Pump Trip

B. 1203.020, Load Rejection

C. 1203.047, Loss of NNI Power

D. 1203.027, Loss of Steam Generator Feed

Question No. 92 **QID: 0599**

The plant is operating at 100% power.
Both PZR level transmitters LT-1001 and LT-1002 have failed LOW.

Which of the following actions are required by Technical Specification 3.3.15 and Table 3.3.15-1?

A. Be in Mode 3 within 6 hours.

B. Both channels must be restored within 7 days.

C. Restore one channel to operable status within 30 days or be in Mode 3 within 6 hours.

D. Restore one channel to operable status within 7 days or be in Mode 3 within 6 hours.

Question No. 93 **QID: 0600**

Given:

- Plant is in a Refueling outage.
- Core re-load is in progress.
- Approximately 90% of the core is in the Reactor vessel.

The Main Fuel Handling Bridge has a once-burned fuel assembly and is in the process of indexing over the specified core location when NI-502 fails to 0.1 cps.

What action should be taken?

A. No action necessary because with NI-501 operating, Tech Spec NI requirements for operablility are met.

B. Contact the Main Fuel Bridge operator and place the assembly in a core location without any adjacent fuel assemblies.

C. Halt operations on the Main Fuel Bridge. Core geometry cannot be changed unless two neutron flux monitors are operable.

D. Verify boron concentration in the Refueling Canal is greater than 2326 ppm and then continue fuel load.

Question No. 94 **QID: 0601**

The plant computer is unavailable.
NI-8 is inoperable.
The following conditions exist:

- Core EFPD is 200
- Reactor power is 80%
- Calculated quadrant tilt is 4.9% in quadrant WX.

If these indications continue, which of the following actions should be taken in accordance with Technical Specification 3.2.4?

A. Reduce applicable RPS trip setpoints 2%.

B. Reduce applicable RPS trip setpoints 4%.

C. Reduce applicable RPS trip setpoints 6%.

D. Reduce applicable RPS trip setpoints 8%.

Question No. 95 **QID: 0252**

A normal plant startup is in progress. Critical data is being obtained.

Which Tech Spec condition would require a plant shutdown to Mode 3 within 30 minutes?

A. One pressurizer code safety valve is declared inoperable.

B. Reactor coolant temperature is below 525 °F.

C. Shutdown margin not within specification.

D. Pressurizer heater power from ES busses is limited to 120 KW.

Question No. 96 **QID: 0409**

Which of the following would require a 10 CFR 50.59 Review per ENS-LI-101, 10 CFR 50.59 Review Program?

A. A deletion of a parameter for the SPDS Alternate Shutdown display, A/S-G.

B. A change to the table of contents for 1203.049, Fires in Areas Affecting Safe Shutdown.

C. A change in the title of Shift Superintendent to Shift Manager.

D. A drawing change to correct a HPI injection valve number on a P&ID used in the SAR.

Question No. 97 **QID: 0119**

Given the following "A" Core Flood Tank (CFT) parameters with the plant is at 100% power.

- Level transmitter out of service
- CFT level is 12.5 feet
- Boric acid concentration is 2280 ppm
- CFT pressure is 580 psig

Which of the above parameters makes the "A" CFT inoperable per Tech Specs?

a. Level transmitter

b. CFT level

c. Boric acid concentration

d. CFT pressure

Question No. 98 **QID: 0120**

Given:

- A Site Area Emergency has been declared on Unit 1.
- An Emergency Medical Team member must enter a 100 REM/hr area to rescue a critically injured employee (he is directed, i.e., not a volunteer).

Which of the following is the MAXIMUM time an individual team member can stay in this area?

A. 3 minutes

B. 6 minutes

C. 15 minutes

D. 30 minutes

Question No. 99 **QID: 0123**

Given:

- Plant shutdown and cooldown in progress
- RCS Tave 185°F
- RB Purge in progress to lower RB atmospheric activity
- RB Purge projected release duration is 4 hours
- RB Purge release commenced two (2) hours ago
- Nuclear Chemistry stated gaseous releases projected to exceed quarterly objectives by 30%
- Release report preliminary release rate 4.1 E4 cfm
- Design flow rate 3.6 E4 cfm to 4.1 E4 cfm

Which of the following would violate the RB Purge permit and require RB Purge termination?

A. Actual (stable) RB purge flow rate of 3.9 E4 cfm.

B. RB Atmosphere Gaseous Detector slowly trending upward.

C. SPING 1 indicates stack activity approaching NUE criteria over next 5 hours.

D. Loss of Decay Heat Removal results in RCS temperature at 220°F.

Question No. 100 **QID: 0602**

Given:

- A shutdown was in progress for a SGTR.
- A loss of offsite power caused a reactor trip.
- Two control rods are stuck out.
- #2 EDG did not start.
- Neither channel of EFIC actuated.
- Pressurizer level is offscale low.

Which of the following EOP Repetitive Tasks should be the number one priority and why?

