ARKANSAS NUCLEAR ONE, UNIT 1

INITIAL EXAMINATIONS DECEMBER 13-19, 1999

DRAFT WRITTEN

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

Applicant Information

Name:	Region: I / II / III / IV
Date:	Facility/Unit: Arkansas Nuclear One Unit 1
License Level: RO / SRO	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. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected five hours after the examination starts.

Applicant Certification

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

_____ Applicant's Signature

Results

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

Question No. 1 **QID: 0030**

During a small break LOCA cooldown, which of the following criteria must be met before High Pressure Injection may be secured?

a. Restoration of adequate subcooling margin.

b. Total low pressure injection flow >2800 gpm.

c. Restoration of forced flow cooling.

d. At least one OTSG is available as a heat sink.

Question No. 2 **QID: 0058**

A startup is in progress. The reactor is critical and the CBOR is commencing power escalation to <2% reactor power. The following indications are observed:

NI-3 1 x 10-8 amps
NI-4 8 x 10-7 amps
NI-5 0.8%
NI-6 1.1%
NI-7 1.3%
NI-8 1.2%

What conclusion should you deduce from the above indications?

a. Power Range channel 5 requires calibration.

b. The Intermediate Range channels are overcompensated.

c. The POAH has not yet been reached.

d. The Intermediate Range channels are undercompensated.

Question No. 3 **QID: 0158**

The outside door of the personnel lock was opened to replace a seal gasket 24 hours ago.

How long does operations have to perform an LLRT on the personnel lock before a loss of containment integrity will exist?

a. 1 hour

b. 12 hours

c. 6 days

d. 13 days

Question No. 4 **QID: 0204**

The #2 EDG monthly surveillance is in progress with the EDG on-line and fully loaded.

EDG 2 Non-critical Trouble (K01-D4) is in alarm.
EDG 2 Critical Trouble (K01-C4) comes into alarm.
The Outside AO reports that EDG 2 Fuel Oil Transfer Pump P-16B is tripped and will NOT start.
The Inside AO reports that the T-30B day tank level is ~180 gallons and going down slowly.

Which of the following is correct with regard to #2 EDG status?

a. EDG 2 is operable because fuel oil can be supplied from EDG 1 transfer pump P-16A.

b. EDG 2 is inoperable because the level in T-30A being is <190 gallons.

c. EDG 2 is operable because Emergency Fuel Storage Tank T-57B is full.

d. EDG 2 is inoperable because EDG 2 Fuel Oil Transfer Pump P-16B is inoperable.

Question No. 5 **QID: 0217**

During HPI Cooldown, pump suctions are shifted from the Borated Water Storage Tank to the reactor building sump when the Borated Water Storage Tank level is:

a. 4 feet

b. 6 feet

c. 8 feet

d. 10 feet

Question No. 6 **QID: 0240**

Given:

Plant is at 100% power
All CETs indicate 602 °F

ICC train "B" Core Exit Thermocouple TE-1152 fails to 900 °F.

What is the effect of this failure?

a. Core Exit Thermocouple TE-1152 will be removed from the average.

b. ICC Core Exit Thermocouple indication will go to ~627 °F.

c. "TRAIN B SUBCLG MARG LO" annunciator will alarm.

d. "B" SPDS will switch from ATOG to the ICC display.

Question No. 7 **QID: 0241**

Reactor Building Service Water Coolers are in service.

Reactor Building Cooling Coils VCC-2A and VCC-2B should be isolated if:

a. Service Water Loop 1 and Discharge Flume process radiation monitors alarm.

b. Service Water Loop 1 and Service Water Loop 2 process radiation monitors alarm.

c. Service Water Loop 2 process radiation monitor alarms and Reactor Building Sump level is rising.

d. Service Water Loop 2 process radiation monitor alarms and low Service Water Loop 2 flow.

Question No. 8 **QID: 0242**

What instruments are marked with a green dot?

a. Instruments designated for use during an alternate shutdown.

b. Instruments that should be reliable during accident conditions.

c. Instruments the Shift Engineer uses after a reactor trip.

d. Instruments designated for use during a loss of NNI-Y power.

Question No. 9 **QID: 0243**

What is ANO's emergency control limits for emergency exposures for vital equipment protection?

a. Planned dose shall not exceed 5 Rem TEDE.

b. Planned dose shall not exceed 10 Rem TEDE.

c. Planned dose shall not exceed 25 Rem TEDE.

d. Planned dose shall not exceed 75 Rem TEDE.

Question No. 10 **QID: 0244**

Only operations personnel are authorized to manipulate plant equipment. 1015.001, Conduct of Operations, specifies exceptions to this guidance. Which of the following would NOT satisfy those exceptions?

a. Chemistry personnel operating sample valves per chemistry procedures.

b. Entergy employee opening a service air connection isolation.

c. Operation of equipment under the direct supervision of the Auxiliary Operator.

d. System engineer closes a valve while troubleshooting a water hammer concern.

Question No. 11 **QID: 0245**

The feedwater/condensate system startup is in progress. A main feedwater isolation valve had been closed by operation of the manual handwheel to isolate the system.

Prior to declaring this valve operable what action must be taken?

a. The valve must be fully opened using the local handwheel.

b. Electricians must check the torque switch adjustment.

c. The torque required to remove valve from seat must be below the limit.

d. The valve must be stroked electrically to confirm proper clutch engagement.

Question No. 12 **QID: 0246**

How is the oncoming operator supposed to verify the correct number of keys are on his key ring during turnover?

a. Check current key lists in the keybox.

b. Check the number specified in the key log procedure.

c. Check against the number on the brass tag on the key ring.

d. Check the number listed on the shift turnover log from last shift.

Question No. 13 **QID: 0247**

A tagout is required on the "A" makeup pump. Which shift personnel are qualified to perform the tagout boundary verification, if the tagout was prepared by a non-licensed operator?

a. Control Board Operator or Auxiliary Operator.

b. Auxiliary Operator or Shift Engineer.

c. Control Room Supervisor or Waste Control Operator.

d. Control Board Operator or Shift Superintendent.

Question No. 14 **QID: 0248**

Given:

The plant is at 100 % power
Decay Heat Pump P-34A is out of service
Service Water Pumps P-4A and P-4B are operating.

Which event would make Decay Heat Pump P-34B inoperable?

a. Lockout relay trip deenergizes A-2

b. Emergency Diesel Generator 1 start time is 16.2 seconds.

c. Service Water Pump P-4C motor fails.

d. LPI Room Cooler VUC-1C is declared inoperable.

Question No. 15 **QID: 0249**

The federal limit for exposure to the skin of the whole body is:

a. 5 Rem/year

b 15 Rem/year

c 40 Rem/year

d. 50 Rem/year

Question No. 16 **QID: 0250**

Movement of a fuel assembly that does NOT follow the sequence in the approved fuel shuffle procedure requires prior approval of:

a. SRO in Charge of Fuel Handling and Shift Operations Superintendent

b. Shift Operations Superintendent and Reactor Engineer

c. Reactor Engineer and SRO in Charge of Fuel Handling

d. SRO in Charge of Fuel Handling and Reactor Building Coordinator

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Question No. 17 **QID: 0251**

You are assigned to perform a valve lineup.
The valve lineup requires you to enter an area posted as 10mR/hr.
After 30 minutes your alarming dosimeter reads 60 mR.

What should you do?

a. Exit the area and notify Health Physics.

b. Notify Health Physics and continue with the alignment.

c. Exit the area, reset your dosimetry and continue with the alignment.

d. Continue with the alignment and notify the Shift Superintendent when completed.

Question No. 18 **QID: 0252**

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

Which condition, if not corrected within 15 minutes, would require a plant shutdown within the following 15 minutes?

a. One pressurizer code safety valve is declared inoperable.

b. Reactor coolant temperature is below 525 °F.

c. Reactor coolant system Hot Leg high point vents inoperable.

d. Pressurizer level stable at 100 inches.

Question No. 19 **QID: 0253**

ICS is in full automatic and the CBOR is verifying proper plant response to a main feedwater pump trip from 75% power.

Which of the following should the CBOR expect to occur?

a. The operating main feedwater pump demand has a 30% bias added.

b. The pressurizer spray valve opens immediately and closes when RCS pressure reaches 2030 psig.

c. The control rods insert immediately due to a bias subtracted from the demand.

d. The main feedwater block valves close immediately in fast speed.

Question No. 20 **QID: 0254**

Given:

EFW started 10 minutes ago
EFW pump P-7A speed is 900 RPM

Which of the following would cause these indications?

a. EFW Pump P-7A governor valve has lost power.

b. EFW Pump P-7A trip/throttle valve does not indicate full open.

c. EFW steam admission valve CV-2613 is closed.

d. EFW Pump P-7A governor valve has an oil leak.

Question No. 21 **QID: 0255**

Given:

Plant startup is in progress.
The plant is at 35% power
"A" Main Feedwater Pump is in service
"B" Main Feedwater Pump is at minimum speed
"B" Main Feedwater Pump Anticipatory Reactor Trip is NOT reset

A malfunction of the "A" Main Feedwater Pump control oil system causes "A" Main Feedwater Pump auto stop oil pressure to go rapidly to 0 (zero) psig.

What effect does this failure have on the plant?

a. ATWS Mitigation Actuation and Control will trip the plant and start Emergency Feedwater.

b. Both OTSG levels will go less than 14.5 inches and start Emergency Feedwater.

c. RPS will trip the plant and start Emergency Feedwater on loss of both Main Feedwater Pumps.

d. High Reactor Coolant System pressure will trip the plant and start Emergency Feedwater.

Question No. 22 **QID: 0256**

Why are Decay Heat Cooler Outlet Valves SW-22A and SW-22B throttled during normal operation?

a. Service water flow to the Auxiliary Cooling Water System is raised during normal operation.

b. Maintains adequate service water flow to the Reactor Building Coolers when ES actuates.

c. Reactor coolant to service water differential temperature is reduced when ES actuates.

d. Decay heat coolers are maintained full and reduces the chance of water hammer.

Question No. 23 **QID: 0257**

Given:

Reactor startup is in progress
Group 6 is 50% withdrawn.
NI-1 source range indicates .1 cps
NI-2 source range indicates 30 CPS

Which of the following would cause these indications?

a. Source range NI-2 discriminator voltage is set too high.

b. Inverter Y-28 failed resulting in a loss of power.

c. Inverter Y-11 failed resulting in a loss of power.

d. Source range NI-1 discriminator voltage is set too low.

Question No. 24 **QID: 0258**

Given:

"A" HPI pump is operating.
Makeup tank level is 80 inches.
Makeup tank pressure is 12 psig.
RCS sampling is in progress.

With no operator action, what will occur if the Makeup Tank Inlet Valve MU-12 was accidentally closed by chemistry personnel?

a. "A" HPI pump will be damaged due to loss of suction.

b. The makeup tank relief valve will open on low pressure.

c. The RCP seals will be damaged due to low seal injection flow.

d. The makeup tank outlet valve will close on low level.

Question No. 25 **QID: 0259**

What is the purpose and function of the temperature interlock associated with letdown isolation valve CV-1221?

a. Prevents releasing of steam through the letdown relief valve by opening CV-3891 for relief path cooler.

b. Prevents exceeding letdown piping thermal limits by shutting CV-1213 & 1215 (letdown cooler inlet MOV).

c. Prevents degrading T36A/B resin by shutting CV1221 (letdown isolation).

d. Prevents exceeding letdown cooler capacity by shutting CV1213 & 1215 (letdown cooler inlet MOV).

Question No. 26 **QID: 0260**

With CV1207 RCP seal injection control valve in hand, which one of the following events would cause seal injection flow to go up?

a. Low pressurizer level.

b. Instrument air line to the Lower North Piping Room ruptures.

c. Opening of CV-1228 (HPI block valve to P32A discharge).

d. Operator raises letdown flow.

Question No. 27 **QID: 0261**

Given:

The plant is at 30 % power.
Main Feedwater Pump P-1A is in service.
Main Feedwater Pump P-1B is shutdown.
Condensate pumps P-2A and P-2C are in service.

Explain the response of "B" condensate pump, if "C" condensate pump trips.

a. Condensate pump low discharge pressure will auto-start condensate pump P-2B.

b. Condensate pump P-2C tripping will auto-start condensate pump P-2B.

c. Condensate pump P-2B will remain off since the plant is operating at a power level less than 40%.

d. Condensate pump P-2B will remain off since Main Feedwater Pump P-1B is not latched.

Question No. 28 **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. 29 **QID: 0263**

Given:

All RCPs are operating.
The plant is at 40 % power.
Time in core life is 325 EFPD.

What is the lowest allowed control rod position for continuous plant operation?

a. Group 6 at 26 %

b. Group 6 at 56 %

c. Group 5 at 71%

d. Group 6 at 36%

Question No. 30 **QID: 0265**

Given:

Reactor tripped 1 minute ago due to low RCS pressure.
ESAS has actuated due to high Reactor Building pressure.
RCS pressure is 1600 psig.
Core Exit Thermocouple temperature is 475 °F.

Which of the following actions should be taken for these conditions?

a. Restore RCP services.

b. Leave one RCP running in each loop.

c. Isolate RCP seal bleedoff.

d. Trip all running RCPs.

Question No. 31 **QID: 0266**

Given:

All controls are in automatic

RCS pressure 1255 psig, slowly dropping

Reactor Building pressure is 49 psia

"A" and "B" OTSG levels at 390 inches

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

a. EFW pumps and LPI pumps

b. RB spray pumps and LPI pumps

c. RB spray pumps and EFW pumps

d. HPI pumps and RB spray pumps

Question No. 32 **QID: 0267**

The CBOR observes a change in seal injection flow rates and notes the following values:

"A" RCP	6.5 gpm
"B" RCP	15.0 gpm
"C" RCP	5.0 gpm
"D" RCP	6.0 gpm

Which of the following explains the seal injection flow indications?

a. Reactor Coolant Pump P-32B trip due to a motor fault.

b. Seal injection line break in the Upper North Piping Penetration Room .

c. "B" Reactor Coolant Pump seal cooler leak.

d. "B" seal injection flow transmitter failure.

Question No. 33 **QID: 0268**

Given:

Both Main Feedwater Loop Demands and "A" MFW Pump are in Hand.
All other ICS stations which may be in Auto are in Auto.
The operator is performing a controlled plant shutdown.
When the "A" Main Feedwater Block Valve starts to go shut, the operator continues to lower "A" MFW Pump speed.

What will this result in?

a. Cross limits increasing Reactor power.

b. Delta Tc opening the "B" Low Load Control Valve to compensate.

c. The "A" Main Feedwater Block Valve stopping its movement.

d. The Turbine rejecting to "Operator Auto."

Question No. 34 **QID: 0269**

The assured water source to the Emergency Feedwater System is:

a. Main Feedwater

b. Condensate Storage Tank

c. Circulating Water System

d. Service Water System

Question No. 35 **QID: 0270**

Given a SG pressure of 925 psig, determine the proper OTSG fill rate by EFIC for the EFW system:

a. ~3"/min

b. ~4"/min

c. ~5"/min

d. ~6"/min

Question No. 36 **QID: 0271**

Which of the following must be performed to release T-16A contents with the Liquid Radwaste Process Monitor (RI-4642) inoperable?

a. Chemistry personnel must estimate radiation level every four hours during the release.

b. A Waste Control Operator must independently verify release path alignment prior to release.

c. The release flow rate must be estimated at least once every three hours during the release.

d. Discharge Flume process monitor RI-3618 must be checked for operability.

Question No. 37 **QID: 0272**

When a high radiation condition occurs in the Waste Gas Discharge Header, the radiation monitor will cause what combination of automatic action(s) to occur?

1. Nitrogen is added for dilution.
2. The Aux. Building Vent Header diverts to the Waste Gas Surge Tank.
3. The Waste Gas Decay Tank effluent control valve (CV-4820) shuts.
4. The Aux. Building Vent Header diverts to the Waste Gas Decay Tank in service.

a. 1 and 2

b. 2 and 3

c. 3 and 4

d. 1 and 4

Question No. 38 **QID: 0273**

The in-service Unit 1 Control Room Supply Vent Radiation Detector, 2RITS-8001A, detects a high radiation condition.

Which of the following will occur?

a. Control Room Air Supply Fan (VSF-8A or 8B) starts.

b. Control Room Chiller Unit (VCH-2A or 2B) trips.

c. Normal ventilation ducts are isolated automatically.

d. 2VSF-9 (CR Emerg. A/C Fan) starts.

Question No. 39 **QID: 0274**

What would be the consequences if the Reactor Building Cooler Chilled Water Bypass Dampers remained latched after an ESAS actuation?

a. Damage to RB ventilation plenum from excessive pressure

b. Excessive heat load on the Chilled Water System

c. Inadequate air flow through the Service Water Cooling Coils

d. Excessive current on the cooling fan motors

Question No. 40 **QID: 0275**

Due to plant conditions an RCP is to be bumped per EOP Repetitive Task 11.

What operator action is required by RT-11 to prevent breakers A-309 and A-409 from tripping?

a. Place bus B5 & B6 UV protection switches in BYPASS.

b. Open test switches on A3 & A4 to bypass UV relays.

c. None, B5 & B6 UV protection relays are auto bypassed on RCP starts.

d. Align B5 or B6 to the train opposite that with the RCP to be bumped.