A. RT-2, Initiate HPI to restore pressurizer level

B. RT-5, Verify proper EFW actuation and control to ensure primary to secondary heat transfer

C. RT-12, Emergency Boration to ensure the reactor is shutdown

D. RT-14, Control RCS pressure low within limits of Figure 3 to limit primary to secondary leakage

ANO Unit One
2005
Initial License Examination
SRO Handout

ENTERGY OPERATIONS INCORPORATED
ARKANSAS NUCLEAR ONE

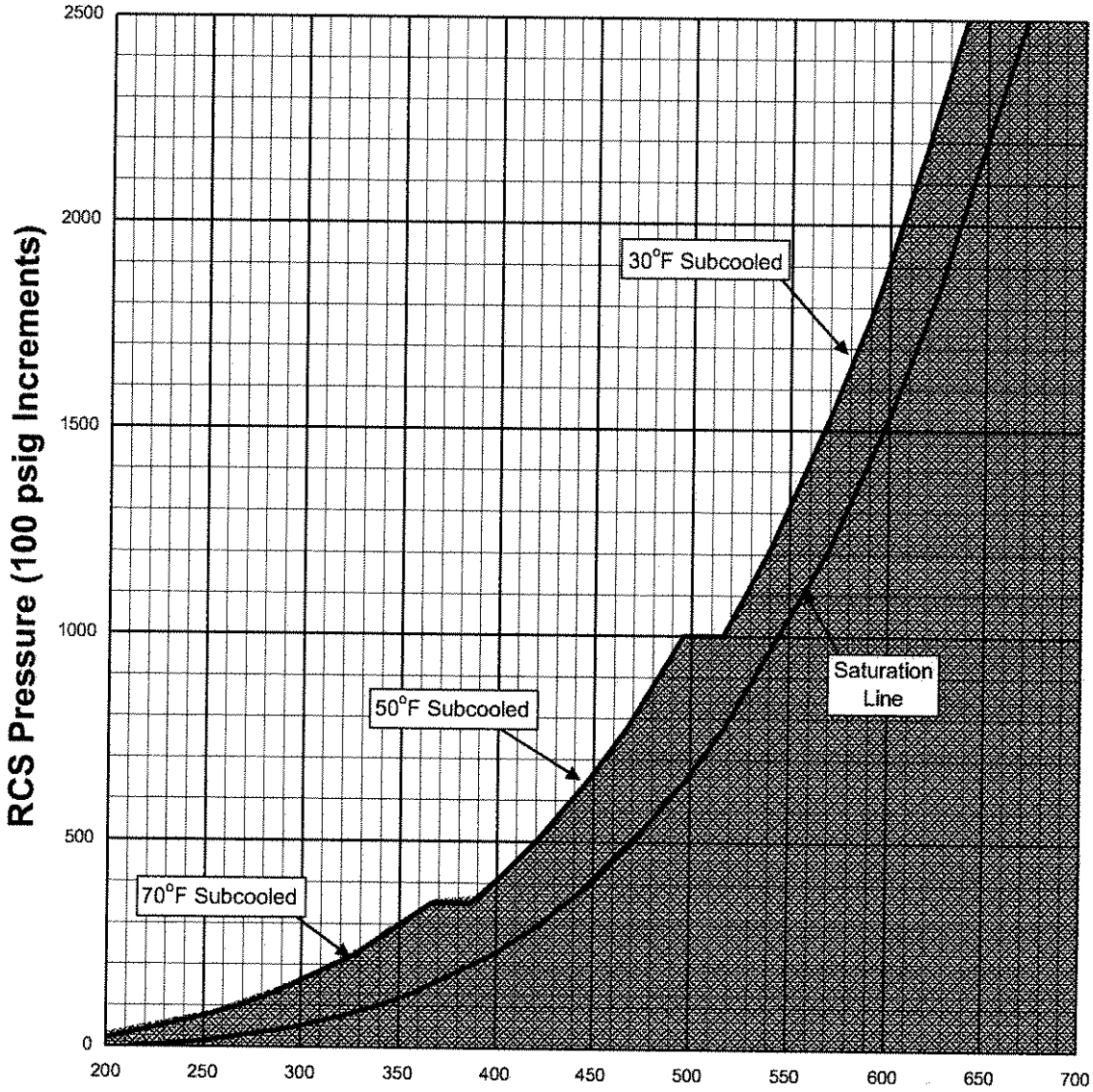
TITLE: **EOP FIGURES**	DOCUMENT NO. **1202.013**	CHANGE NO. **004-00-0**
	WORK PLAN EXP. DATE **N/A**	TC EXP. DATE **N/A**
SET #	SAFETY-RELATED ☒YES ☐NO	IPTE ☐YES ☒NO
	TEMP ALT ☐YES ☒NO	

When you see these ***TRAPS***	Get these ***TOOLS***
Time Pressure	Effective Communication
Distraction/Interruption	Questioning Attitude
Multiple Tasks	Placekeeping
Over Confidence	Self Check
Vague or Interpretive Guidance	Peer Check
First Shift/Last Shift	Knowledge
Peer Pressure	Procedures
Change/Off Normal	Job Briefing
Physical Environment	Coaching
Mental Stress (Home or Work)	Turnover

VERIFIED BY	DATE	TIME

FORM TITLE:	FORM NO.	CHANGE NO.
VERIFICATION COVER SHEET	1000.006A	050-00-0

FIGURE 1
Saturation and Adequate SCM



RCS Pressure	Adequate SCM
>1000 psig	≥30°F
350 to 1000 psig	≥50°F
<350 psig	≥70°F