Question No. 41 **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. 42 **QID: 0277**

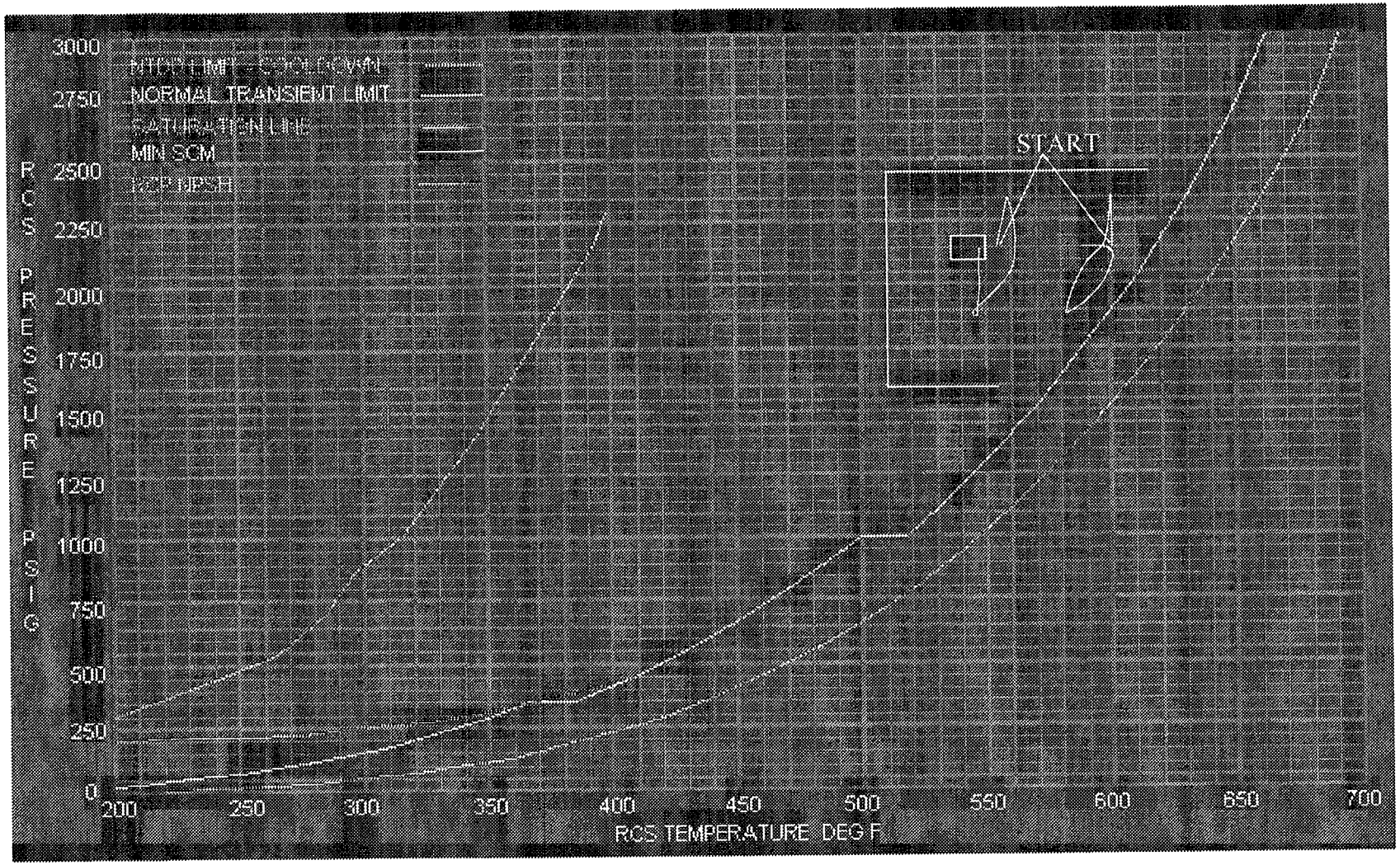
What transient is represented by the atttached ATOG trace?

a. Steam line break

b. RCS cold leg break

c. Loss of off-site power

d. Loss of both Main FW pumps


NORMAL TRANSIENT LIMIT
MIN SCM
START
RCS PRESSURE PSIG
3000
2750
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
200
250
300
350
400
450
500
550
600
650
700
RCS TEMPERATURE DEG F

Question No. 43 **QID: 0279**

Given:

The plant is in a blackout condition.
Startup transformer #1 primary voltage is 19 KV.
Unit 2 vital and non-vital buses are aligned to startup transformer #2.
Startup transformer #2 voltage is 155 KV.

How should off-site power be restored to the plant?

a. Verify 1202.008, Att. 1, "Blackout Breaker Alignment UV Defeat", complete then close feeder breakers from startup transformer #1.

b. Check acceptable loading on startup transformer #2 then close the feeder breakers from startup transformer #2.

c. Verify 1202.008, Att. 2, "Recovery from Blackout Breaker Alignment and UV Defeat", complete then close feeder breakers from startup transformer #1.

d. Check the autotransformer is aligned to startup transformer #2, then close the feeder breakers from startup transformer #2.

Question No. 44 **QID: 0280**

The plant is operating at 70% when the following indications are observed:

Loop "A" RC Flow is 35 mlb/hr
Loop "B" RC Flow is 70 mlb/hr
FW RERATIO ON LOSS OF RC-FLOW ENABLED is in alarm

What is the cause of these indications?

a. Reactor Coolant Pump P-32C trip.

b. Reactor Coolant Pump P-32A trip.

c. Reactor Coolant Pump P-32C sheared shaft.

d. Reactor Coolant Pump P-32A sheared shaft.

Question No. 45 **QID: 0281**

Service Water Pumps P-4A, P-4B (supplied from A-4), and P-4C are running. An ES actuation coincident with a loss of off-site power occurs.

Which service water pumps will autostart when A-3 and A-4 are re-energized?

a. P-4A, P-4B and P-4C

b. P-4A and P-4B

c. P-4B and P-4C

d. P-4A and P-4C

Question No. 46 **QID: 0282**

Given:

Unit 1 is at 100% power.
ICW pumps P-33A and P-33B are in service.

Subsequently the ICW pump supplying the Non-Nuclear ICW loop trips. Which of the following actions should you verify as the proper system response to the above conditions?

a. P-33B and P-33C running
P-33A to P-33B suction and discharge crosstie valves open
P-33B to P-33C suction and discharge crosstie valves closed

b. P-33A and P-33C running
P-33A to P-33B suction and discharge crosstie valves closed
P-33B to P-33C suction and discharge crosstie valves open

c. P-33B and P-33C running
P-33A to P-33B suction and discharge crosstie valves open
P-33B to P-33C suction and discharge crosstie valves open

d. P-33A and P-33C running
P-33A to P-33B suction and discharge crosstie valves closed
P-33B to P-33C suction and discharge crosstie valves closed

Question No. 47 **QID: 0283**

The plant is operating at 100% power.
Group 7 CRAs can not be moved on the normal or auxiliary power supply.

What operator action is required?

a. Declare Group 7 INOPERABLE and borate the plant to Hot Shutdown.

b. Declare Group 7 INOPERABLE and shutdown using remaining rod groups.

c. Exercise all other rods, verify 1.5% SDM, and continue operation.

d. Initiate Emergency Boration and trip the reactor.

Question No. 48 **QID: 0284**

Insufficient Pressurizer spray valve bypass spray flow can result in low spray line temperatures. What is the Tech Spec limit on spray fluid to Pressurizer differential temperature?

a. 450 degrees F

b. 430 degrees F

c. 350 degrees F

d. 100 degrees F

Question No. 49 **QID: 0285**

Following a turbine and reactor trip, an overcooling transient is occurring due to a stuck open safety.

The affected SG pressure is 825 psig and falling.

What actions are taken to seat the MSSV per the Overcooling procedure?

a. Actuate Main Steam Line Isolation for the SG with the lowest pressure.

b. Quickly reduce the lowest SG pressure to 700 psig or the MSSV open alarm is clear.

c. Trip both Main Feedwater pumps, actuate EFW, and perform RT-5.

d. Shut the Main Feedwater Isolation Valve for the affected Steam Generator.

Question No. 50 **QID: 0286**

Identify the post trip RCS Tcold temperature stated in the Reactor Trip EOP below which entry into the overcooling procedure is required?

a. 560 degrees F.

b. 550 degrees F.

c. 540 degrees F.

d. 530 degrees F.

Question No. 51 **QID: 0287**

Why is the Main Turbine tripped when condenser vacuum is less than 26.5 inches and turbine load is less than 270 megawatts?

a. Prevent Main Turbine blade damage due to excessive heating.

b. Prevent condenser tube bundle damage due to excessive heating.

c. Prevent personnel hazard due to blowing out of condenser rupture discs.

d. Prevent damage to the main condenser flexible boot due to overpressure.

Question No. 52 **QID: 0288**

Given:

Following a Reactor Trip all NNI-X power is lost.
RCS pressure is at 1800 psig and trending down slowly.

Which of the following explains the RCS pressure trend?

a. Pressurizer automatic heater control is inoperable.

b. Pressurizer spray valve has failed to 40% open.

c. ERV has shifted to the LTOP pressure setpoint.

d. Loss of AC power to RCS pressure instruments.

Question No. 53 **QID: 0289**

For reflux boiling to be effective, the primary steam bubble must extend:

a. below the high point of the Tcold.

b. above the secondary side water level.

c. below the secondary side water level.

d. above the upper tube sheet.

Question No. 54 **QID: 0290**

During a large break LOCA, RCP's have been secured due to loss of Subcooling Margin. Which one of the following indicates that the reactor core is covered?

a. SPDS automatically switches from the ATOG display to the ICC display.

b. The A Hot Leg temperature indicator indicates superheated conditions.

c. The RCS is saturated as indicated by Core Exit Thermocouples.

d. ICCMDS display indicates voids in the Reactor Vessel head and hot legs.

Question No. 55 **QID: 0291**

The SS & CRS are performing Alternate Shutdown, Delayed Control Room Evacuation, followup actions. Followup actions direct that the P7A EFW Flow Control valves (CV-2645 and CV-2647) are to be placed in HAND and throttled full open while throttling closed on the EFW Isolations (CV-2627 & CV-2620), to maintain proper EFW flow.

The reason for this step is:

a. The EFW Isolation valves tend to stick if kept in the full open position.

b. The EFW Control Valves will fail in the closed position if the valves are not locally pinned open. This sets the proper position to pin the valves.

c. This will leave the isolation valves in the proper position when instrument air is removed locally by RO #1.

d. To allow for removal of DC power from the EFW Flow Control valves and to prevent overcooling.

Question No. 56 **QID: 0292**

Reactor trip occurred.
ICCMDS indicates Subcooling Margin is 10°F.

Which of the following actions should be taken?

a. If less than two minutes has elapsed, then trip all RCPs.

b. If more than two minutes has elapsed, then trip all RCPs.

c. If less than two minutes has elapsed, then trip one RCP in each loop.

d. If more than two minutes has elapsed, then trip all but one RCP.

Question No. 57 **QID: 0293**

Given:

Plant is in Cold Shutdown

"B" Decay Heat pump is running

Which of the following would cause a loss of Decay Heat Removal?

a. A-1 voltage of 3300 volts

b. A-2 voltage of 3300 volts

c. B-5 voltage of 415 volts

d. B-6 voltage of 415 volts

Question No. 58 **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. 59 **QID: 0295**

Given:

80% power

P33C (ICW Pump) out of service

With no operator action, what affect would a loss of instrument air pressure have?

a. ICW pump runout

b. Low RCP motor cooling flow

c. High main feed pump oil temperature

d. Loss of ICW flow to RCP seals

Question No. 60 **QID: 0296**

Given:

Startup is in progress.
Turbine-Generator is in Integrated Control.
Generator load is 175 megawatts.
Turbine header pressure is 895 psig (at setpoint).

At what pressure will the Turbine Bypass Valves open and close?

a. Turbine Bypass Valves open at 905 psig and close when header pressure is less than 895 psig.

b. Turbine Bypass Valves open at 945 psig and close when header pressure is less than 945 psig.

c. Turbine Bypass Valves open at 995 psig and close when header pressure is less than 905 psig.

d. Turbine Bypass Valves open at 945 psig and close when header pressure is less than 895 psig.

Question No. 61 **QID: 0297**

Placing the OPC test switch in the OPC test position will:

a. Block the actuation of the Overspeed Protection Controller.

b. Simulate an electronic overspeed trip signal.

c. Actuate the Overspeed Protection Controller.

d. Block the actuation of the electronic overspeed trip signal.

Question No. 62 **QID: 0298**

Why does service water pressure drop during an inadvertent actuation of ES channel 5 ?

a. The SW valves to the RB Cooler on that channel will open.

b. There are more flow demands on the SW Systems during ES actuation.

c. The SW valves will automatically realign to Emergency Pond suction.

d. The SW Loop One and Loop Two cross ties will close.

Question No. 63 **QID: 0299**

The plant is at 80% power. The NI SASS mismatch alarm is bypassed due to a mismatch. What would be the predicted plant response if NI-6 failed to 125%?

a. Control rods move inward, feedwater flows go up.

b. Control rods move inward, feedwater flows do down.

c. Control rods move outward, feedwater flows go up.

d. Control rods move outward, feedwater flow go down.

Question No. 64 **QID: 0300**

Given:

The plant is at 25% power.
ICS Unit Load Demand (ULD) and "B" Main Feed Pump (MFP) stations are in Hand.
"A" MFP is in automatic.
The Feedwater Pumps Discharge Crosstie valve is open.

The automatic control of "A" MFP is being provided by:

a. High auctioneered delta-P across the main block valve

b. Low auctioneered startup flow and delta-P across the startup control valves

c. "A" Loop feedwater demand and feedwater flow error

d. "A" Loop feedwater demand and Low Auctioneered delta-P across the main blocks

---

Question No. 65 **QID: 0301**

How is it determined which pressurizer relief valve is in alarm?

a. The relief valve position indicator light on C-486 shows which PSV is open.

b. The K09 control room annunciator identifies which relief valve is open.

c. Red light on relief monitor on C-486 will flash on the relief that is open.

d. By checking the analog position indication and Hi-alarm lights on panel C-486.

Question No. 66 **QID: 0302**

Given:

The reactor tripped due to a small break LOCA.
Pressure has stabilized at 800 psig.
RCS temperature is 500 °F and slowly rising.

Which of the following is appropriate?

a. Start Reactor Coolant Pumps and establish forced flow cooling.

b. Take actions to establish primary to secondary heat transfer cooling.

c. Continue cooling with the existing break flow.

d. Commence High Pressure Injection cooldown.

Question No. 67 **QID: 0303**

Which of the following occurs when HPI is automatically actuated on low RCS pressure?

a. RCP Seal INJ Block Valve CV-1206 receives an open signal.

b. Makeup Tank Outlet Valve automatically closes.

c. Decay Heat Cooler Outlet to HPI pump suction CV-1276 automatically opens.

d. RCS Makeup Block Valve CV-1234 receives a close signal.

Question No. 68 **QID: 0304**

Given:

A degraded power condition is present.
Diesel Generator #1 failed to start.
No other failures are present.

Which component would be automatically actuated to its ES position/status if RCS pressure subsequently dropped below 1590 psig?

a. EFW pump P-7B would restart.

b. Penetration room ventilation fan VEF-38A would start.

c. HPI pump P-36B would start.

d. Letdown coolers outlet CV-1221 would close.

Question No. 69 **QID: 0305**

The following conditions exist:

Unit 1 is operating at 100% power when the Pressurizer Spray Control valve (CV-1008) fails open.
Pressurizer Spray Isolation valve (CV-1009) will NOT close because of high torque on the motor.

Which one of the following methods should be used to override the CV-1009 torque switch to operate the valve in the CLOSED direction?

a. Open RC-4 (Spray Line Minimum Flow Valve) to reduce delta pressure.

b. Close the valve using breaker control switches.

c. HOLD the handswitch in the CLOSED position.

d. Place the handswitch in the OPEN position then the CLOSED position.

Question No. 70 **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. Reactor Coolant Pump trip at 95% power

Question No. 71 **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 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. 72 **QID: 0308**

Given:

Plant is at 100% power.
ICS is in full automatic.

Subsequently, annunciator K07-B3 "ASYM ROD RUNBACK IN EFFECT" alarms.
A check of the PI panel shows that Rod 6 in Group 5 has dropped.

Which of the following alarms or indications would you expect to see on the diamond panel?

a. Sequence Inhibit lamp ON

b. Out Inhibit lamp ON

c. Auto Inhibit lamp ON

d. Group 5 Out Limit lamp OFF

Question No. 73 **QID: 0309**

Given:

The plant is operating at 100% power.
Loop "A" T-cold Narrow Range Temperature instrument fails HIGH.

If this instrument was hard selected by the SASS selector switch, what ICS HAND/AUTO stations should be placed in HAND?

a. Reactor Demand and both Feedwater Loop Demands.

b. SG/Rx Master and Reactor Demand.

c. SG/Rx Master and both Feedwater Loop Demands.

d. Both MFW Pumps and Turbine (EHC).