FIGURE 2
SG Pressure vs T-sat

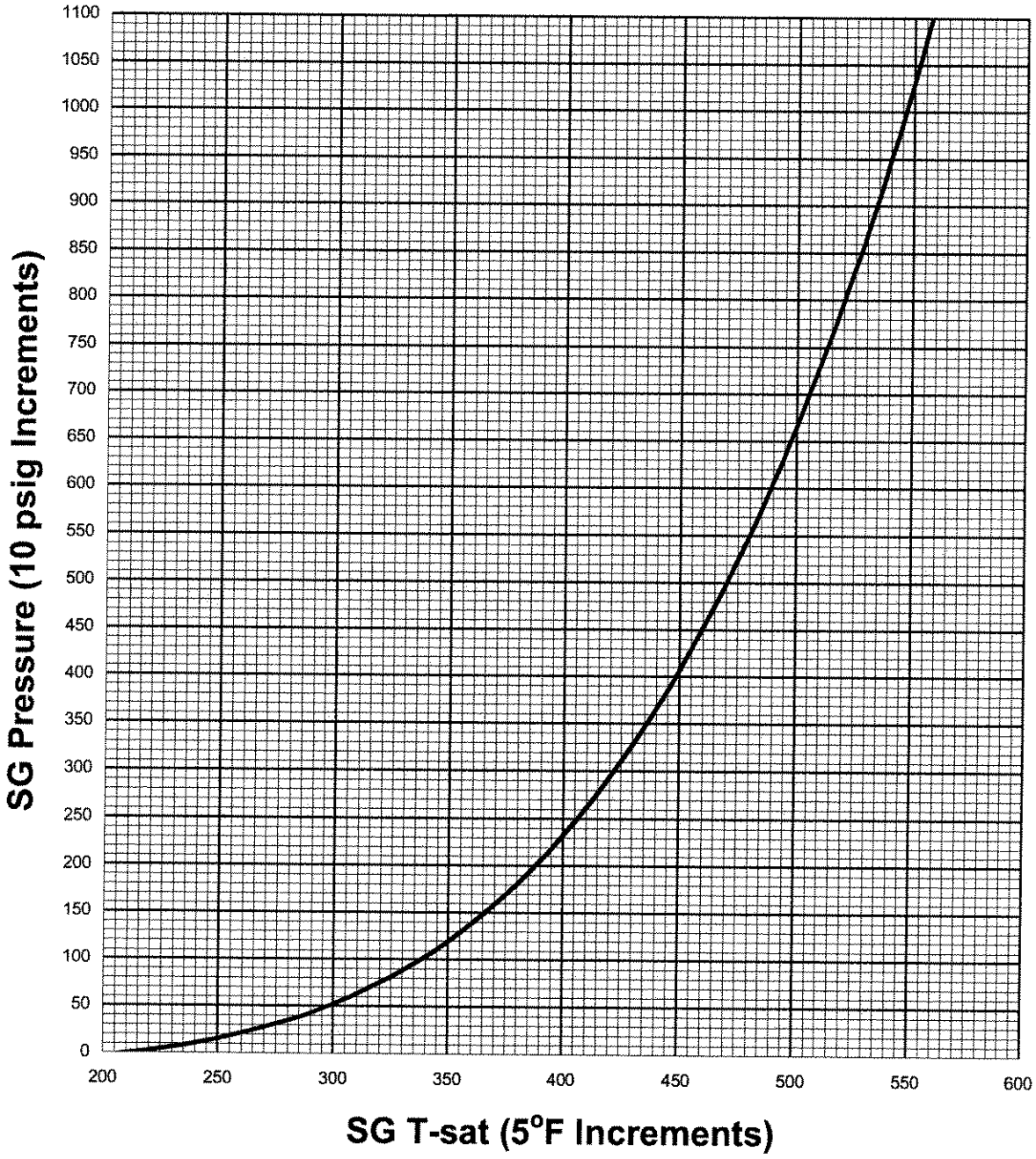


FIGURE 3
RCS Pressure vs Temperature Limits

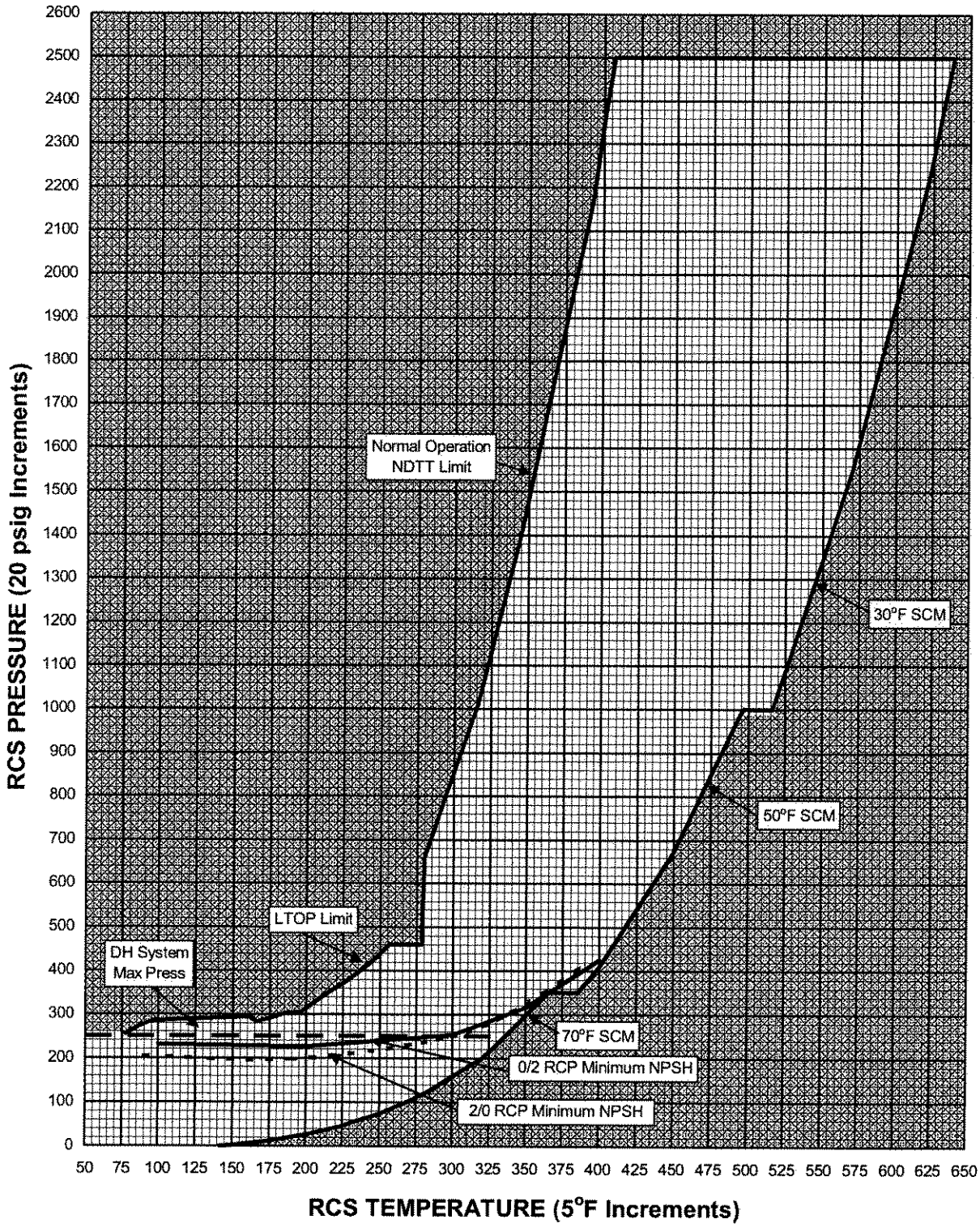


FIGURE 4
Core Exit Thermocouple for Inadequate Core Cooling