Question No. 74 **QID: 0310**

Why is the screen mesh installed on the reactor building sump suction lines?

a. Prevent damage from post-accident debris to the decay heat and reactor building spray pump seals.

b. Prevent vortex formation and subsequent loss of suction to the decay heat and reactor building spray pumps.

c. Prevent debris after an accident from clogging the level transmitters for the reactor building sump.

d. Prevent post-accident debris from clogging the reactor building spray header nozzles.

Question No. 75 **QID: 0311**

Reactor Building pressure is 15.7 psia.

What action should be taken to initiate RB purge?

a. The reactor building purge inlets should be opened first.

b. The reactor building purge inlets and outlets should be opened simultaneously.

c. The reactor building purge outlets should be opened first.

d. The reactor building should be vented to the waste gas system.

Question No. 76 **QID: 0312**

What is the basis for the minimum SFP level (-0.5 ft) specified in the normal operating procedure?

a. This volume of water will maintain bulk SFP water temperature below boiling.

b. This volume of water will ensure adequate boron concentration in the SFP.

c. This volume of water provides adequate shielding for activities at the SFP.

d. This volume of water ensures adequate time for operator action in the event of a leak.

Question No. 77 **QID: 0313**

Given:

RCS pressure is 1800 psig,
RCS temperature is 545 degrees F,
"A" OTSG pressure is 650 psig,
"B" OTSG pressure is 970 psig,
Reactor Building Pressure is 6 psig.

Actions required to stop this transient are found in the:

a. ESAS procedure.

b. Overcooling procedure.

c. Forced Flow Cooldown procedure.

d. Loss of Subcooling Margin procedure.

Question No. 78 **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 at what pressure will the OTSG's be controlled?

a. 895 psig

b. 995 psig

c. 1020 psig

d. 1050 psig

Question No. 79 **QID: 0315**

What is the Condenser vacuum setpoint that interlocks the Turbine Bypass Valves closed?

a. 17 in. Hg

b. 21 in. Hg

c. 23 in. Hg

d. 25 in. Hg

Question No. 80 **QID: 0316**

Which of the following would explain why a loss of bus A1 will cause CV-1206 (RC Pump Seal Injection Block Valve) to close?

(Assume plant is at 100% power)

a. P36A (HPI) pump was the in-service pump.

b. Loss of instrument air to Seal Injection Control Valve, CV-1207.

c. P36C (HPI) pump was the in-service pump.

d. Loss of instrument air to Pressurizer Level Control valve CV-1235.

Question No. 81 **QID: 0317**

Unit One is at 100% power and experiences a loss of 125V DC Bus D02.

Which of the following D02 loads will cause the reactor to trip?

a. MCC D25

b. Panel RA2

c. Inverter Y22

d. Inverter Y28

Question No. 82 **QID: 0318**

You are on watch in the Control Room when the following annunciators go into alarm:

K12-A1, "FIRE"

K12-A2, "FIRE WATER FLOW"

K12-B2, "FIRE PUMP AUTO START"

Then you notice the running Fire Water Pump trips.

Which of the following actions should you take to ensure the Fire Water System can respond to the event in a timely manner?

a. Verify the Electric Fire Pump P-6A starts.

b. Verify the Diesel Fire Pump P-6B starts.

c. Dispatch an operator to place the Temporary Fire Pump in service.

d. Verify the Jockey Fire Water Pump P-11 starts.

Question No. 83 **QID: 0319**

Given:

100% power
Total RCS leakage is .5 gpm
Seal injection flow to each RCP is 9 gpm
Controlled bleedoff flow from each RCP is 1.5 gpm
Letdown flow is maximum for one demineralizer
Pressurizer level is 220"

Approximately how much flow is being added to the RCS via the makeup line?

a. 70-79 gpm

b. 80-89 gpm

c. 90-99 gpm

d. 100-109 gpm

Question No. 84 **QID: 0320**

A dropped rod event has occurred (one CRA in Group 7) and the following conditions exist:

Reactor power = 30% and decreasing.
Turbine output = 320 MWe and decreasing.
Annunciator (K07-C3) HIGH LOAD LIMIT is in fast flash.
Turbine runback is in progress.

What operator action is required?

a. Allow the runback to terminate normally.

b. Take manual control of the turbine and raise load.

c. Take manual control of SG/RX master.

d. Trip the reactor.

Question No. 85 **QID: 0321**

Given:

100% Reactor Power
Seal Injection Flow 40 gpm
Seal Bleedoff Flow 1.5 gpm for each RCP
Letdown flow 100 gpm

A Pressurizer Level Instrument failure causes Makeup Flow to rise to 200 gpm. Pressurizer Level is 230 inches and rising.

Assuming constant flow rates and no operator action, how long will it take to reach a condition requiring a manual reactor trip?

a. between 1 and 3.9 minutes

b. between 4 and 6.9 minutes

c. between 7 and 9.9 minutes

d. between 10 and 13 minutes

Question No. 86 **QID: 0322**

A reactor coolant pump trip has caused a plant runback.

What ensures ICS maintains power steady (does not return to its previous load demand) when the runback is complete?

a. The Unit Master H/A station input tracks the Rate and Load Limited Megawatt demand signal.

b. The ICS runback demand signal is fed directly into the input of the Unit Master H/A station.

c. The input to the Unit Master H/A station is driven by cross limits to match the runback back demand signal.

d. The ICS runback signal will clear only when the Unit Master H/A station output equals actual generated megawatts.

Question No. 87 **QID: 0323**

A plant power escalation is in progress at 28% power.
The following conditions are observed:

Rapid rise in RCS temperature
Rapid rise in RCS pressure
Rapid rise in PZR level
Rapid rise in Main Steam pressure
Megawatt output = zero (0)

What procedure contains the required mitigating operator actions?

a. 1203.001, "ICS Abnormal Operating"

b. 1203.018, "Turbine Trip below 43% Power"

c. 1203.020, "Load Rejection"

d. 1202.001, "Reactor Trip"

Question No. 88 **QID: 0324**

Given:

Reactor tripped on low pressure.
RCS Tave 545 °F and stable
Pressurizer level off-scale high
RCS pressure 1850 psig and rising rapidly
RB sump level 55% and rising

During this transient, which of the following methods will be used to limit the RCS pressure rise, in accordance with RT-14?

a. Cycle ERV as required

b. Secure steaming OTSGs

c. Raise makeup flow

d. Lower letdown flow

Question No. 89 **QID: 0325**

Following a reactor trip, what pressurizer level value (dropping) requires initiation of HPI per RT-2?

a. 110 inches

b. 90 inches

c. 55 inches

d. 30 inches

Question No. 90 **QID: 0326**

Reactor Coolant Pump (P32A) has a 2.6 gallon seal bleedoff flow.

What will happen to seal bleedoff temperature if seal injection is subsequently lost?

a. Rise due to loss of flow to the seal cooler.

b. Rise due to bleedoff in excess of seal cooler capacity.

c. Remain the same due to seal bleedoff cooling flow.

d. Remain the same due to seal recirc flow impeller circulation.

Question No. 91 **QID: 0327**

The RCS pressure setpoints at which the Decay Heat suction isolation valves close are _____ for CV-1050 and _____ for CV-1410.

a. 290 psig, 320 psig

b. 340 psig, 400 psig

c. 320 psig, 385 psig

d. 340 psig, 385 psig

Question No. 92 **QID: 0328**

The plant is operating at 100% and the following indications are observed:

"A" and "B" Main Feedwater Pumps are tripped
CRD groups 1, 2, 3, and 4 are at the out limit.
CRD groups 5, 6, and 7 are at the in limit.
NI-3 indicates 1 E-8 and lowering.

What action should be performed FIRST?

a. Depress the CRD Power Supply Breaker Trip Pushbuttons.

b. Dispatch an operator to open the CRD AC Power Supply Breakers.

c. Commence Emergency Boration per RT-12.

d. Manually insert CRD groups 1, 2, 3, and 4.

Question No. 93 **QID: 0329**

Given:

Plant startup in progress
NI501 at 9 x E4 cps
NI502 at 1 x E5 cps
NR502 is operable and at 5 x E-2% power
NI3 at 2 x E-11 amps
NI4 at 5 x E-11 amps
NI5 thru 8 at 0%

What action should be taken by control room operators?

a. Maintain flux level in the source range

b. Trip the reactor

c. Continue with startup

d. Stabilize power at 1 x E-8 amps

Question No. 94 **QID: 0330**

Which of the following satisfy entry conditions for the Tube Rupture procedure, 1202.006?

a. "A" OTSG tube leak of 0.1 gpm with turbine trip.

b. "B" OTSG tube leak of 5 gpm with condenser vacuum pump radiation alarm.

c. "A" OTSG tube leak of 3 gpm and "B" OTSG tube leak of 4 gpm with main feedwater pump "A" trip.

d. "B" OTSG tube leak of 2 gpm with reactor trip.

Question No. 95 **QID: 0332**

What EOP action is designed to reduce the rate of leakage into a ruptured OTSG?

a. Controlling reactor coolant system pressure low within the limits of Figure 3.

b. Concurrently performing 1203.014, Control of Secondary System Contamination.

c. Isolation of the OTSG with the ruptured tube.

d. Cooling down the reactor coolant system to less than 500 °F.

Question No. 96 **QID: 0333**

After a reactor trip, which of the following would indicate a ruptured tube in the "A" Steam Generator?

a. "A" EFIC level is 31 stable "A" MFW Flow is .3 mlb/hr
"B" EFIC level is 35 rising "B" MFW Flow is .2 mlb/hr

b. "A" EFIC level is 31 stable "A" MFW Flow is .3 mlb/hr
"B" EFIC level is 29 rising "B" MFW Flow is .4 mlb/hr

c. "A" EFIC level is 28 rising "A" MFW Flow is .5 mlb/hr
"B" EFIC level is 31 stable "B" MFW Flow is .3 mlb/hr

d. "A" EFIC level is 35 rising "A" MFW Flow is .1 mlb/hr
"B" EFIC level is 31 stable "B" MFW Flow is .3 mlb/hr

Question No. 97 **QID: 0334**

Prior to any automatic or operator actions, which set of parameters would indicate a Main Feedwater Line Break inside of the reactor building?

a. OTSG level dropping
Feedwater flow dropping
RB pressure rising

b. OTSG level rising
Feedwater flow dropping
RB pressure rising

c. OTSG level rising
Feedwater flow rising
RB pressure dropping

d. OTSG level dropping
Feedwater flow rising
RB pressure rising

Question No. 98 **QID: 0335**

Given:

Loss of all Feedwater
HPI core cooling started

What indicates adequate HPI core cooling?

a. CET temperatures stable after 100 minutes.

b. T-cold tracking associated SG T-sat.

c. T-hot tracking CET temperatures.

d. T-hot/T-cold differential temperature dropping.

Question No. 99 **QID: 0336**

Given:

Turbine Lockout Relay DC Failure Alarm (K04-B5),
D11 Loss of Voltage (K01-B7),
Loss of Breaker Position Indicator Lights for Plant Buses on left side of C10.

Which action should be performed?

a. Start both Diesel Generators from C-10.

b. Trip the Generator Output Breakers.

c. Transfer D11 to its Emergency Power Supply.

d. Line up Battery Charger D03A or D03B to the D01 Bus.

Question No. 100 **QID: 0360**

Given:

Emergency Boration is required following a reactor trip.
Both boric acid pumps are inoperable.

Which of the following would NOT be a contingency action?

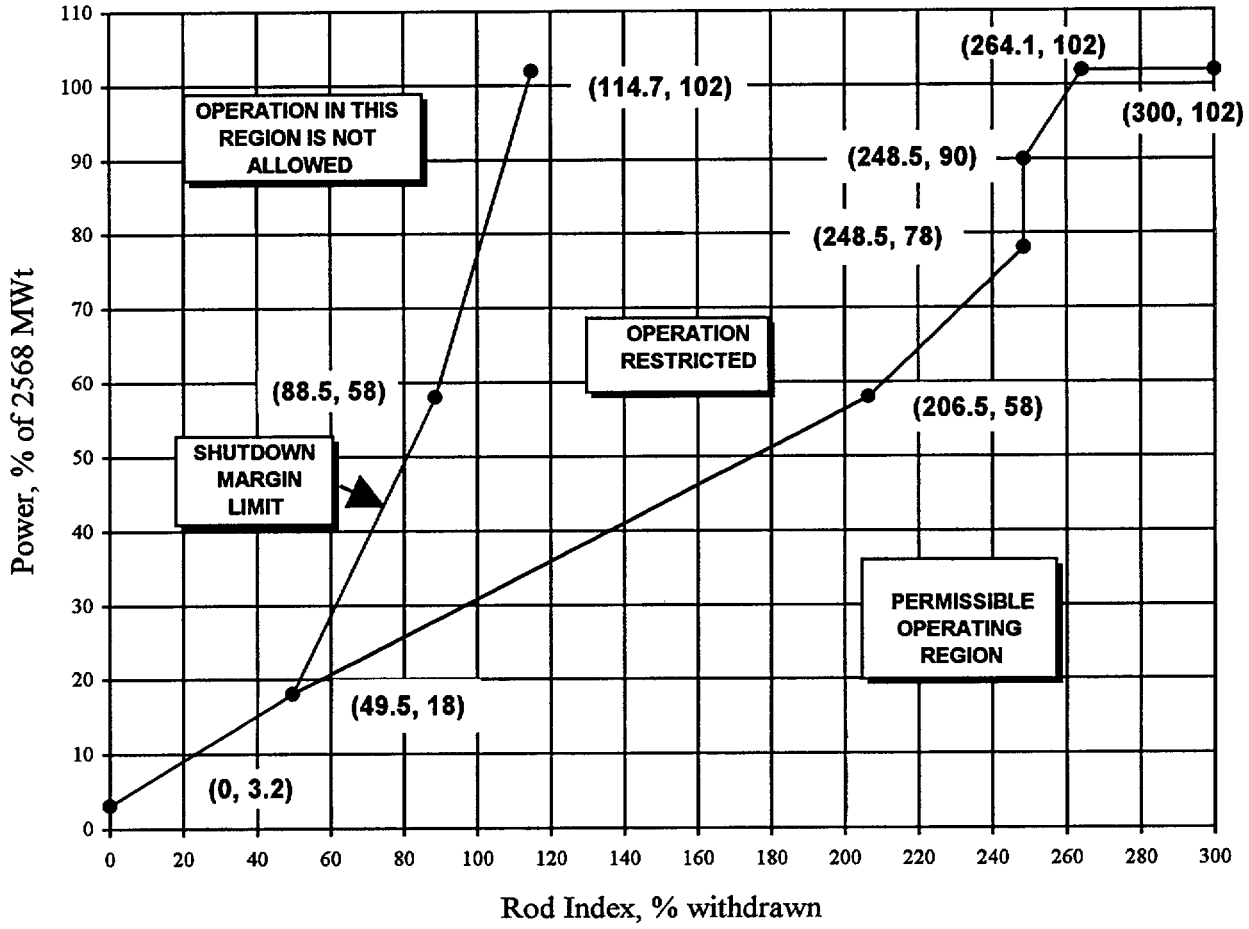
a. Open the BWST outlet valve for the operating HPI pump.

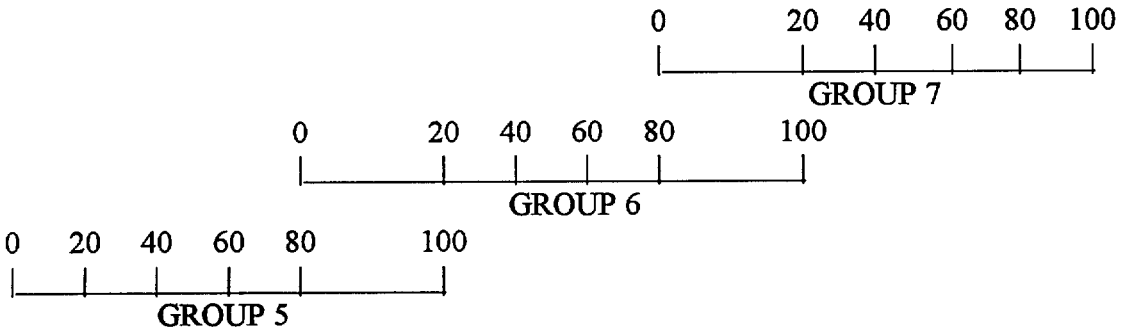
b. Set the batch controller to the maximum batch size.

c. Raise letdown flow to maximum allowed.

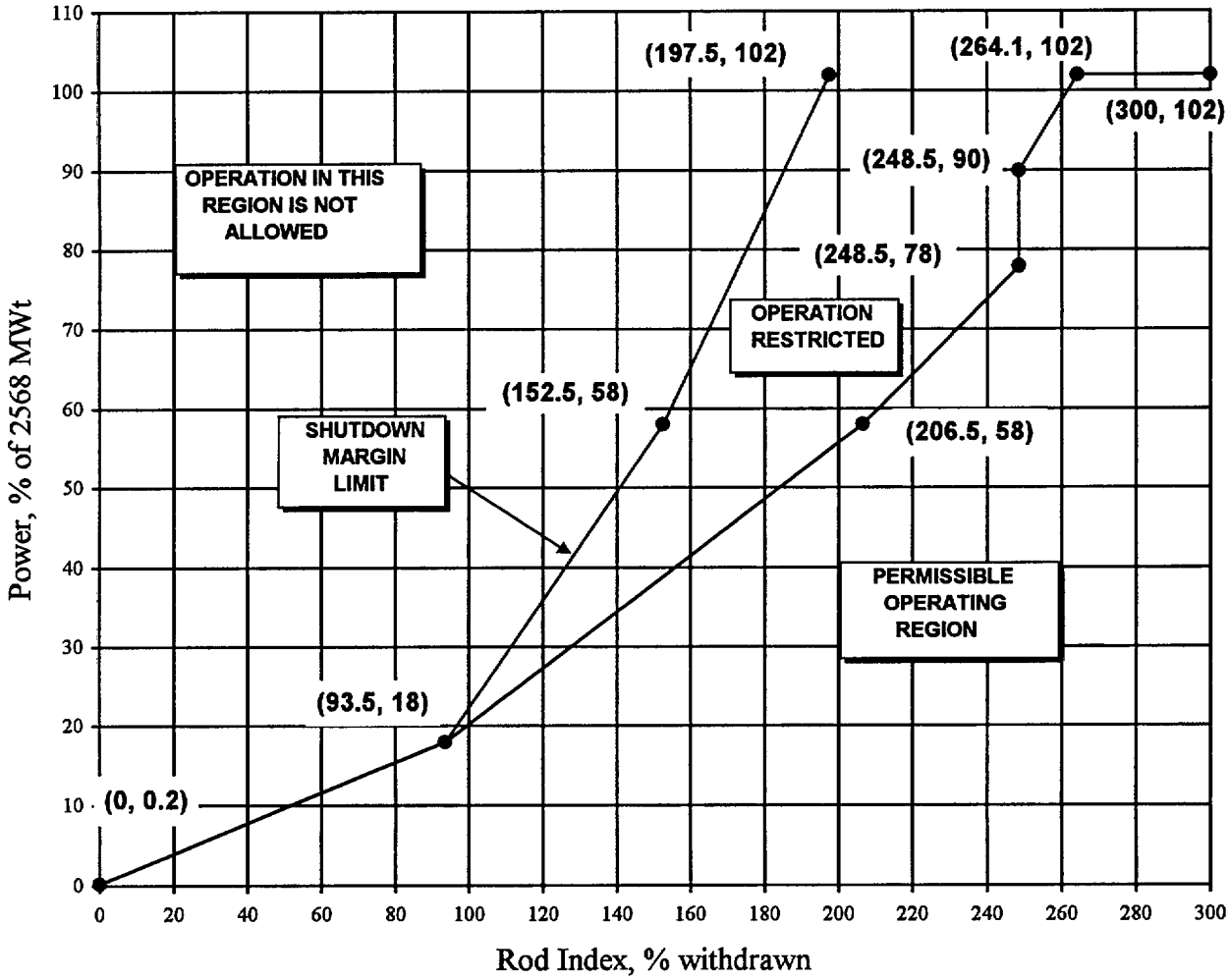
d. Start the ES standby HPI pump.

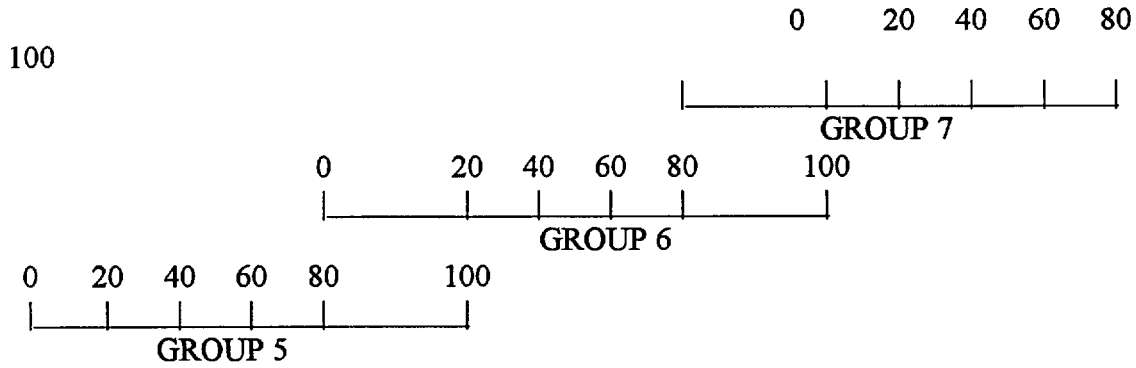
Rod Position Setpoints for 4-Pump Operation From 0 to 300 ± 10 EFPD -- ANO-1 Cycle 15



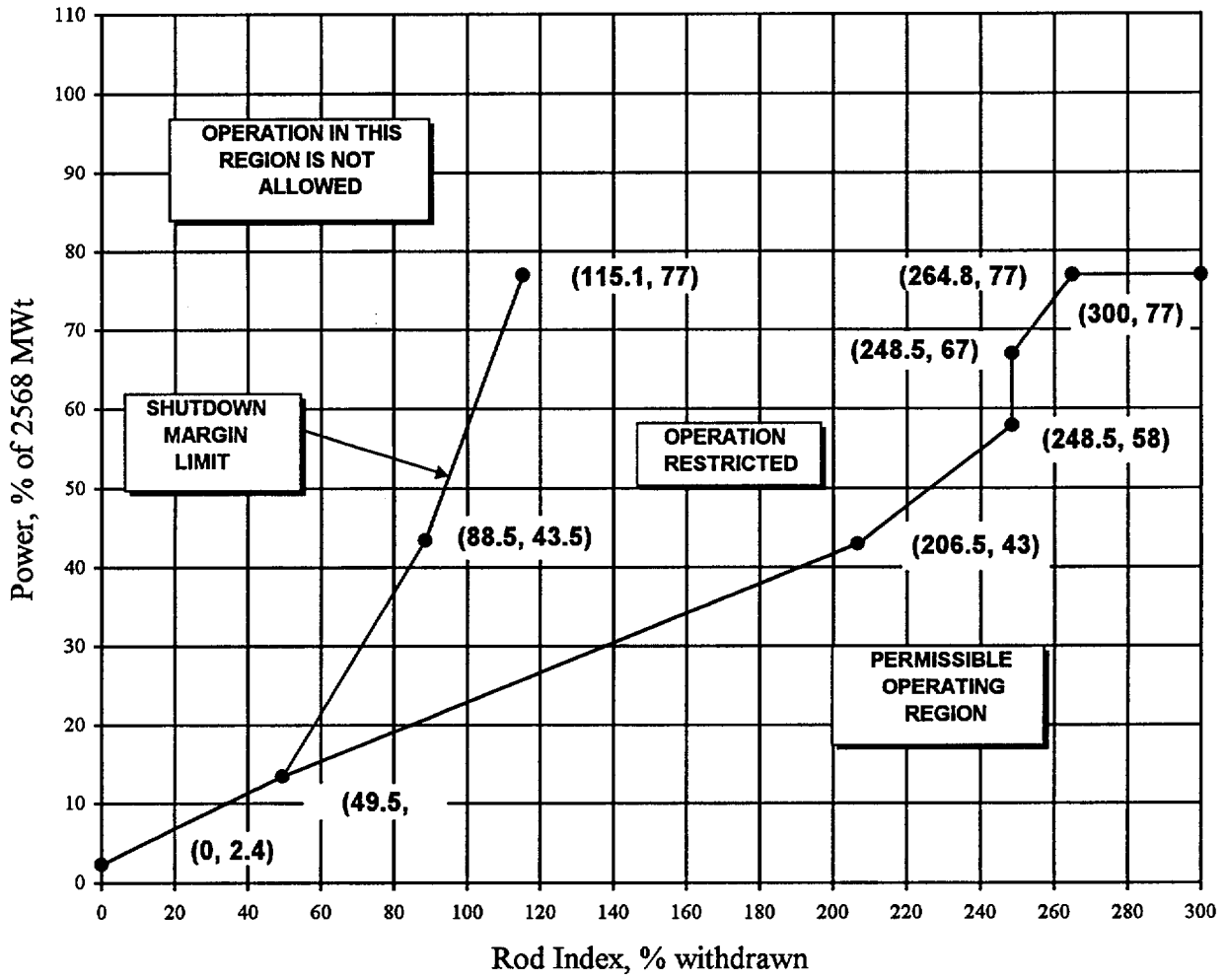


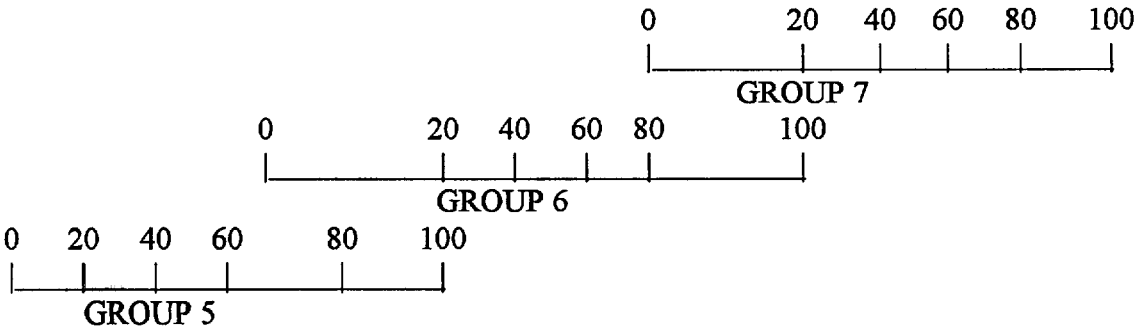
Rod Position Setpoints for 4-Pump Operation From 300 ± 10 EFPD to EOC -- ANO-1 Cycle 15



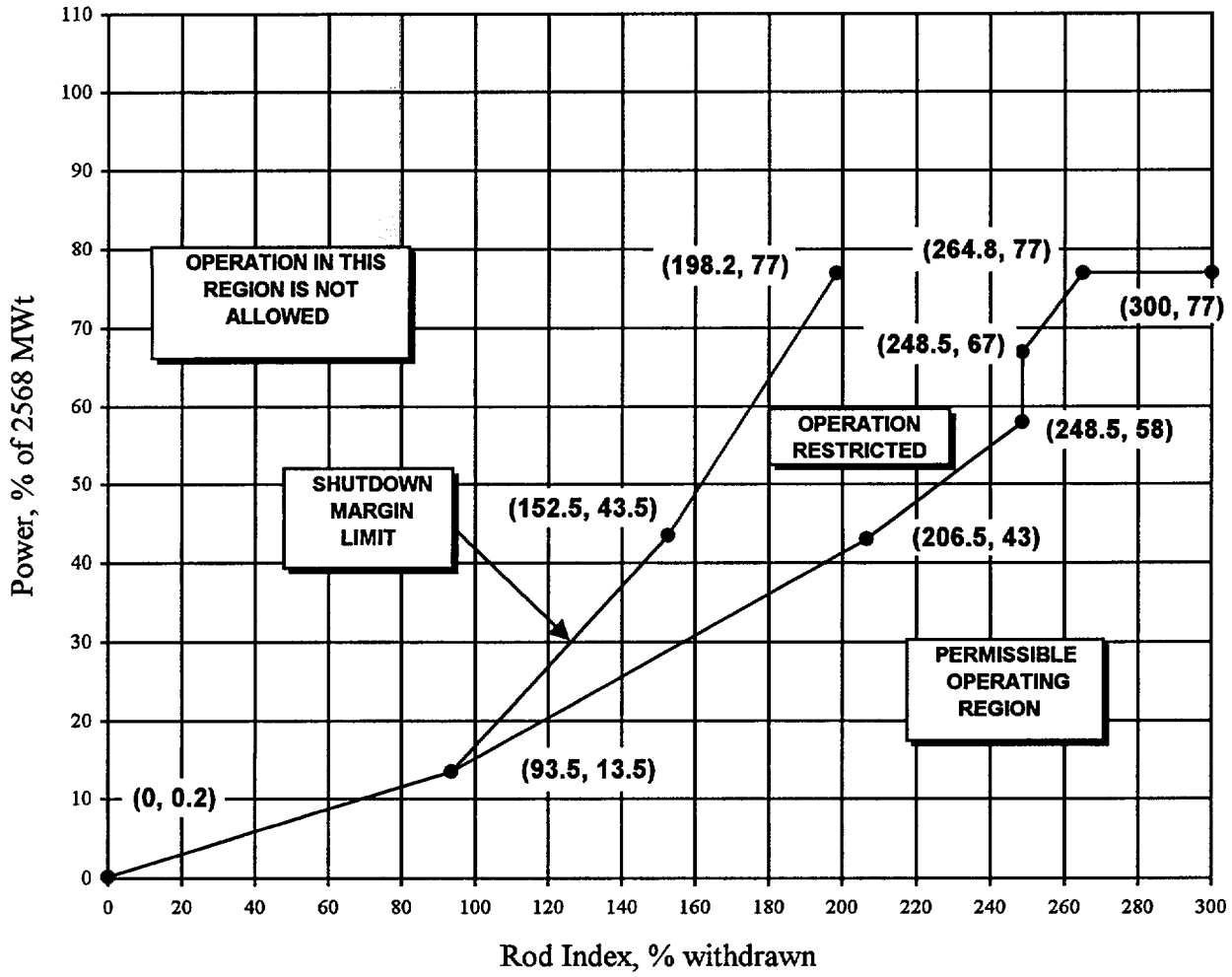


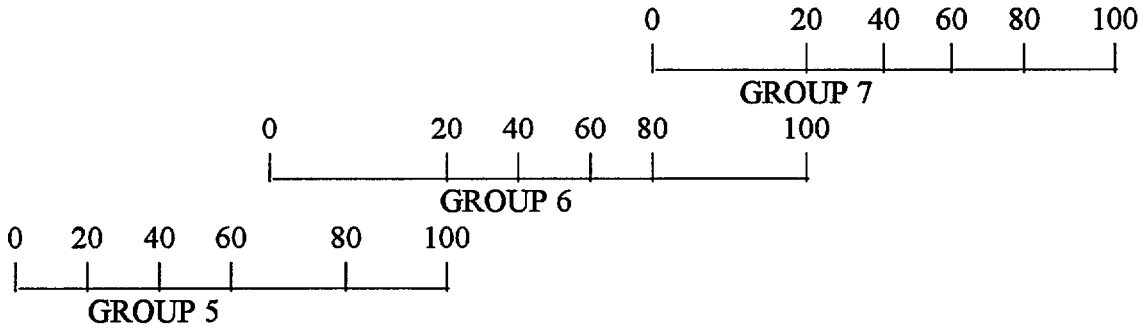
Rod Position Setpoints for 3-Pump Operation From 0 to 300 ± 10 EFPD -- ANO-1 Cycle 15