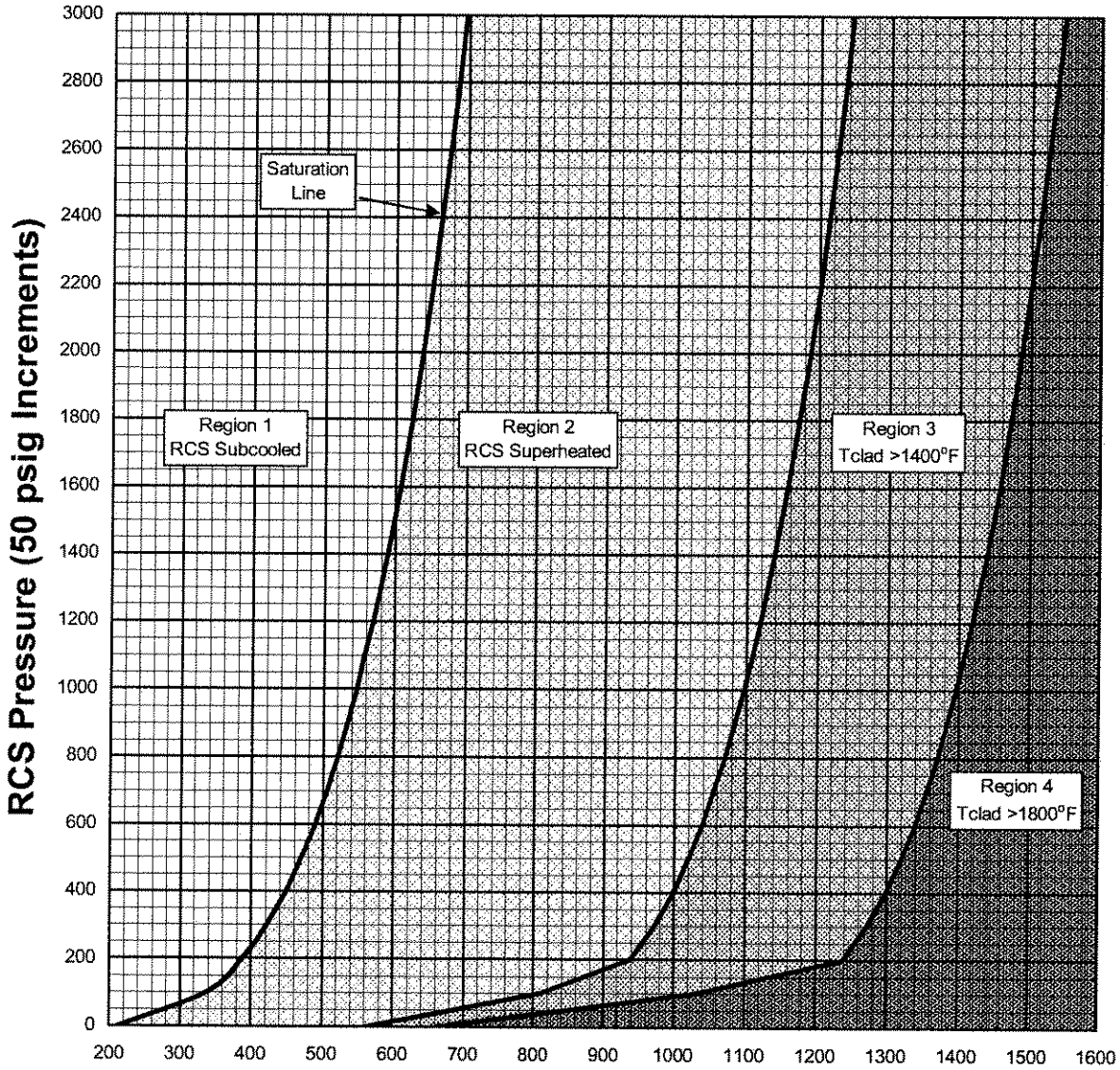


FIGURE 5

SG Pressure to Establish 40° to 60°F Primary to Secondary ΔT

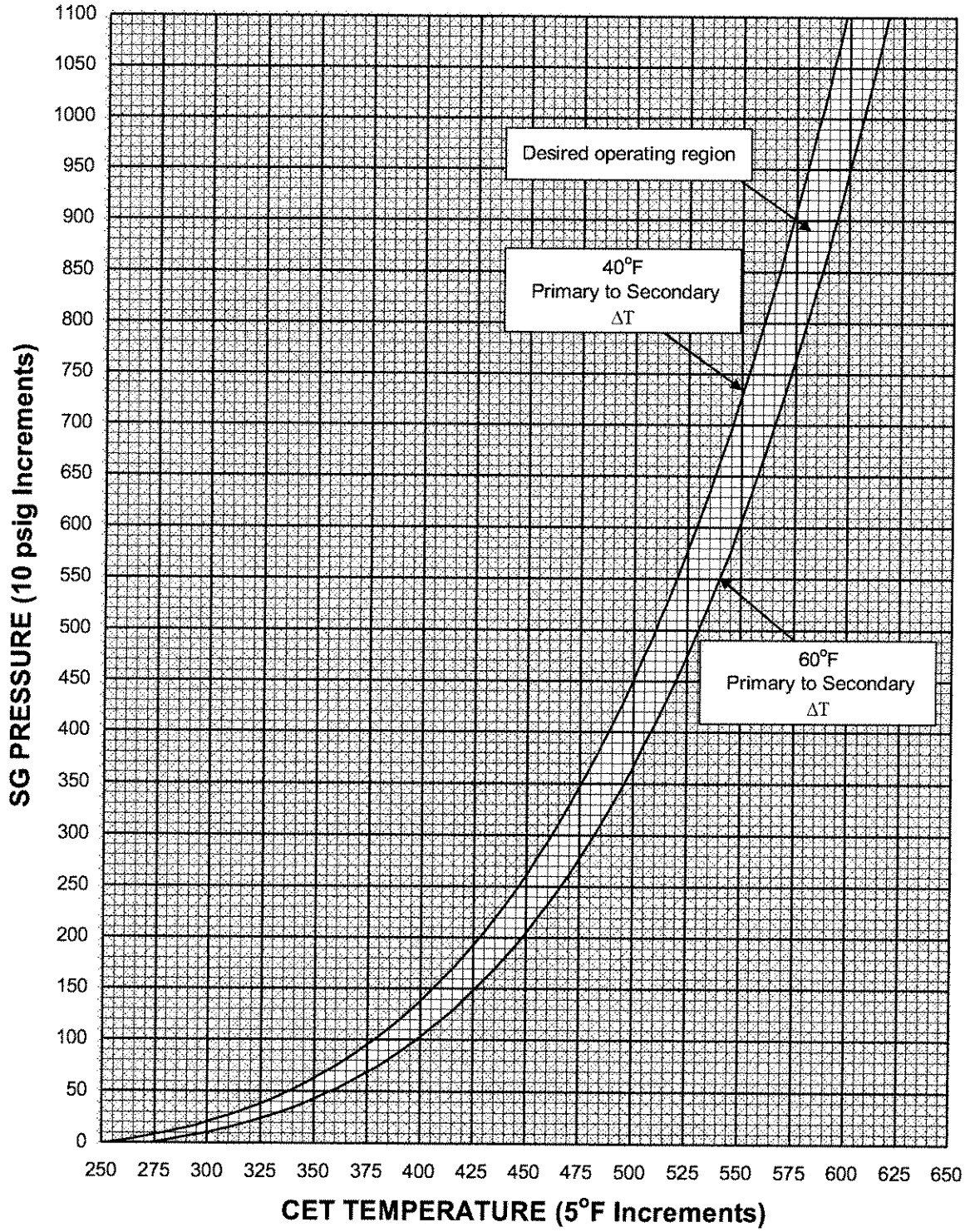
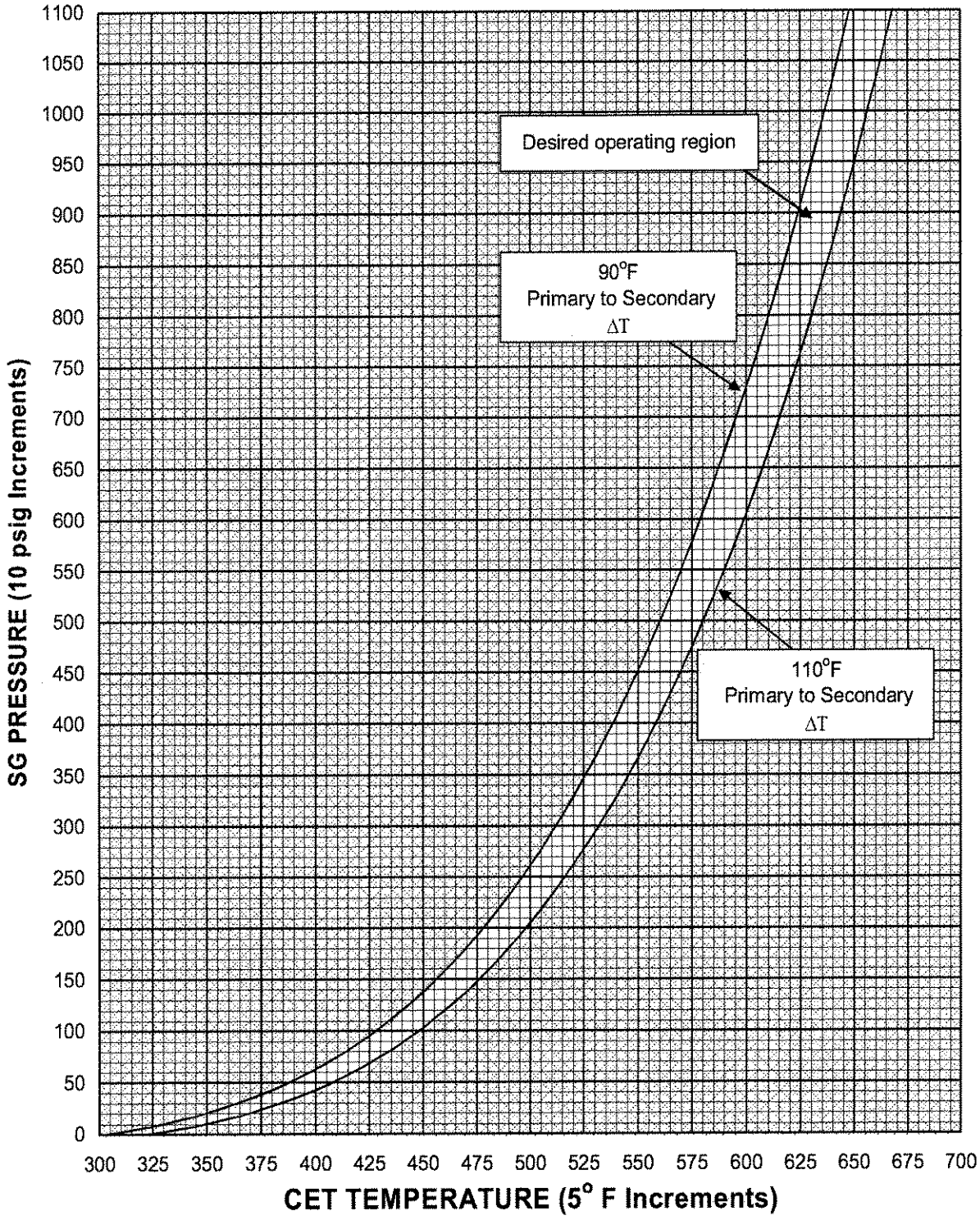


FIGURE 6

SG Pressure to Establish 90° to 110°F Primary to Secondary ΔT



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 limits specified in the COLR.	A.1.1 Perform SR 3.2.5.1.	Once per 2 hours
	OR	
	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.	2 hours
		OR
		2 hours after last performance of SR 3.2.5.1
	AND	
	A.1.2.2 Reduce 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.	10 hours
		OR
		10 hours after last performance of SR 3.2.5.1
	AND	

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.1.2.3 Reduce the regulating group insertion limits given in the COLR ≥ 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
	A.1.2.4 Reduce the Operational Power Imbalance Setpoints given in the COLR ≥ 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
	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. Required Action and associated Completion Time of Condition A not met.	B.1 Reduce THERMAL POWER to < 60% of the ALLOWABLE THERMAL POWER. AND	2 hours
	B.2 Reduce nuclear overpower trip setpoint to ≤ 65.5% of the ALLOWABLE THERMAL POWER.	10 hours
C. Required Action and associated Completion Time for Condition B not met.	C.1 Reduce THERMAL POWER to ≤ 20% RTP.	4 hours
D. QPT greater than the maximum limit specified in the COLR.	D.1 Reduce THERMAL POWER to ≤ 20% RTP.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.4.1	Verify QPT is within limits as specified in the COLR.	7 days AND When QPT has been restored to less than or equal to the steady state limit, 1 hour for 12 consecutive hours, or until verified acceptable at ≥ 95% RTP

3.3 INSTRUMENTATION

3.3.15 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.15 The PAM instrumentation for each Function in Table 3.3.15-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

----------NOTES----------

1. LCO 3.0.4 is not applicable
2. Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to prepare and submit a Special Report.	Immediately
C. One or more Functions with two required channels inoperable.	C.1 Restore one channel to OPERABLE status.	7 days
D. Required Action and associated Completion Time of Condition C not met.	D.1 Enter the Condition referenced in Table 3.3.15-1 for the channel.	Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. As required by Required Action D.1 and referenced in Table 3.3.15-1.	E.1 Be in MODE 3. AND E.2 Be in MODE 4.	6 hours 12 hours
F. As required by Required Action D.1 and referenced in Table 3.3.15-1.	F.1 Initiate action to prepare and submit a Special Report.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------
These SRs apply to each PAM instrumentation Function in Table 3.3.15-1.

SURVEILLANCE		FREQUENCY
SR 3.3.15.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
SR 3.3.15.2	----------NOTE---------- Neutron detectors are excluded from CHANNEL CALIBRATION. --- Perform CHANNEL CALIBRATION.	 18 months

Table 3.3.15-1
Post Accident Monitoring Instrumentation

FUNCTION	REQUIRED CHANNELS	CONDITIONS REFERENCED FROM REQUIRED ACTION D.1
1. Wide Range Neutron Flux	2	E
2. RCS Hot Leg Temperature	2	E
3. RCS Hot Leg Level	2	F
4. RCS Pressure (Wide Range)	2	E
5. Reactor Vessel Water Level	2	F
6. Reactor Building Water Level (Wide Range)	2	E
7. Reactor Building Pressure (Wide Range)	2	E
8. Penetration Flow Path Automatic Reactor Building Isolation Valve Position	2 per penetration flow path[(a)(b)]	E
9. Reactor Building Area Radiation (High Range)	2	F
10. Deleted		
11. Pressurizer Level	2	E
12. a. SG "A" Water Level – Low Range	2	E
b. SG "B" Water Level – Low Range	2	E
c. SG "A" Water Level – High Range	2	E
d. SG "B" Water Level – High Range	2	E
13. a. SG "A" Pressure	2	E
b. SG "B" Pressure	2	E
14. Condensate Storage Tank Level	2	E
15. Borated Water Storage Tank Level	2	E
16. Core Exit Temperature (CETs per quadrant)	2	E
17. a. Emergency Feedwater Flow to SG "A"	2	E
b. Emergency Feedwater Flow to SG "B"	2	E
18. High Pressure Injection Flow	2	E
19. Low Pressure Injection Flow	2	E
20. Reactor Building Spray Flow	2	E

(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(b) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops – MODE 4

LCO 3.4.6 Two loops consisting of any combination of RCS loops and decay heat removal (DHR) loops shall be OPERABLE and one OPERABLE loop shall be in operation.

----------NOTE----------
All reactor coolant pumps (RCPs) and DHR pumps may be removed from operation for ≤ 1 hour provided:

a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

b. Core outlet temperature is maintained at less than or equal to a temperature which is 10°F below saturation temperature.

APPLICABILITY: MODE 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required loop inoperable.	A.1 Initiate action to restore a second loop to OPERABLE status. AND A.2 ----------NOTE---------- Only required if DHR loop is OPERABLE. ---------- Be in MODE 5.	Immediately 24 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Two required loops inoperable. OR Required loop not in operation.	B.1 Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1. AND B.2 Initiate action to restore one loop to OPERABLE status and operation.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.6.1	Verify required DHR or RCS loop is in operation.	12 hours
SR 3.4.6.2	----------NOTE---------- Not required to be performed until 24 hours after a required pump is not in operation. ---------- Verify correct breaker alignment and indicated power available to each required pump.	 7 days

3.6 REACTOR BUILDING SYSTEMS

3.6.5 Reactor Building Spray and Cooling Systems

LCO 3.6.5 Two reactor building spray trains and two reactor building cooling trains shall be OPERABLE.

---NOTE---
Only one train of reactor building spray and one train of reactor building cooling are required to be OPERABLE during MODES 3 and 4.

APPLICABILITY: MODES 1, 2, 3, and 4

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One reactor building spray train inoperable in MODE 1 or 2.	A.1 Restore reactor building spray train to OPERABLE status.	72 hours AND 10 days from discovery of failure to meet the LCO
B. One reactor building cooling train inoperable in MODE 1 or 2.	B.1 Restore reactor building cooling train to OPERABLE status.	7 days AND 10 days from discovery of failure to meet the LCO
C. Two reactor building cooling trains inoperable in MODE 1 or 2.	C.1 Restore one reactor building cooling train to OPERABLE status.	72 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A, B, or C not met.	D.1 Be in MODE 3.	6 hours
E. One required reactor building spray train inoperable in MODE 3 or 4. OR One required reactor building cooling train inoperable in MODE 3 or 4.	E.1 Restore required inoperable train to OPERABLE status.	36 hours
F. Required Action and associated Completion Time of Condition E not met.	F.1 Be in MODE 5.	36 hours
G. Two reactor building spray trains inoperable in MODE 1 or 2. OR Any combination of three or more trains inoperable in MODE 1 or 2. OR One required reactor building spray train and one required reactor building cooling train inoperable in MODE 3 or 4.	G.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.6.5.1	Verify each reactor building spray manual, power operated, and automatic valve in each required flow path that is not locked, sealed, or otherwise secured in position is in the correct position.	31 days
SR 3.6.5.2	Operate each required reactor building cooling train fan unit for ≥ 15 minutes.	31 days
SR 3.6.5.3	Verify each required reactor building cooling train cooling water flow rate is ≥ 1200 gpm.	31 days
SR 3.6.5.4	Verify each required reactor building spray pump's developed head at the flow test point is greater than or equal to the required developed head.	In accordance with the Inservice Testing Program
SR 3.6.5.5	Verify each automatic reactor building spray valve in each required flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	18 months
SR 3.6.5.6	Verify each required reactor building spray pump starts automatically on an actual or simulated actuation signal.	18 months
SR 3.6.5.7	Verify each required reactor building cooling train starts automatically on an actual or simulated actuation signal.	18 months
SR 3.6.5.8	Verify each required train spray nozzle is unobstructed.	10 years