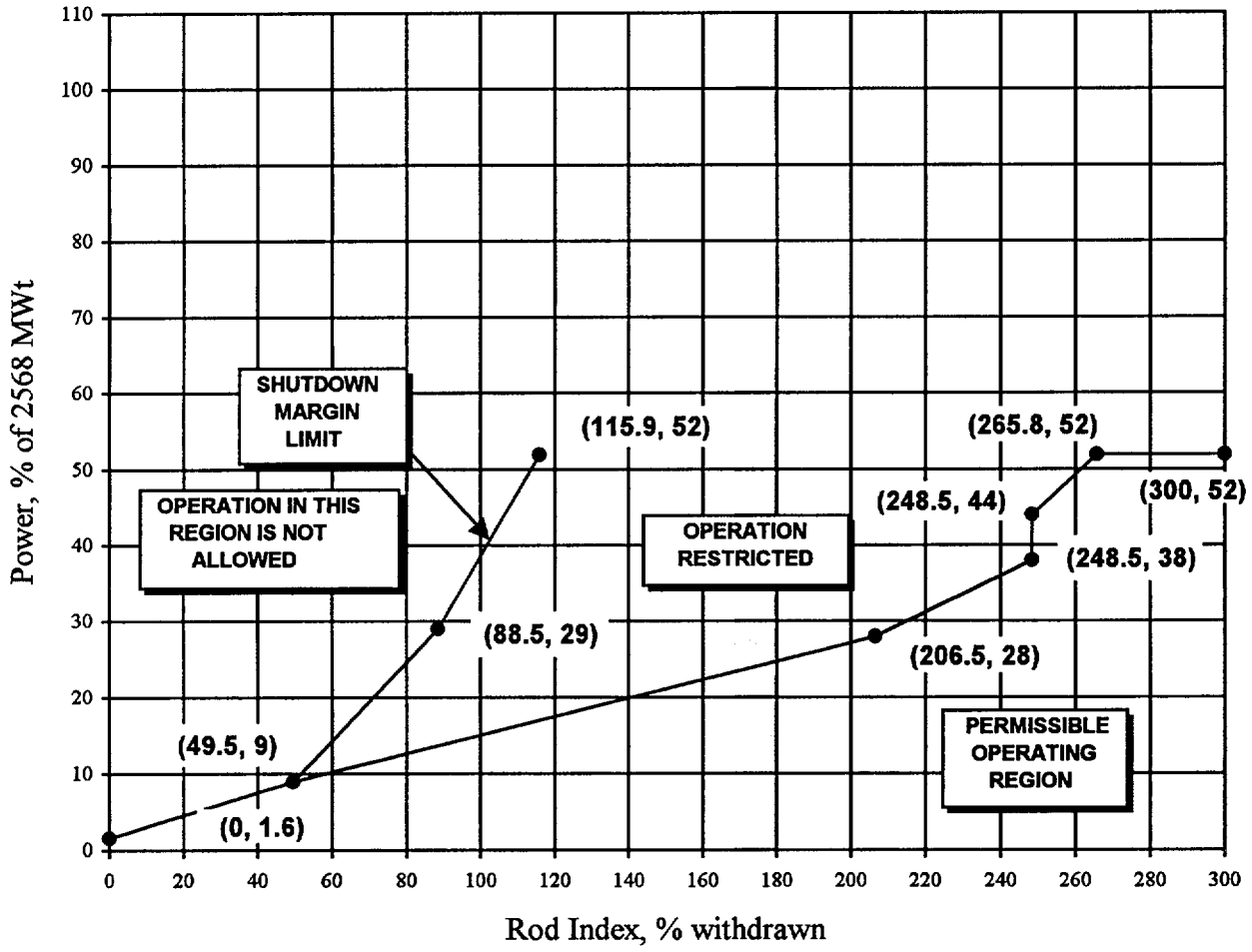


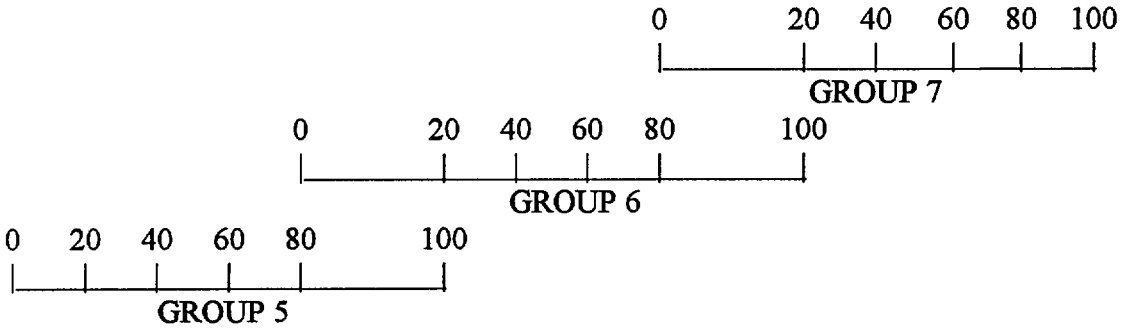
Rod Position Setpoints for 3-Pump Operation From 300 ± 10 EFPD to EOC -- ANO-1 Cycle 15



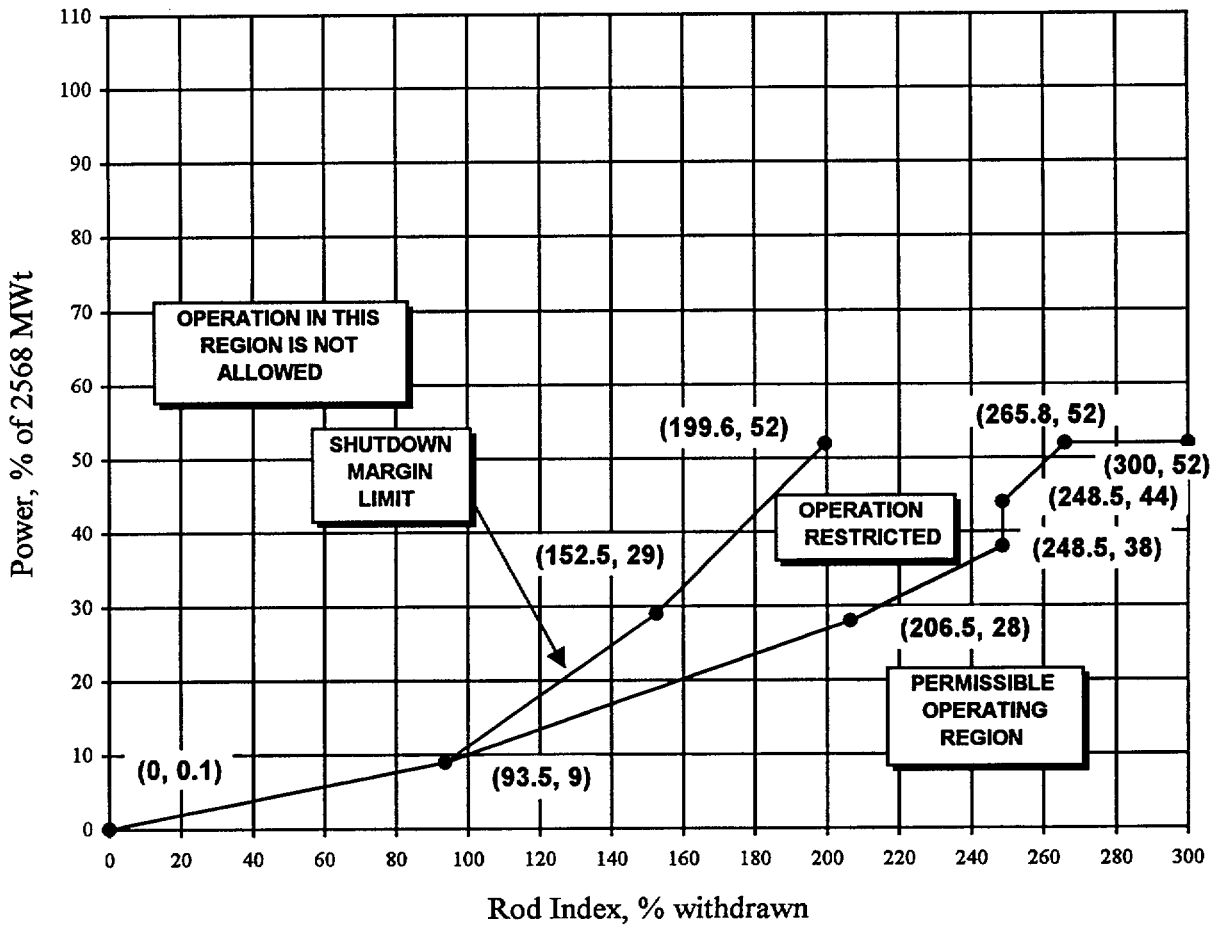


Rod Position Setpoints for 2-Pump Operation From 0 to 300 ± 10 EFPD -- ANO-1 Cycle 15





Rod Position Setpoints for 2-Pump Operation From 300 ± 10 EFPD to EOC -- ANO-1 Cycle 15



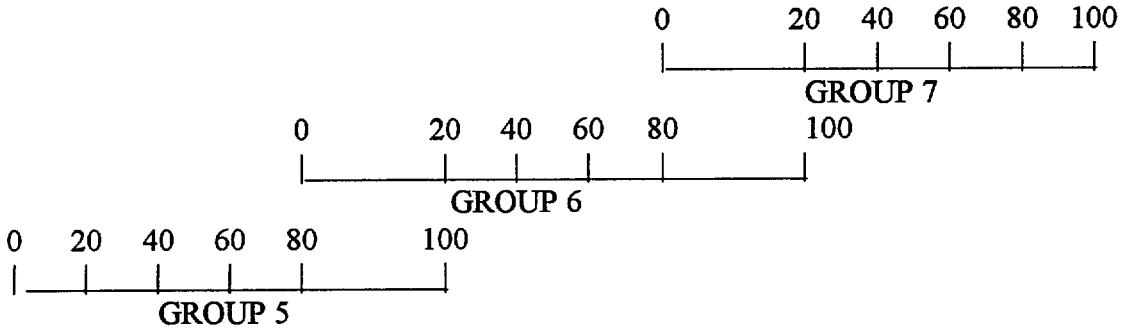
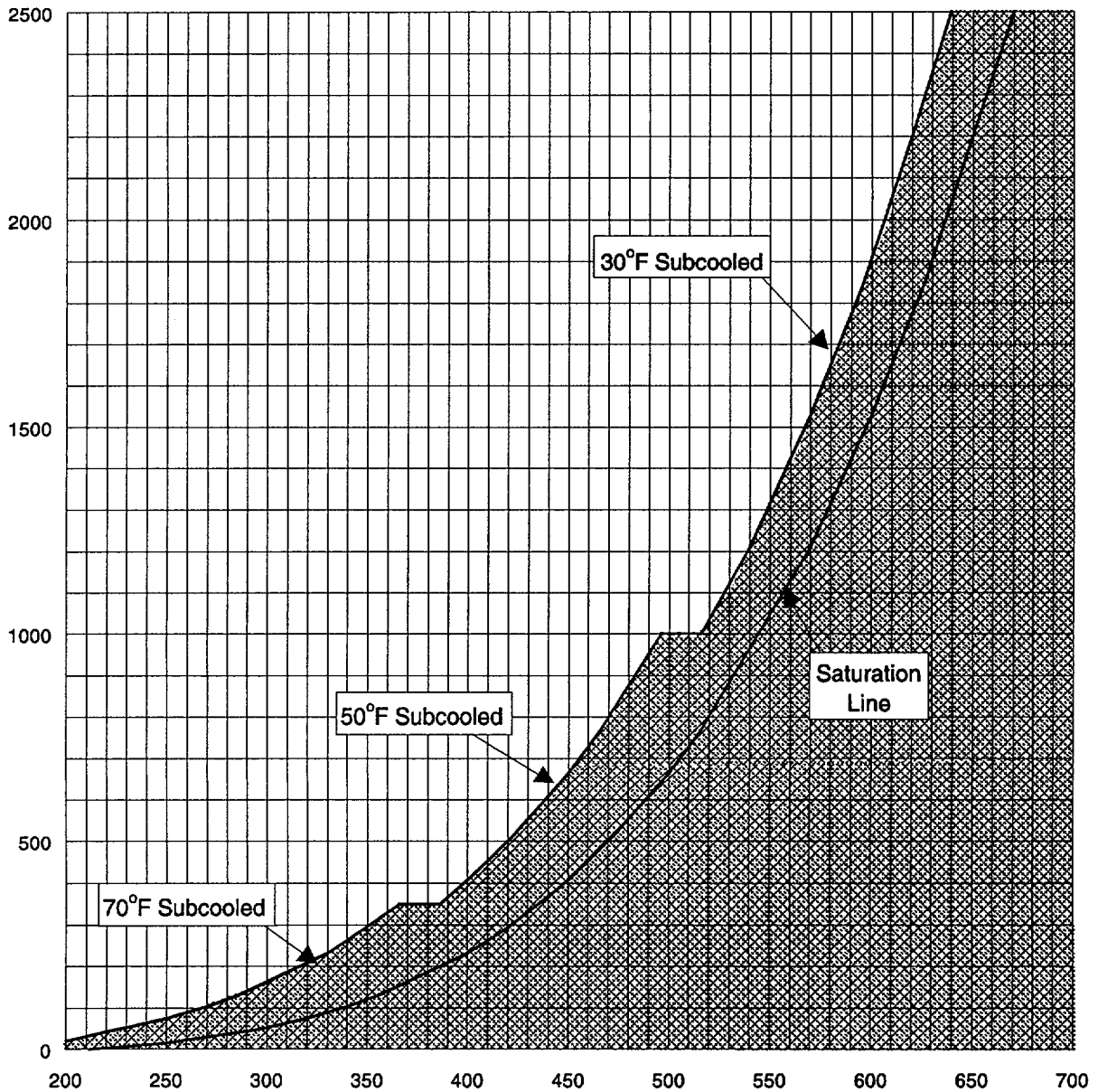