3.7 PLANT SYSTEMS

3.7.7 Service Water System (SWS)

LCO 3.7.7 Two SWS loops shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SWS loop inoperable.	A.1 ----------NOTES---------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources - Operating," for diesel generator made inoperable by SWS. 2. Enter Applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops - MODE 4," for decay heat removal made inoperable by SWS. ---------- Restore SWS loop to OPERABLE status.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.7.1	----------NOTE---------- Isolation of SWS flow to individual components does not render the SWS inoperable. ----------	
	Verify each SWS manual, power operated, and automatic valve in the flow path servicing safety related equipment, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.7.7.2	Verify each SWS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	18 months
SR 3.7.7.3	Verify each required SWS pump starts automatically on an actual or simulated signal.	18 months

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 diesel generators (DGs) each capable of supplying one train of the onsite Class 1E AC Electrical Power Distribution System.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 for OPERABLE required offsite circuit. AND A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable. AND	1 hour AND Once per 12 hours thereafter 24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 ----------NOTE---------- Startup Transformer No. 2 may be removed from service for up to 30 days for preplanned preventative maintenance. This 30 day Completion Time may be applied not more than once in any 10 year period. The provisions of LCO 3.0.4 are not applicable to Startup Transformer No. 2 during this 30 day preventative maintenance period. ---------- Restore required offsite circuit to OPERABLE status.	72 hours AND 10 days from discovery of failure to meet LCO
B. One DG inoperable.	B.1 Perform SR 3.8.1.1 for OPERABLE required offsite circuit(s). AND B.2 Declare required feature(s) supported by the inoperable DG inoperable when its redundant required feature(s) is inoperable. AND B.3.1 Determine OPERABLE DG is not inoperable due to common cause failure. OR	1 hour AND Once per 12 hours thereafter 4 hours from discovery of Condition B concurrent with inoperablity of redundant required feature(s) 24 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.3.2 Perform SR 3.8.1.2 for OPERABLE DG. AND B.4 Restore DG to OPERABLE status.	24 hours 7 days AND 10 days from discovery of failure to meet LCO
C. Two required offsite circuits inoperable.	C.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable. AND C.2 Restore one required offsite circuit to OPERABLE status.	12 hours from discovery of Condition C concurrent with inoperability of redundant required feature(s) 24 hours
D. One required offsite circuit inoperable. AND One DG inoperable.	----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.6, "Distribution Systems – Operating," when Condition D is entered with no AC power source to any train. ---------- D.1 Restore required offsite circuit to OPERABLE status. OR D.2 Restore DG to OPERABLE status.	 12 hours 12 hours
E. Two DGs inoperable.	E.1 Restore one DG to OPERABLE status.	2 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and Associated Completion Time of Condition A, B, C, D, or E not met.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	12 hours 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	----------NOTE---------- All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. ---------- Verify each DG starts from standby conditions and, in ≤ 15 seconds achieves "ready-to-load" conditions.	31 days
SR 3.8.1.3	----------NOTES---------- 1. DG 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 DG at a time. 4. This SR shall be preceded by and follow, without shutdown, a successful performance of SR 3.8.1.2. ---------- Verify each DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 2475 kW and ≤ 2750 kW.	31 days

SURVEILLANCE		FREQUENCY
SR 3.8.1.4	Verify each day tank contains ≥ 160 gallons of fuel oil.	31 days
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	31 days
SR 3.8.1.6	Verify the fuel oil transfer system operates to transfer fuel oil from storage tanks to the day tank.	31 days
SR 3.8.1.7	----------NOTE---------- This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ---------- Verify automatic transfer of AC power sources to the selected offsite circuit and manual transfer to the alternate required offsite circuit.	18 months
SR 3.8.1.8	----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- Verify on an actual or simulated loss of offsite power signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; and c. DG auto-starts from standby condition and: 1. achieves "ready-to-load" conditions in ≤ 15 seconds, 2. energizes permanently connected loads, 3. energizes auto-connected shutdown load through automatic load sequencing timers, and 4. supplies connected loads for ≥ 5 minutes.	18 months

	SURVEILLANCE	FREQUENCY
SR 3.8.1.9	----------NOTE---------- All DG starts may be preceded by an engine prelube period. --- Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; and c. DG auto-starts from standby condition and: 1. achieves "ready-to-load" conditions in ≤ 15 seconds, 2. energizes permanently connected loads, 3. energizes auto-connected emergency loads through load sequencing timers, and 4. supplies connected loads for ≥ 5 minutes.	18 months

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Inverters - Operating

LCO 3.8.7 The following inverters shall be OPERABLE.

a. Two Red Train inverters (Y11 and Y13, Y11 and Y15, or Y13 and Y15),

b. Two Green Train inverters (Y22 and Y24, Y22 and Y25, or Y24 and Y25), and

c. Inverter Y28

----------NOTE----------
One of the four inverters requried by LCO 3.8.7.a and LCO 3.8.7.b may be disconnected from its associated DC bus for ≤ 2 hours to perform load transfer to or from the swing inverter, provided:

a. The associated 120 VAC bus is energized from its alternate AC source; and

b. The other three 120 VAC buses are energized from their associated OPERABLE inverters.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One of the four inverters required by LCO 3.8.7.a and LCO 3.8.7.b inoperable.	A.1 ----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any of the 120 VAC buses RS1, RS2, RS3, or RS4 de-energized. ---------- Restore inverter to OPERABLE status.	24 hours AND 96 hours from discovery of failure to meet LCO

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Inverter Y28 inoperable.	B.1 ----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with 120 VAC bus C540 de-energized. ---------- Restore inverter to OPERABLE status.	72 hours AND 96 hours from discovery of failure to meet LCO
C. Inverter Y28 inoperable. AND One of the two Red Train inverters required by LCO 3.8.7.a inoperable.	C.1 Restore one inverter to OPERABLE status.	2 hours
D. Required Action and associated Completion Time not met. OR Two or more of the four inverters required by LCO 3.8.7.a and LCO 3.8.7.b inoperable.	D.1 Be in MODE 3. AND D.2 Be in MODE 5.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.7.1	Verify correct inverter voltage, frequency, and alignment to associated 120 VAC buses RS1, RS2, RS3, RS4, and C540.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