FIGURE 1
Saturation and Adequate SCM



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

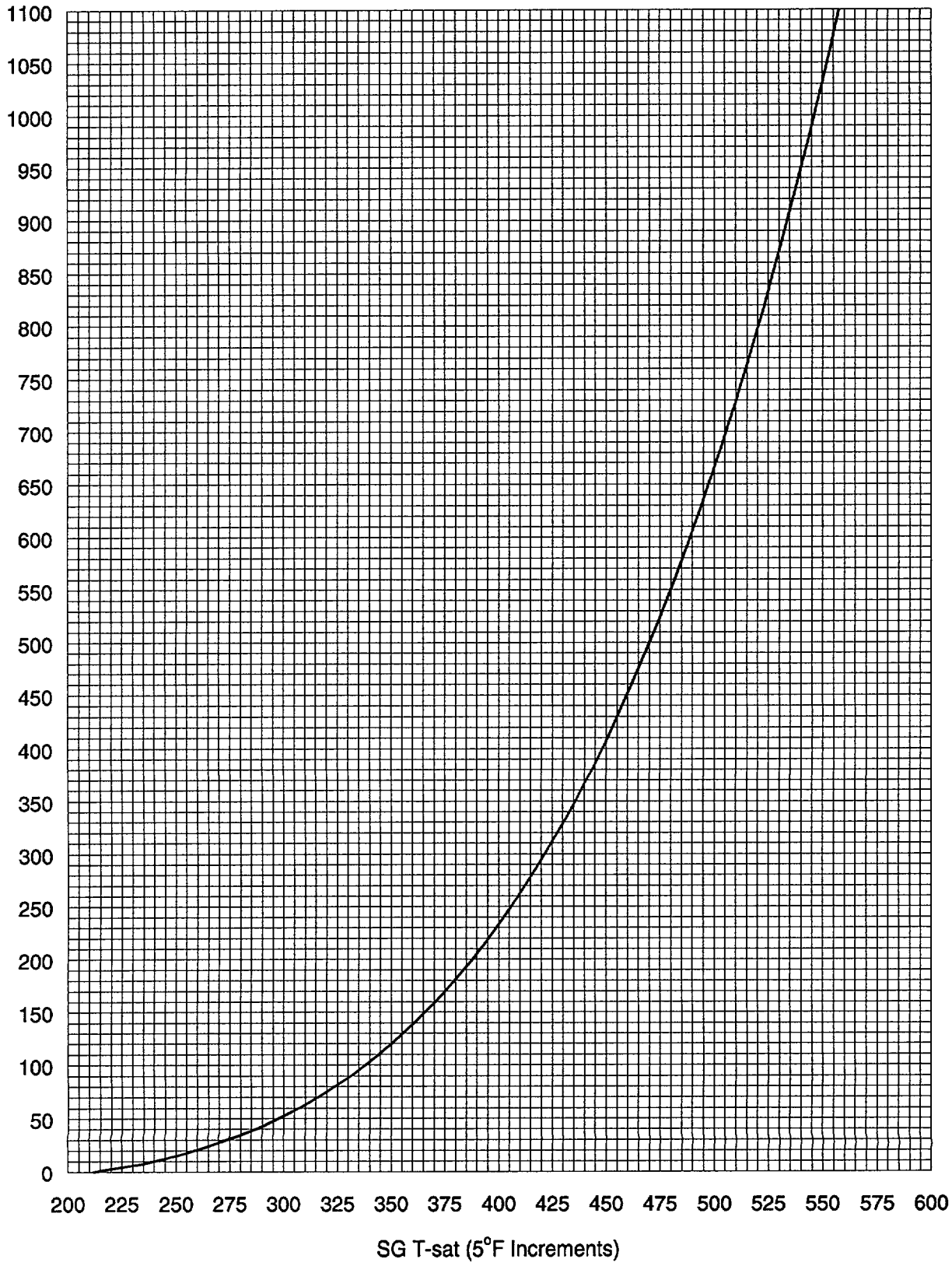


FIGURE 3
RCS Pressure vs Temperature Limits

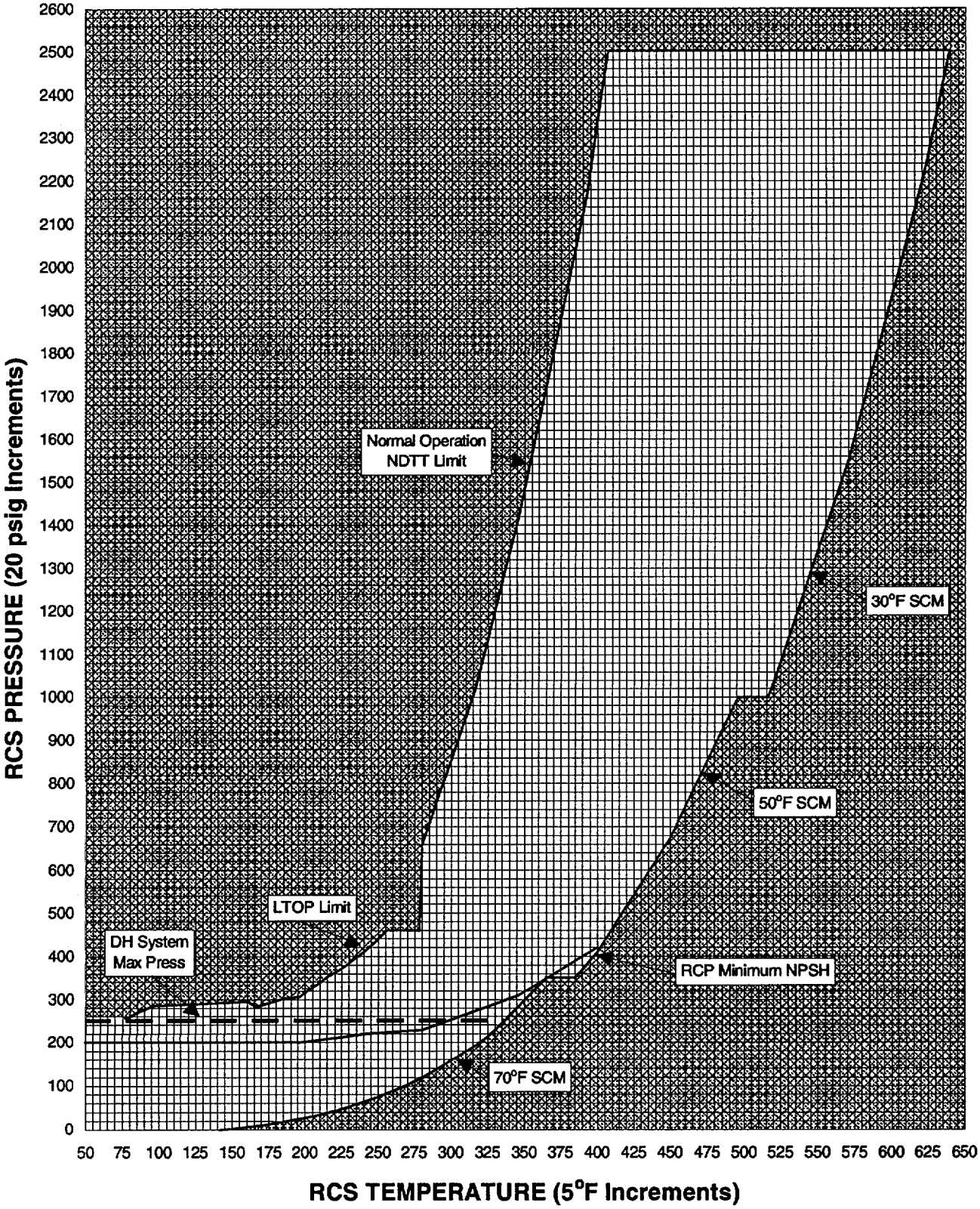


FIGURE 4
Core Exit Thermocouple for Inadequate Core Cooling

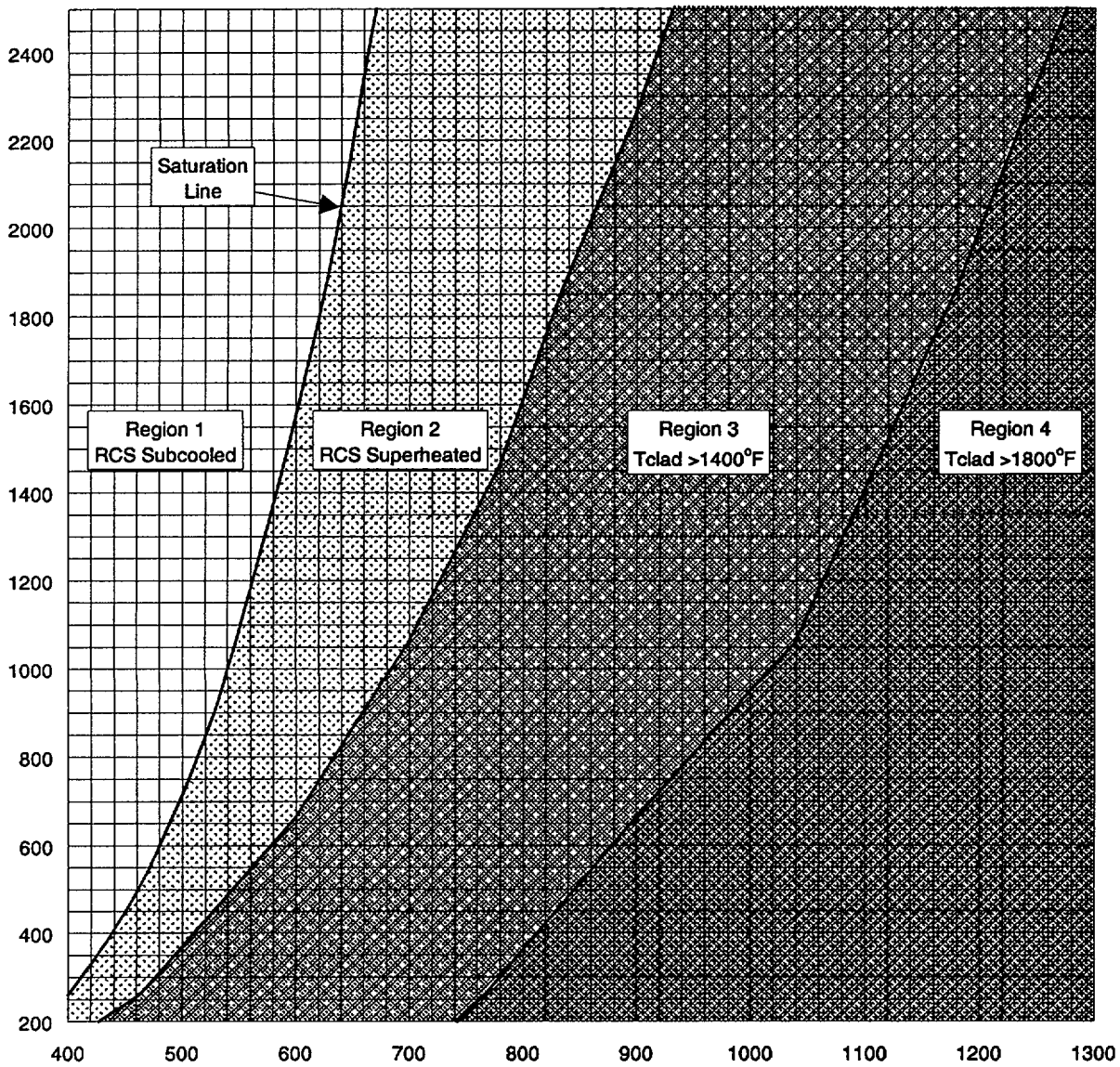


FIGURE 5

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

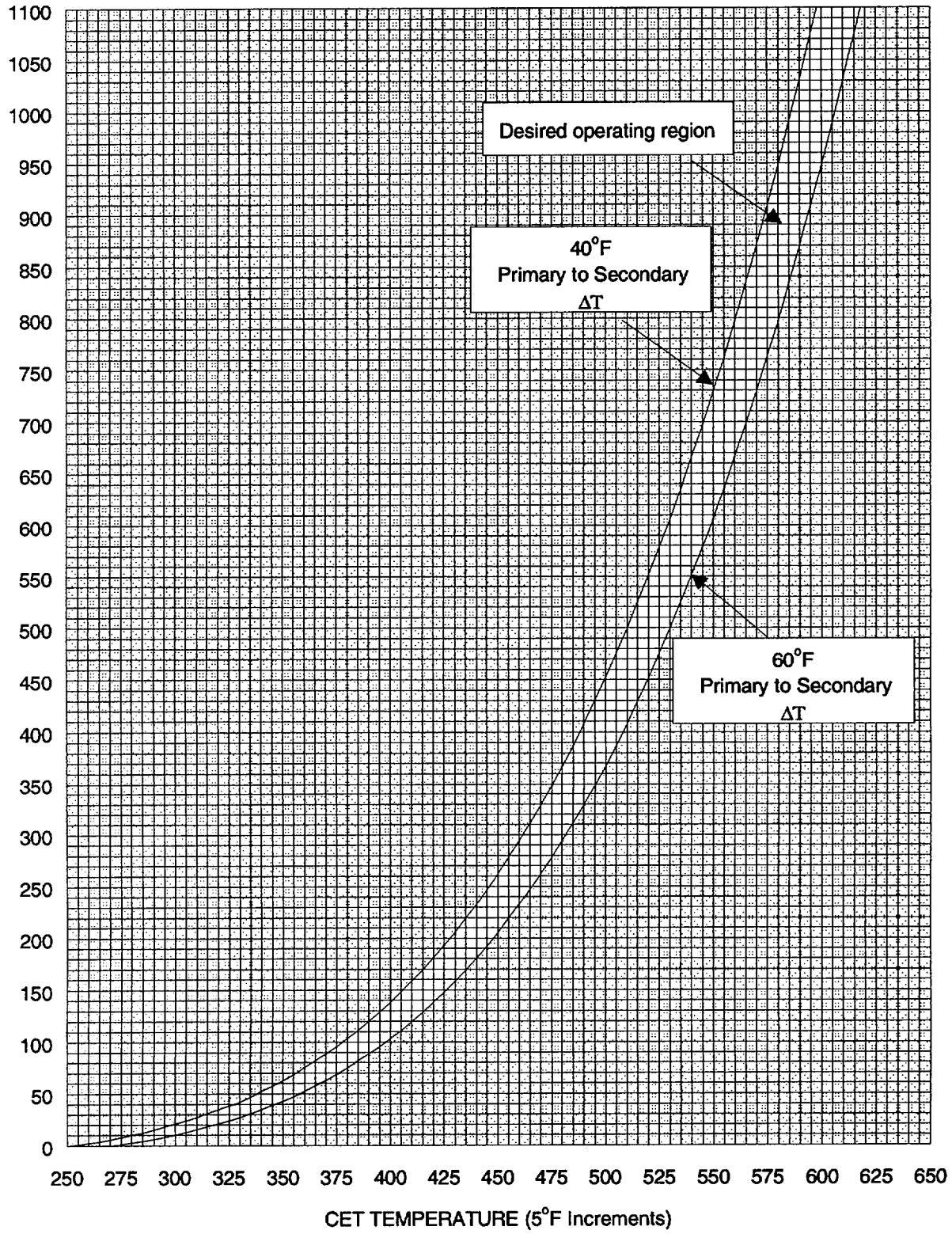
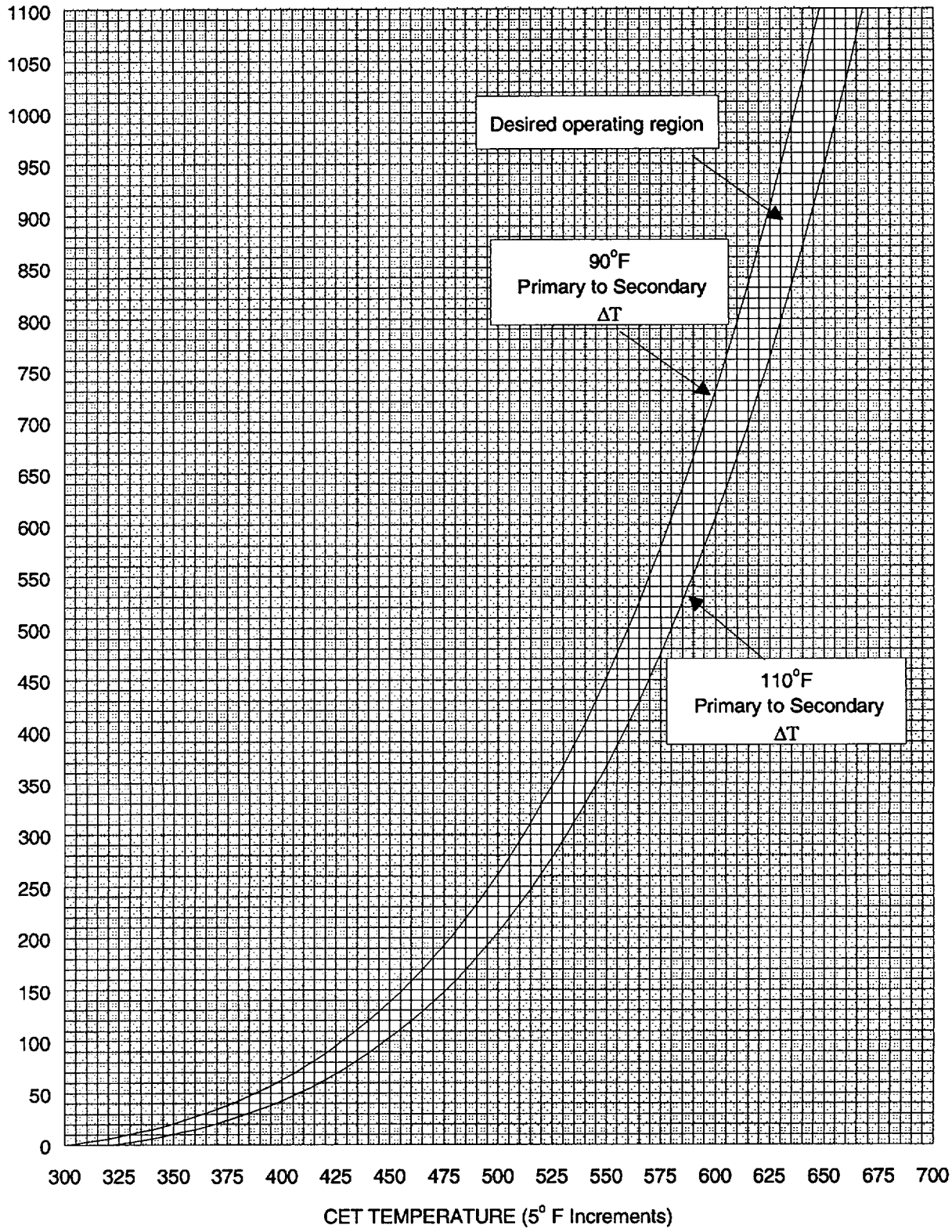


FIGURE 6

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



ANO Unit 1 - 1999 Reactor Operator License Exam Key

9/20/99

Question No. 1 **QID: 0030** **Point Value: 1**

Answer:

a. Restoration of adequate subcooling margin.

Question No. 2 **QID: 0058** **Point Value: 1**

Answer:

b. The Intermediate Range channels are overcompensated.

Question No. 3 **QID: 0158** **Point Value: 1**

Answer:

c. 6 days

Question No. 4 **QID: 0204** **Point Value: 1**

Answer:

d. EDG 2 is inoperable because EDG 2 Fuel Oil Transfer Pump P-16B is inoperable.

Question No. 5 **QID: 0217** **Point Value: 1**

Answer:

b. 6 feet

Question No. 6 **QID: 0240** **Point Value: 1**

Answer:

a. Core Exit Thermocouple TE-1152 will be removed from the average.

Question No. 7 **QID: 0241** **Point Value: 1**

Answer:

a. Service Water Loop 1 and Discharge Flume process radiation monitors alarm.

Question No. 8 **QID: 0242** **Point Value: 1**

Answer:

b. Instruments that should be reliable during accident conditions.

Question No. 9 **QID: 0243** **Point Value: 1**
Answer:
b. Planned dose shall not exceed 10 Rem TEDE.

Question No. 10 **QID: 0244** **Point Value: 1**
Answer:
d. System engineer closes a valve while troubleshooting a water hammer concern.

Question No. 11 **QID: 0245** **Point Value: 1**
Answer:
d. The valve must be stroked electrically.

Question No. 12 **QID: 0246** **Point Value: 1**
Answer:
c. Check against the number on the brass tag on the key ring.

Question No. 13 **QID: 0247** **Point Value: 1**
Answer:
d. Control Board Operator or Shift Superintendent.

Question No. 14 **QID: 0248** **Point Value: 1**
Answer:
a. Lockout relay trip deenergizes A-2.

Question No. 15 **QID: 0249** **Point Value: 1**
Answer:
d. 50 Rem/year

Question No. 16 **QID: 0250** **Point Value: 1**
Answer:
c. Reactor Engineer and SRO in Charge of Fuel Handling

Question No. 17 **QID:** 0251 **Point Value:** 1
Answer:
a. Exit the area and notify Health Physics.

Question No. 18 **QID:** 0252 **Point Value:** 1
Answer:
b. Reactor coolant temperature goes below 525 °F.

Question No. 19 **QID:** 0253 **Point Value:** 0
Answer:
d. The main feedwater block valves close immediately in fast speed.

Question No. 20 **QID:** 0254 **Point Value:** 1
Answer:
b. EFW Pump P-7A trip/throttle valve does not indicate full open.

Question No. 21 **QID:** 0255 **Point Value:** 1
Answer:
c. RPS will trip the plant and start Emergency Feedwater on loss of both Main Feedwater Pumps.

Question No. 22 **QID:** 0256 **Point Value:** 1
Answer:
b. Maintains adequate service water flow to the Reactor Building Coolers when ES actuates.

Question No. 23 **QID:** 0257 **Point Value:** 1
Answer:
c. Inverter Y-11 failed resulting in a loss of power.

Question No. 24 **QID:** 0258 **Point Value:** 1
Answer:
a. "A" HPI pump will be damaged due to loss of suction.

Question No. 25 **QID:** 0259 **Point Value:** 1

Answer:

c. Prevents degrading T36A/B resin by shutting CV1221 (letdown isolation).