LCO 3.8.9 Two AC, DC, and 120 VAC electrical power distribution subsystems shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more AC electrical power distribution subsystem(s) inoperable.	A.1 Restore AC electrical power distribution subsystem(s) to OPERABLE status.	8 hours AND 16 hours from discovery of failure to meet LCO
B. One or more 120 VAC electrical power distribution subsystem(s) (RS1, RS2, RS3, RS4) inoperable.	B.1 Restore 120 VAC electrical power distribution subsystem(s) to OPERABLE status.	8 hours AND 16 hours from discovery of failure to meet LCO
C. 120 VAC electrical power distribution subsystem C540 inoperable.	C.1 Enter applicable Conditions and Required Actions of LCO 3.3.11, "Emergency Feedwater Initiation and Control (EFIC) System Instrumentation," LCO 3.3.15, "Post Accident Monitoring (PAM) Instrumentation," and LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage."	Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more DC electrical power distribution subsystem(s) inoperable.	D.1 Restore DC electrical power distribution subsystem(s) to OPERABLE status.	8 hours AND 16 hours from discovery of failure to meet LCO
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 5.	12 hours 36 hours
F. Two or more electrical power distribution subsystems inoperable that result in a loss of function.	F.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.9.1	Verify correct breaker alignments to required AC, DC, and 120 VAC bus electrical power distribution subsystems.	7 days

QUADRANT POWER TILT LIMITS AND SETPOINTS

(Figure is referred to by Technical Specification 3.2.4)

Measurement System	From 0 EFPD to EOC		
	Steady State Value (%)		Maximum Value (%)
	≤ 60% RTP	> 60% RTP	
Full In-core Detector System Setpoint	6.83	4.31	25.0
Minimum In-core Detector System Setpoint	2.78*	1.90*	25.0
Ex-core Power Range NI Channel Setpoint	4.05	1.96	25.0
Measurement System Independent Limit	7.50	4.92	25.0

* Assumes that no individual long emitter detector affecting the minimum in-core tilt calculation exceeds 73% sensitivity depletion. The setpoint must be reduced to 1.50% (power levels > 60% FP) and to 2.19% (power levels ≤ 60% FP) at the earliest time-in-life that this assumption is no longer valid.

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Question No. 1 **QID: 0608** **Point Value: 1**

Answer:

A. Reactor trip causes a Generator Lockout which closes SU #1 feeder breakers as long as the SU #2 feeder breakers are open.

Question No. 2 **QID: 0324** **Point Value: 1**

Answer:

A. Cycle ERV as required to quickly and effectively control the pressure rise.

Question No. 3 **QID: 0368** **Point Value: 1**

Answer:

C. Verify Reflux Boiling setpoint is selected on both EFIC trains.

Question No. 4 **QID: 0198** **Point Value: 1**

Answer:

A. To ensure adequate NPSH for ECCS pumps.

Question No. 5 **QID: 0609** **Point Value: 1**

Answer:

C. Seal beedoff temperature 60°F above 1st stage seal temperature

Question No. 6 **QID: 0610** **Point Value: 1**

Answer:

D. Maintain RCS inventory.

Question No. 7 **QID: 0611** **Point Value: 1**

Answer:

B. Stop P-34A Decay Heat pump and close CV-1404.

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Question No. 8 **QID: 0007** **Point Value: 1**

Answer:
c. 1717

Question No. 9 **QID: 0395** **Point Value: 1**

Answer:
b. To prevent the ERV opening, causing a rapid depressurization of the RCS.

Question No. 10 **QID: 0612** **Point Value: 1**

Answer:
A. T-hot indicates 485°

Question No. 11 **QID: 0551** **Point Value: 1**

Answer:
A. HPI on with all RCPs off

Question No. 12 **QID: 0552** **Point Value: 1**

Answer:
B. All 4160V busses de-energized

Question No. 13 **QID: 0553** **Point Value: 1**

Answer:
C. T-cold 545°F dropping slowly and SG pressures 990 psig dropping slowly.

Question No. 14 **QID: 0339** **Point Value: 1**

Answer:
b. de-energize RS-4.

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Question No. 15 **QID: 0613** **Point Value: 1**

Answer:

A. Verify reactor is tripped due to loss of power to RCP underpower monitor circuit.

Question No. 16 **QID: 0554** **Point Value: 1**

Answer:

A. Establish SW slowly to prevent DH cooler water hammer.

Question No. 17 **QID: 0555** **Point Value: 1**

Answer:

D. Trip the reactor and go to 1202.001, Reactor Trip.

Question No. 18 **QID: 0614** **Point Value: 1**

Answer:

B. 60°F (tubes hotter)

Question No. 19 **QID: 0557** **Point Value: 1**

Answer:

B. In automatic, an asymmetric rod runback bypasses the group "in limit".

Question No. 20 **QID: 0495** **Point Value: 1**

Answer:

C. The maximum batch size setting and commence adding boric acid to the make up tank.

Question No. 21 **QID: 0216** **Point Value: 1**

Answer:

b. A high primary to secondary DP is increasing primary coolant loss.

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Question No. 22 **QID: 0025** **Point Value: 1**

Answer:

a. Main Turbine Anticipatory trip.

Question No. 23 **QID: 0606** **Point Value: 1**

Answer:

C. RB Vent Header Isolation to T-17, CV-4804, closes to isolate any additions to system from RB vent header.

Question No. 24 **QID: 0558** **Point Value: 1**

Answer:

D. Motor driven EFW pump P-7B is initially used and then local control of steam driven EFW pump P-7A is established.

Question No. 25 **QID: 0162** **Point Value: 1**

Answer:

a. 360 MWe

Question No. 26 **QID: 0276** **Point Value: 1**

Answer:

a. Place EDG #1 output breaker in PULL-TO-LOCK and release.

Question No. 27 **QID: 0421** **Point Value: 1**

Answer:

a. Loss of Subcooling Margin (1202.002)

Question No. 28 **QID: 0615** **Point Value: 1**

Answer:

C. Non-nuclear ICW to RCP motor cooling flow is low.

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Question No. 29 **QID: 0432** **Point Value: 1**

Answer:

B. PZR level will continue to rise during this event.

Question No. 30 **QID: 0091** **Point Value: 1**

Answer:

B. 50°F/hr

Question No. 31 **QID: 0560** **Point Value: 1**

Answer:

B. Cooler outlet valve shut, cooler bypass valve 75% open, injection block valve shut.

Question No. 32 **QID: 0197** **Point Value: 1**

Answer:

B. High N2 pressure could cause RCS inventory to be lost out of the break in the event of a LOCA.

Question No. 33 **QID: 0071** **Point Value: 1**

Answer:

B. Throttle "A" flow to within 20 gpm of "C"

Question No. 34 **QID: 0561** **Point Value: 1**

Answer:

D. Quench Tank pressure 3.5 psig after a 3 minute blow of the ERV.

Question No. 35 **QID: 0294** **Point Value: 1**

Answer:

b. Provide sufficient cooling-quench water during pressurizer operations.

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Question No. 36 **QID: 0562** **Point Value: 1**

Answer:

B. P33A is powered from B-12 while P33B and P33C are powered from B-22.

Question No. 37 **QID: 0072** **Point Value: 1**

Answer:

d. Trip the reactor

Question No. 38 **QID: 0306** **Point Value: 1**

Answer:

D. Two Reactor Coolant Pumps trip at 100% power

Question No. 39 **QID: 0307** **Point Value: 1**

Answer:

a. One out-of-two

Question No. 40 **QID: 0266** **Point Value: 1**

Answer:

A. HPI pumps and LPI pumps

Question No. 41 **QID: 0564** **Point Value: 1**

Answer:

C. Raise RB Spray flow using DH-9, DH-10 Bypass valve.

Question No. 42 **QID: 0135** **Point Value: 1**

Answer:

c. ES channels 5 & 6, VSF-1A, 1B, 1C, & 1D running with service water aligned to the cooling coils.