Question No. 26 **QID:** 0260 **Point Value:** 1

Answer:

b. Instrument air line to the Lower North Piping Room ruptures.

Question No. 27 **QID:** 0261 **Point Value:** 1

Answer:

d. Condensate pump P-2B will remain off since Main Feedwater Pump P-1B is not latched.

Question No. 28 **QID:** 0262 **Point Value:** 1

Answer:

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

Question No. 29 **QID:** 0263 **Point Value:** 1

Answer:

b. Group 6 at 56 %

Question No. 30 **QID:** 0265 **Point Value:** 1

Answer:

d. Trip all running RCPs.

Question No. 31 **QID:** 0266 **Point Value:** 1

Answer:

d. HPI pumps and RB spray pumps

Question No. 32 **QID:** 0267 **Point Value:** 1

Answer:

c. "B" Reactor Coolant Pump seal cooler leak.

Question No. 33 **QID:** 0268 **Point Value:** 1
Answer:
c. The "A" Main Feedwater Block Valve stopping its movement.

Question No. 34 **QID:** 0269 **Point Value:** 1
Answer:
d. Service Water System

Question No. 35 **QID:** 0270 **Point Value:** 1
Answer:
c. ~5"/min

Question No. 36 **QID:** 0271 **Point Value:** 1
Answer:
b. A Waste Control Operator must independently verify release path alignment prior to release.

Question No. 37 **QID:** 0272 **Point Value:** 1
Answer:
b. 2 and 3

Question No. 38 **QID:** 0273 **Point Value:** 1
Answer:
c. Normal ventilation ducts are isolated automatically.

Question No. 39 **QID:** 0274 **Point Value:** 1
Answer:
c. Inadequate air flow through the Service Water Cooling Coils

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Question No. 40 **QID:** 0275 **Point Value:** 1
Answer:
a. Place bus B5 & B6 UV protection switches in BYPASS.

Question No. 41 **QID: 0276** **Point Value: 1**

Answer:

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

Question No. 42 **QID: 0277** **Point Value: 1**

Answer:

c. Loss of off-site power

Question No. 43 **QID: 0279** **Point Value: 1**

Answer:

a. Verify 1202.008, Att. 1, "Blackout Breaker Alignment UV Defeat", complete then close feeder breakers from startup transformer #1.

Question No. 44 **QID: 0280** **Point Value: 1**

Answer:

a. Reactor Coolant Pump P-32C trip.

Question No. 45 **QID: 0281** **Point Value: 1**

Answer:

d. P-4A and P-4C

Question No. 46 **QID: 0282** **Point Value: 1**

Answer:

a. P-33B and P-33C started
P-33A to P-33B suction and discharge crosstie valves open
P-33B to P-33C suction and discharge crosstie valves closed

Question No. 47 **QID: 0283** **Point Value: 1**

Answer:

a. Declare Group 7 INOPERABLE and borate the plant to Hot Shutdown.

Question No. 48 **QID: 0284** **Point Value: 1**
Answer:
b. 430 degrees F

Question No. 49 **QID: 0285** **Point Value: 1**
Answer:
b. Quickly reduce the lowest SG pressure to 700 psig or the MSSV open alarm is clear.

Question No. 50 **QID: 0286** **Point Value: 1**
Answer:
c. 540 degrees F.

Question No. 51 **QID: 0287** **Point Value: 1**
Answer:
a. Prevent Main Turbine blade damage due to excessive heating.

Question No. 52 **QID: 0288** **Point Value: 1**
Answer:
a. Pressurizer automatic heater control is inoperable.

Question No. 53 **QID: 0289** **Point Value: 1**
Answer:
c. below the secondary side water level.

Question No. 54 **QID: 0290** **Point Value: 1**
Answer:
c. The RCS is saturated as indicated by Core Exit Thermocouples.

Question No. 55 **QID: 0291** **Point Value: 1**
Answer:
d. To allow for removal of DC power from the EFW flow control valves and to prevent overcooling.

Question No. 56 **QID: 0292** **Point Value: 1**
Answer:
a. If less than two minutes has elapsed, then trip all RCPs.

Question No. 57 **QID: 0293** **Point Value: 1**
Answer:
d. B-6 voltage of 415 volts

Question No. 58 **QID: 0294** **Point Value: 1**
Answer:
b. Provide sufficient cooling-quench water during pressurizer operations.

Question No. 59 **QID: 0295** **Point Value: 1**
Answer:
d. Loss of ICW flow to RCP seals

Question No. 60 **QID: 0296** **Point Value: 1**
Answer:
b. Turbine Bypass Valves open at 945 psig and close when header pressure is less than 945 psig.

Question No. 61 **QID: 0297** **Point Value: 1**
Answer:
c. Actuate the Overspeed Protection Controller.

Question No. 62 **QID: 0298** **Point Value: 1**
Answer:
a. The SW valves to the RB Cooler on that channel will open.

Question No. 63 **QID: 0299** **Point Value: 1**
Answer:
a. Control rods move inward, feedwater flows go up.

Question No. 64 **QID: 0300** **Point Value: 1**
Answer:
d. "A" Loop feedwater demand and Low Auctioneered delta-P across the main blocks

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Question No. 65 **QID: 0301** **Point Value: 1**
Answer:
d. By checking the analog position ind. and Hi-alarm lights on panel C-486.

Question No. 66 **QID: 0302** **Point Value: 1**
Answer:
b. Take actions to establish primary to secondary heat transfer cooling.

Question No. 67 **QID: 0303** **Point Value: 1**
Answer:
d. RCS Makeup Block Valve CV-1234 receives a close signal.

Question No. 68 **QID: 0304** **Point Value: 1**
Answer:
d. Letdown coolers outlet CV-1221 would close.

Question No. 69 **QID: 0305** **Point Value: 1**
Answer:
c. HOLD the handswitch in the CLOSED position.

Question No. 70 **QID: 0306** **Point Value: 1**
Answer:
d. Reactor Coolant Pump trip at 95% power.

Question No. 71 **QID: 0307** **Point Value: 1**
Answer:
a. One out-of-two

Question No. 72 **QID:** 0308 **Point Value:** 1
Answer:
b. Out Inhibit lamp ON

Question No. 73 **QID:** 0309 **Point Value:** 1
Answer:
a. Reactor Demand and both Feedwater Loop Demands.

Question No. 74 **QID:** 0310 **Point Value:** 1
Answer:
d. Prevent post-accident debris from clogging the reactor building spray header nozzles.

Question No. 75 **QID:** 0311 **Point Value:** 1
Answer:
c. The reactor building purge outlets should be opened first.

Question No. 76 **QID:** 0312 **Point Value:** 1
Answer:
c. This volume of water provides adequate shielding for activities in the SFP.

Question No. 77 **QID:** 0313 **Point Value:** 1
Answer:
b. Overcooling procedure.

Question No. 78 **QID:** 0314 **Point Value:** 1
Answer:
c. 1020 psig

Question No. 79 **QID:** 0315 **Point Value:** 1
Answer:
b. 21 in. Hg

Question No. 80 **QID:** 0316 **Point Value:** 1
Answer:
a. P36A (HPI) pump was the in-service pump.

Question No. 81 **QID:** 0317 **Point Value:** 1
Answer:
b. Panel RA2

Question No. 82 **QID:** 0318 **Point Value:** 1
Answer:
b. Verify the Diesel Fire Pump P-6B starts.

Question No. 83 **QID:** 0319 **Point Value:** 1
Answer:
c. 90-99 gpm

Question No. 84 **QID:** 0320 **Point Value:** 1
Answer:
c. Take manual control of SG/RX master.

Question No. 85 **QID:** 0321 **Point Value:** 1
Answer:
b. between 4 and 6.9 minutes

Question No. 86 **QID:** 0322 **Point Value:** 1
Answer:
a. The Unit Master H/A station input tracks the Rate and Load Limited Megawatt demand signal.

Question No. 87 **QID:** 0323 **Point Value:** 1
Answer:
b. 1203.018, "Turbine Trip below 43% Power"

Question No. 88 **QID:** 0324 **Point Value:** 1
Answer:
a. Cycle ERV as required

Question No. 89 **QID:** 0325 **Point Value:** 1
Answer:
d. 30 inches

Question No. 90 **QID:** 0326 **Point Value:** 1
Answer:
b. Increase due to bleedoff in excess of seal cooler capacity.

Question No. 91 **QID:** 0327 **Point Value:** 1
Answer:
c. 320 psig, 385 psig

Question No. 92 **QID:** 0328 **Point Value:** 1
Answer:
a. Depress the CRD Power Supply Breaker Trip Pushbuttons.

Question No. 93 **QID:** 0329 **Point Value:** 1
Answer:
a. Maintain flux level in the source range

Question No. 94 **QID:** 0330 **Point Value:** 1
Answer:
d. "B" OTSG tube leak of 2 gpm with reactor trip.

Question No. 95 **QID:** 0332 **Point Value:** 1
Answer:
a. Controlling reactor coolant system pressure low within the limits of Figure 3.

Question No. 96 **QID:** 0333 **Point Value:** 1

Answer:

d. "A" EFIC level is 35 rising "A" MFW Flow is .1 mlb/hr
"B" EFIC level is 31 stable "B" MFW Flow is .3 mlb/hr

Question No. 97 **QID:** 0334 **Point Value:** 1

Answer:

d. OTSG level dropping
Feedwater flow rising
RB pressure rising

Question No. 98 **QID:** 0335 **Point Value:** 1

Answer:

a. CET temperatures stable after 100 minutes.

Question No. 99 **QID:** 0336 **Point Value:** 1

Answer:

c. Transfer D11 to its Emergency Power Supply.

Question No. 100 **QID:** 0360 **Point Value:** 1

Answer:

b. Set the batch controller to the maximum batch size.

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

Applicant Information

Name:	Region: I / II / III / IV
Date:	Facility/Unit: Arkansas Nuclear One Unit 1
License Level: RO / SRO	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. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected five hours after the examination starts.

Applicant Certification

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

_____ Applicant's Signature

Results

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

Question No. 1 **QID: 0030**

During a small break LOCA cooldown, which of the following criteria must be met before High Pressure Injection may be secured?

a. Restoration of adequate subcooling margin.

b. Total low pressure injection flow >2800 gpm.

c. Restoration of forced flow cooling.

d. At least one OTSG is available as a heat sink.

Question No. 2 **QID: 0058**

A startup is in progress. The reactor is critical and the CBOR is commencing power escalation to <2% reactor power. The following indications are observed:

NI-3 1 x 10-8 amps
NI-4 8 x 10-7 amps
NI-5 0.8%
NI-6 1.1%
NI-7 1.3%
NI-8 1.2%

What conclusion should you deduce from the above indications?

a. Power Range channel 5 requires calibration.

b. The Intermediate Range channels are overcompensated.

c. The POAH has not yet been reached.

d. The Intermediate Range channels are undercompensated.

Question No. 3 **QID: 0158**

The outside door of the personnel lock was opened to replace a seal gasket 24 hours ago.

How long does operations have to perform an LLRT on the personnel lock before a loss of containment integrity will exist?

a. 1 hour

b. 12 hours

c. 6 days

d. 13 days

Question No. 4 **QID: 0204**

The #2 EDG monthly surveillance is in progress with the EDG on-line and fully loaded.

EDG 2 Non-critical Trouble (K01-D4) is in alarm.
EDG 2 Critical Trouble (K01-C4) comes into alarm.
The Outside AO reports that EDG 2 Fuel Oil Transfer Pump P-16B is tripped and will NOT start.
The Inside AO reports that the T-30B day tank level is ~180 gallons and going down slowly.

Which of the following is correct with regard to #2 EDG status?

a. EDG 2 is operable because fuel oil can be supplied from EDG 1 transfer pump P-16A.

b. EDG 2 is inoperable because the level in T-30A being is <190 gallons.

c. EDG 2 is operable because Emergency Fuel Storage Tank T-57B is full.

d. EDG 2 is inoperable because EDG 2 Fuel Oil Transfer Pump P-16B is inoperable.

Question No. 5 **QID: 0217**

During HPI Cooldown, pump suctions are shifted from the Borated Water Storage Tank to the reactor building sump when the Borated Water Storage Tank level is:

a. 4 feet

b. 6 feet

c. 8 feet

d. 10 feet

Question No. 6 **QID: 0240**

Given:

Plant is at 100% power
All CETs indicate 602 °F

ICC train "B" Core Exit Thermocouple TE-1152 fails to 900 °F.

What is the effect of this failure?

a. Core Exit Thermocouple TE-1152 will be removed from the average.

b. ICC Core Exit Thermocouple indication will go to ~627 °F.

c. "TRAIN B SUBCLG MARG LO" annunciator will alarm.

d. "B" SPDS will switch from ATOG to the ICC display.

Question No. 7 **QID: 0241**

Reactor Building Service Water Coolers are in service.

Reactor Building Cooling Coils VCC-2A and VCC-2B should be isolated if:

a. Service Water Loop 1 and Discharge Flume process radiation monitors alarm.

b. Service Water Loop 1 and Service Water Loop 2 process radiation monitors alarm.

c. Service Water Loop 2 process radiation monitor alarms and Reactor Building Sump level is rising.

d. Service Water Loop 2 process radiation monitor alarms and low Service Water Loop 2 flow.

Question No. 8 **QID: 0243**

What is ANO's emergency control limits for emergency exposures for vital equipment protection?

a. Planned dose shall not exceed 5 Rem TEDE.

b. Planned dose shall not exceed 10 Rem TEDE.

c. Planned dose shall not exceed 25 Rem TEDE.

d. Planned dose shall not exceed 75 Rem TEDE.

Question No. 9 **QID: 0244**

Only operations personnel are authorized to manipulate plant equipment. 1015.001, Conduct of Operations, specifies exceptions to this guidance. Which of the following would NOT satisfy those exceptions?

a. Chemistry personnel operating sample valves per chemistry procedures.

b. Entergy employee opening a service air connection isolation.

c. Operation of equipment under the direct supervision of the Auxiliary Operator.

d. System engineer closes a valve while troubleshooting a water hammer concern.

Question No. 10 **QID: 0245**

The feedwater/condensate system startup is in progress. A main feedwater isolation valve had been closed by operation of the manual handwheel to isolate the system.

Prior to declaring this valve operable what action must be taken?

a. The valve must be fully opened using the local handwheel.

b. Electricians must check the torque switch adjustment.

c. The torque required to remove valve from seat must be below the limit.

d. The valve must be stroked electrically to confirm proper clutch engagement.

Question No. 11 **QID: 0246**

How is the oncoming operator supposed to verify the correct number of keys are on his key ring during turnover?

a. Check current key lists in the keybox.

b. Check the number specified in the key log procedure.

c. Check against the number on the brass tag on the key ring.

d. Check the number listed on the shift turnover log from last shift.

Question No. 12 **QID: 0247**

A tagout is required on the "A" makeup pump. Which shift personnel are qualified to perform the tagout boundary verification, if the tagout was prepared by a non-licensed operator?

a. Control Board Operator or Auxiliary Operator.

b. Auxiliary Operator or Shift Engineer.

c. Control Room Supervisor or Waste Control Operator.

d. Control Board Operator or Shift Superintendent.

Question No. 13 **QID: 0248**

Given:

The plant is at 100 % power
Decay Heat Pump P-34A is out of service
Service Water Pumps P-4A and P-4B are operating.

Which event would make Decay Heat Pump P-34B inoperable?

a. Lockout relay trip deenergizes A-2

b. Emergency Diesel Generator 1 start time is 16.2 seconds.

c. Service Water Pump P-4C motor fails.

d. LPI Room Cooler VUC-1C is declared inoperable.

Question No. 14 **QID: 0249**

The federal limit for exposure to the skin of the whole body is:

a. 5 Rem/year

b 15 Rem/year

c 40 Rem/year

d. 50 Rem/year

Question No. 15 **QID: 0251**

You are assigned to perform a valve lineup.
The valve lineup requires you to enter an area posted as 10mR/hr.
After 30 minutes your alarming dosimeter reads 60 mR.

What should you do?

a. Exit the area and notify Health Physics.

b. Notify Health Physics and continue with the alignment.

c. Exit the area, reset your dosimetry and continue with the alignment.

d. Continue with the alignment and notify the Shift Superintendent when completed.

Question No. 16 **QID: 0252**

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

Which condition, if not corrected within 15 minutes, would require a plant shutdown within the following 15 minutes?

a. One pressurizer code safety valve is declared inoperable.

b. Reactor coolant temperature is below 525 °F.

c. Reactor coolant system Hot Leg high point vents inoperable.

d. Pressurizer level stable at 100 inches.

Question No. 17 **QID: 0253**

ICS is in full automatic and the CBOR is verifying proper plant response to a main feedwater pump trip from 75% power.

Which of the following should the CBOR expect to occur?

a. The operating main feedwater pump demand has a 30% bias added.

b. The pressurizer spray valve opens immediately and closes when RCS pressure reaches 2030 psig.

c. The control rods insert immediately due to a bias subtracted from the demand.

d. The main feedwater block valves close immediately in fast speed.