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Question No. 43 **QID: 0444** **Point Value: 1**

Answer:
c. 100% Cooling/200% Iodine

Question No. 44 **QID: 0314** **Point Value: 1**

Answer:
c. 1020 psig

Question No. 45 **QID: 0565** **Point Value: 1**

Answer:
B. Feedwater loop B demand is greater than feedwater loop A demand.

Question No. 46 **QID: 0195** **Point Value: 1**

Answer:
c. 'B' MFP Suction Pressure computer point (P2830)

Question No. 47 **QID: 0566** **Point Value: 1**

Answer:
C. To start EFW Pump P-7B.

Question No. 48 **QID: 0140** **Point Value: 1**

Answer:
A. Loss of Seal Injection, verify seal cooling is maintained

Question No. 49 **QID: 0616** **Point Value: 1**

Answer:
B. Startup #2 Transformer

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Question No. 50 **QID: 0617** **Point Value: 1**

Answer:
D. Reactor would trip.

Question No. 51 **QID: 0568** **Point Value: 1**

Answer:
C. Five

Question No. 52 **QID: 0089** **Point Value: 1**

Answer:
A. Verify no flow on Discharge to Flume, FI-4642

Question No. 53 **QID: 0211** **Point Value: 1**

Answer:
d. Start P-4C, stop P-4B, swap P-4B MOD (A6) to the A3 supply and start P-4B.

Question No. 54 **QID: 0227** **Point Value: 1**

Answer:
b. Close Unit 1 to Unit 2 Instrument Air cross-connect.

Question No. 55 **QID: 0569** **Point Value: 1**

Answer:
B. Failure to perform a LLRT on emergency hatch within 7 days after opening.

Question No. 56 **QID: 0262** **Point Value: 1**

Answer:
d. Rods go full out, Tave goes down, power stays the same.

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Question No. 57 **QID: 0604** **Point Value: 1**

Answer:
A Initiate HPI per RT-2.

Question No. 58 **QID: 0571** **Point Value: 1**

Answer:
C. ICS would insert control rods and raise feedwater.

Question No. 59 **QID: 0572** **Point Value: 1**

Answer:
C. Neither ICCMDS train's mimic display or local displays are updating.

Question No. 60 **QID: 0573** **Point Value: 1**

Answer:
B. Taking a suction on the Fuel Transfer Canal, through the purification loop and then discharging to the DHR system.

Question No. 61 **QID: 0201** **Point Value: 1**

Answer:
c. 300-340 inches.

Question No. 62 **QID: 0574** **Point Value: 1**

Answer:
B. ~18%

Question No. 63 **QID: 0575** **Point Value: 1**

Answer:
C. 995 psig and 547°F

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Question No. 64 **QID: 0196** **Point Value: 1**

Answer:
c. A high radiation setpoint has been exceeded on SPING 1.

Question No. 65 **QID: 0619** **Point Value: 1**

Answer:
D. Manually operate the Operate switch for the Cable Spreading Room on C463.

Question No. 66 **QID: 0620** **Point Value: 1**

Answer:
C. Less than or equal to 240 °F/hour

Question No. 67 **QID: 0079** **Point Value: 1**

Answer:
d. Open RB purge outlets first, then open inlets.

Question No. 68 **QID: 0576** **Point Value: 1**

Answer:
B. RCS temperature is between 200 °F and 280 °F

Question No. 69 **QID: 0116** **Point Value: 1**

Answer:
c. plus or minus 0.5% delta k/k
control rods to achieve 1.5% SD margin
verify calculation

Question No. 70 **QID: 0621** **Point Value: 1**

Answer:
B. Verifier

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Question No. 71 **QID: 0390** **Point Value: 1**

Answer:
d. Sequence inhibit.

Question No. 72 **QID: 0605** **Point Value: 1**

Answer:
C. Individual's supervisor recommends, RP Manager approves, and Plant General Manager concurs

Question No. 73 **QID: 0579** **Point Value: 1**

Answer:
C. Aligning HPI to provide PZR Aux Spray

Question No. 74 **QID: 0580** **Point Value: 1**

Answer:
D. RCS Tavg

Question No. 75 **QID: 0128** **Point Value: 1**

Answer:
A. RCS leakage indicates greater than 50 gpm.

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Question No. 76 **QID: 0581** **Point Value: 1**

Answer:

A. Loss of Inventory

Question No. 77 **QID: 0331** **Point Value: 1**

Answer:

c. 1202.011, HPI Cooldown

Question No. 78 **QID: 0584** **Point Value: 1**

Answer:

B. No, this could overstress reactor vessel.

Question No. 79 **QID: 0586** **Point Value: 1**

Answer:

D. Within 84 hours

Question No. 80 **QID: 0587** **Point Value: 1**

Answer:

A. 3.8.7 Condition "A"

Question No. 81 **QID: 0588** **Point Value: 1**

Answer:

B. 1202.004, Overheating

Question No. 82 **QID: 0589** **Point Value: 1**

Answer:

D. Borate to restore SDM within 1 hour and place the plant in Mode 3 within 6 hours.

Question No. 83 **QID: 0590** **Point Value: 1**

Answer:

B. Immediately suspend positive reactivity additions and initiate a shutdown so that all CRD breakers are open within one hour.

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Question No. 84 **QID: 0591** **Point Value: 1**

Answer:
C. 1203.047, Loss of NNI Power

Question No. 85 **QID: 0592** **Point Value: 1**

Answer:
B. 1203.041, Small Break LOCA cooldown

Question No. 86 **QID: 0594** **Point Value: 1**

Answer:
A. 1203.015, Pressurizer Systems Failure

Question No. 87 **QID: 0607** **Point Value: 1**

Answer:
C. 1203.026, Loss of Reactor Coolant Makeup, Section 2 - Large Makeup and Purification System Leak

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Question No. 88 **QID: 0596** **Point Value: 1**

Answer:
B. 3.6.5 Required Action C.1

Question No. 89 **QID: 0597** **Point Value: 1**

Answer:
B. Refueling Abnormal Operations, 1203.042, and Annunciator Corrective Action, 1203.012

Question No. 90 **QID: 0598** **Point Value: 1**

Answer:
C. Perform SR 3.8.1.1

Question No. 91 **QID: 0570** **Point Value: 1**

Answer:
A. 1203.022, Reactor Coolant Pump Trip

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Question No. 92 **QID: 0599** **Point Value: 1**

Answer:
D. Restore one channel to operable status within 7 days or be in Mode 3 within 6 hours.

Question No. 93 **QID: 0600** **Point Value: 1**

Answer:
C. Halt operations on the Main Fuel Bridge. Core geometry cannot be changed unless two neutron flux monitors are operable.

Question No. 94 **QID: 0601** **Point Value: 1**

Answer:
C. Reduce applicable RPS trip setpoints 6%

Question No. 95 **QID: 0252** **Point Value: 1**

Answer:
b. Reactor coolant temperature goes below 525 °F.

Question No. 96 **QID: 0409** **Point Value: 1**

Answer:
A. A deletion of a parameter for the SPDS Alternate Shutdown display, A/S-G.

Question No. 97 **QID: 0119** **Point Value: 1**

Answer:
b. CFT level

Question No. 98 **QID: 0120** **Point Value: 1**

Answer:
C. 15 minutes

Question No. 99 **QID: 0123** **Point Value: 1**

Answer:
D. Loss of Decay Heat Removal results in RCS temperature at 220°F.

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Question No. 100 **QID: 0602** **Point Value: 1**

Answer:

C. RT-12, Emergency Boration to ensure the reactor is shutdown