Question No. 18 **QID: 0254**

Given:

EFW started 10 minutes ago
EFW pump P-7A speed is 900 RPM

Which of the following would cause these indications?

a. EFW Pump P-7A governor valve has lost power.

b. EFW Pump P-7A trip/throttle valve does not indicate full open.

c. EFW steam admission valve CV-2613 is closed.

d. EFW Pump P-7A governor valve has an oil leak.

Question No. 19 **QID: 0255**

Given:

Plant startup is in progress.
The plant is at 35% power
"A" Main Feedwater Pump is in service
"B" Main Feedwater Pump is at minimum speed
"B" Main Feedwater Pump Anticipatory Reactor Trip is NOT reset

A malfunction of the "A" Main Feedwater Pump control oil system causes "A" Main Feedwater Pump auto stop oil pressure to go rapidly to 0 (zero) psig.

What effect does this failure have on the plant?

a. ATWS Mitigation Actuation and Control will trip the plant and start Emergency Feedwater.

b. Both OTSG levels will go less than 14.5 inches and start Emergency Feedwater.

c. RPS will trip the plant and start Emergency Feedwater on loss of both Main Feedwater Pumps.

d. High Reactor Coolant System pressure will trip the plant and start Emergency Feedwater.

Question No. 20 **QID: 0256**

Why are Decay Heat Cooler Outlet Valves SW-22A and SW-22B throttled during normal operation?

a. Service water flow to the Auxiliary Cooling Water System is raised during normal operation.

b. Maintains adequate service water flow to the Reactor Building Coolers when ES actuates.

c. Reactor coolant to service water differential temperature is reduced when ES actuates.

d. Decay heat coolers are maintained full and reduces the chance of water hammer.

Question No. 21 **QID: 0257**

Given:

Reactor startup is in progress
Group 6 is 50% withdrawn.
NI-1 source range indicates .1 cps
NI-2 source range indicates 30 CPS

Which of the following would cause these indications?

a. Source range NI-2 discriminator voltage is set too high.

b. Inverter Y-28 failed resulting in a loss of power.

c. Inverter Y-11 failed resulting in a loss of power.

d. Source range NI-1 discriminator voltage is set too low.

Question No. 22 **QID: 0259**

What is the purpose and function of the temperature interlock associated with letdown isolation valve CV-1221?

a. Prevents releasing of steam through the letdown relief valve by opening CV-3891 for relief path cooler.

b. Prevents exceeding letdown piping thermal limits by shutting CV-1213 & 1215 (letdown cooler inlet MOV).

c. Prevents degrading T36A/B resin by shutting CV1221 (letdown isolation).

d. Prevents exceeding letdown cooler capacity by shutting CV1213 & 1215 (letdown cooler inlet MOV).

Question No. 23 **QID: 0260**

With CV1207 RCP seal injection control valve in hand, which one of the following events would cause seal injection flow to go up?

a. Low pressurizer level.

b. Instrument air line to the Lower North Piping Room ruptures.

c. Opening of CV-1228 (HPI block valve to P32A discharge).

d. Operator raises letdown flow.

Question No. 24 **QID: 0261**

Given:

The plant is at 30 % power.
Main Feedwater Pump P-1A is in service.
Main Feedwater Pump P-1B is shutdown.
Condensate pumps P-2A and P-2C are in service.

Explain the response of "B" condensate pump, if "C" condensate pump trips.

a. Condensate pump low discharge pressure will auto-start condensate pump P-2B.

b. Condensate pump P-2C tripping will auto-start condensate pump P-2B.

c. Condensate pump P-2B will remain off since the plant is operating at a power level less than 40%.

d. Condensate pump P-2B will remain off since Main Feedwater Pump P-1B is not latched.

Question No. 25 **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. 26 **QID: 0263**

Given:

All RCPs are operating.
The plant is at 40 % power.
Time in core life is 325 EFPD.

What is the lowest allowed control rod position for continuous plant operation?

a. Group 6 at 26 %

b. Group 6 at 56 %

c. Group 5 at 71%

d. Group 6 at 36%

Question No. 27 **QID: 0267**

The CBOR observes a change in seal injection flow rates and notes the following values:

"A" RCP	6.5 gpm
"B" RCP	15.0 gpm
"C" RCP	5.0 gpm
"D" RCP	6.0 gpm

Which of the following explains the seal injection flow indications?

a. Reactor Coolant Pump P-32B trip due to a motor fault.

b. Seal injection line break in the Upper North Piping Penetration Room .

c. "B" Reactor Coolant Pump seal cooler leak.

d. "B" seal injection flow transmitter failure.

Question No. 28 **QID: 0271**

Which of the following must be performed to release T-16A contents with the Liquid Radwaste Process Monitor (RI-4642) inoperable?

a. Chemistry personnel must estimate radiation level every four hours during the release.

b. A Waste Control Operator must independently verify release path alignment prior to release.

c. The release flow rate must be estimated at least once every three hours during the release.

d. Discharge Flume process monitor RI-3618 must be checked for operability.

Question No. 29 **QID: 0272**

When a high radiation condition occurs in the Waste Gas Discharge Header, the radiation monitor will cause what combination of automatic action(s) to occur?

1. Nitrogen is added for dilution.
2. The Aux. Building Vent Header diverts to the Waste Gas Surge Tank.
3. The Waste Gas Decay Tank effluent control valve (CV-4820) shuts.
4. The Aux. Building Vent Header diverts to the Waste Gas Decay Tank in service.

a. 1 and 2

b. 2 and 3

c. 3 and 4

d. 1 and 4

Question No. 30 **QID: 0273**

The in-service Unit 1 Control Room Supply Vent Radiation Detector, 2RITS-8001A, detects a high radiation condition.

Which of the following will occur?

a. Control Room Air Supply Fan (VSF-8A or 8B) starts.

b. Control Room Chiller Unit (VCH-2A or 2B) trips.

c. Normal ventilation ducts are isolated automatically.

d. 2VSF-9 (CR Emerg. A/C Fan) starts.

Question No. 31 **QID: 0278**

A Natural Circulation Cooldown is in progress. The Shift Superintendent/Control Room Supervisor are discussing entering 10CFR 50.54x for use of high pressure auxiliary spray.

Which of the following conditions would NOT allow the use of high pressure auxiliary spray?

a. Pressurizer/spray fluid differential temperature is greater than 430 °F.

b. Pressurizer spray valve, CV-1008, is failed open.

c. Pressurizer spray isolation valve, CV-1009, is failed open.

d. Borated Water Storage Tank level is less than 23 feet.

Question No. 32 **QID: 0279**

Given:

The plant is in a blackout condition.
Startup transformer #1 primary voltage is 19 KV.
Unit 2 vital and non-vital buses are aligned to startup transformer #2.
Startup transformer #2 voltage is 155 KV.

How should off-site power be restored to the plant?

a. Verify 1202.008, Att. 1, "Blackout Breaker Alignment UV Defeat", complete then close feeder breakers from startup transformer #1.

b. Check acceptable loading on startup transformer #2 then close the feeder breakers from startup transformer #2.

c. Verify 1202.008, Att. 2, "Recovery from Blackout Breaker Alignment and UV Defeat", complete then close feeder breakers from startup transformer #1.

d. Check the autotransformer is aligned to startup transformer #2, then close the feeder breakers from startup transformer #2.

Question No. 33 **QID: 0280**

The plant is operating at 70% when the following indications are observed:

Loop "A" RC Flow is 35 mlb/hr
Loop "B" RC Flow is 70 mlb/hr
FW RERATIO ON LOSS OF RC-FLOW ENABLED is in alarm

What is the cause of these indications?

a. Reactor Coolant Pump P-32C trip.

b. Reactor Coolant Pump P-32A trip.

c. Reactor Coolant Pump P-32C sheared shaft.

d. Reactor Coolant Pump P-32A sheared shaft.

Question No. 34 **QID: 0281**

Service Water Pumps P-4A, P-4B (supplied from A-4), and P-4C are running. An ES actuation coincident with a loss of off-site power occurs.

Which service water pumps will autostart when A-3 and A-4 are re-energized?

a. P-4A, P-4B and P-4C

b. P-4A and P-4B

c. P-4B and P-4C

d. P-4A and P-4C

Question No. 35 **QID: 0282**

Given:

Unit 1 is at 100% power.
ICW pumps P-33A and P-33B are in service.

Subsequently the ICW pump supplying the Non-Nuclear ICW loop trips. Which of the following actions should you verify as the proper system response to the above conditions?

a. P-33B and P-33C running
P-33A to P-33B suction and discharge crosstie valves open
P-33B to P-33C suction and discharge crosstie valves closed

b. P-33A and P-33C running
P-33A to P-33B suction and discharge crosstie valves closed
P-33B to P-33C suction and discharge crosstie valves open

c. P-33B and P-33C running
P-33A to P-33B suction and discharge crosstie valves open
P-33B to P-33C suction and discharge crosstie valves open

d. P-33A and P-33C running
P-33A to P-33B suction and discharge crosstie valves closed
P-33B to P-33C suction and discharge crosstie valves closed

Question No. 36 **QID: 0283**

The plant is operating at 100% power.
Group 7 CRAs can not be moved on the normal or auxiliary power supply.

What operator action is required?

a. Declare Group 7 INOPERABLE and borate the plant to Hot Shutdown.

b. Declare Group 7 INOPERABLE and shutdown using remaining rod groups.

c. Exercise all other rods, verify 1.5% SDM, and continue operation.

d. Initiate Emergency Boration and trip the reactor.

Question No. 37 **QID: 0285**

Following a turbine and reactor trip, an overcooling transient is occurring due to a stuck open safety.

The affected SG pressure is 825 psig and falling.

What actions are taken to seat the MSSV per the Overcooling procedure?

a. Actuate Main Steam Line Isolation for the SG with the lowest pressure.

b. Quickly reduce the lowest SG pressure to 700 psig or the MSSV open alarm is clear.

c. Trip both Main Feedwater pumps, actuate EFW, and perform RT-5.

d. Shut the Main Feedwater Isolation Valve for the affected Steam Generator.

Question No. 38 **QID: 0286**

Identify the post trip RCS Tcold temperature stated in the Reactor Trip EOP below which entry into the overcooling procedure is required?

a. 560 degrees F.

b. 550 degrees F.

c. 540 degrees F.

d. 530 degrees F.

Question No. 39 **QID: 0287**

Why is the Main Turbine tripped when condenser vacuum is less than 26.5 inches and turbine load is less than 270 megawatts?

a. Prevent Main Turbine blade damage due to excessive heating.

b. Prevent condenser tube bundle damage due to excessive heating.

c. Prevent personnel hazard due to blowing out of condenser rupture discs.

d. Prevent damage to the main condenser flexible boot due to overpressure.

Question No. 40 **QID: 0288**

Given:

Following a Reactor Trip all NNI-X power is lost.
RCS pressure is at 1800 psig and trending down slowly.

Which of the following explains the RCS pressure trend?

a. Pressurizer automatic heater control is inoperable.

b. Pressurizer spray valve has failed to 40% open.

c. ERV has shifted to the LTOP pressure setpoint.

d. Loss of AC power to RCS pressure instruments.

Question No. 41 **QID: 0289**

For reflux boiling to be effective, the primary steam bubble must extend:

a. below the high point of the Tcold.

b. above the secondary side water level.

c. below the secondary side water level.

d. above the upper tube sheet.

Question No. 42 **QID: 0291**

The SS & CRS are performing Alternate Shutdown, Delayed Control Room Evacuation, followup actions. Followup actions direct that the P7A EFW Flow Control valves (CV-2645 and CV-2647) are to be placed in HAND and throttled full open while throttling closed on the EFW Isolations (CV-2627 & CV-2620), to maintain proper EFW flow.

The reason for this step is:

a. The EFW Isolation valves tend to stick if kept in the full open position.

b. The EFW Control Valves will fail in the closed position if the valves are not locally pinned open. This sets the proper position to pin the valves.

c. This will leave the isolation valves in the proper position when instrument air is removed locally by RO #1.

d. To allow for removal of DC power from the EFW Flow Control valves and to prevent overcooling.

Question No. 43 **QID: 0292**

Reactor trip occurred.
ICCMDS indicates Subcooling Margin is 10°F.

Which of the following actions should be taken?

a. If less than two minutes has elapsed, then trip all RCPs.

b. If more than two minutes has elapsed, then trip all RCPs.

c. If less than two minutes has elapsed, then trip one RCP in each loop.

d. If more than two minutes has elapsed, then trip all but one RCP.

Question No. 44 **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. 45 **QID: 0297**

Placing the OPC test switch in the OPC test position will:

a. Block the actuation of the Overspeed Protection Controller.

b. Simulate an electronic overspeed trip signal.

c. Actuate the Overspeed Protection Controller.

d. Block the actuation of the electronic overspeed trip signal.

Question No. 46 **QID: 0298**

Why does service water pressure drop during an inadvertent actuation of ES channel 5 ?

a. The SW valves to the RB Cooler on that channel will open.

b. There are more flow demands on the SW Systems during ES actuation.

c. The SW valves will automatically realign to Emergency Pond suction.

d. The SW Loop One and Loop Two cross ties will close.

Question No. 47 **QID: 0302**

Given:

The reactor tripped due to a small break LOCA.
Pressure has stabilized at 800 psig.
RCS temperature is 500 °F and slowly rising.

Which of the following is appropriate?

a. Start Reactor Coolant Pumps and establish forced flow cooling.

b. Take actions to establish primary to secondary heat transfer cooling.

c. Continue cooling with the existing break flow.

d. Commence High Pressure Injection cooldown.

Question No. 48 **QID: 0303**

Which of the following occurs when HPI is automatically actuated on low RCS pressure?

a. RCP Seal INJ Block Valve CV-1206 receives an open signal.

b. Makeup Tank Outlet Valve automatically closes.

c. Decay Heat Cooler Outlet to HPI pump suction CV-1276 automatically opens.

d. RCS Makeup Block Valve CV-1234 receives a close signal.

Question No. 49 **QID: 0304**

Given:

A degraded power condition is present.
Diesel Generator #1 failed to start.
No other failures are present.

Which component would be automatically actuated to its ES position/status if RCS pressure subsequently dropped below 1590 psig?

a. EFW pump P-7B would restart.

b. Penetration room ventilation fan VEF-38A would start.

c. HPI pump P-36B would start.

d. Letdown coolers outlet CV-1221 would close.

Question No. 50 **QID: 0305**

The following conditions exist:

Unit 1 is operating at 100% power when the Pressurizer Spray Control valve (CV-1008) fails open.
Pressurizer Spray Isolation valve (CV-1009) will NOT close because of high torque on the motor.

Which one of the following methods should be used to override the CV-1009 torque switch to operate the valve in the CLOSED direction?

a. Open RC-4 (Spray Line Minimum Flow Valve) to reduce delta pressure.

b. Close the valve using breaker control switches.

c. HOLD the handswitch in the CLOSED position.

d. Place the handswitch in the OPEN position then the CLOSED position.

Question No. 51 **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. Reactor Coolant Pump trip at 95% power

Question No. 52 **QID: 0308**

Given:

Plant is at 100% power.
ICS is in full automatic.

Subsequently, annunciator K07-B3 "ASYM ROD RUNBACK IN EFFECT" alarms.
A check of the PI panel shows that Rod 6 in Group 5 has dropped.

Which of the following alarms or indications would you expect to see on the diamond panel?

a. Sequence Inhibit lamp ON

b. Out Inhibit lamp ON

c. Auto Inhibit lamp ON

d. Group 5 Out Limit lamp OFF

Question No. 53 **QID: 0309**

Given:

The plant is operating at 100% power.
Loop "A" T-cold Narrow Range Temperature instrument fails HIGH.

If this instrument was hard selected by the SASS selector switch, what ICS HAND/AUTO stations should be placed in HAND?

a. Reactor Demand and both Feedwater Loop Demands.

b. SG/Rx Master and Reactor Demand.

c. SG/Rx Master and both Feedwater Loop Demands.

d. Both MFW Pumps and Turbine (EHC).

Question No. 54 **QID: 0310**

Why is the screen mesh installed on the reactor building sump suction lines?

a. Prevent damage from post-accident debris to the decay heat and reactor building spray pump seals.

b. Prevent vortex formation and subsequent loss of suction to the decay heat and reactor building spray pumps.

c. Prevent debris after an accident from clogging the level transmitters for the reactor building sump.

d. Prevent post-accident debris from clogging the reactor building spray header nozzles.

Question No. 55 **QID: 0311**

Reactor Building pressure is 15.7 psia.

What action should be taken to initiate RB purge?

a. The reactor building purge inlets should be opened first.

b. The reactor building purge inlets and outlets should be opened simultaneously.

c. The reactor building purge outlets should be opened first.

d. The reactor building should be vented to the waste gas system.

Question No. 56 **QID: 0312**

What is the basis for the minimum SFP level (-0.5 ft) specified in the normal operating procedure?

a. This volume of water will maintain bulk SFP water temperature below boiling.

b. This volume of water will ensure adequate boron concentration in the SFP.

c. This volume of water provides adequate shielding for activities at the SFP.

d. This volume of water ensures adequate time for operator action in the event of a leak.

Question No. 57 **QID: 0313**

Given:

RCS pressure is 1800 psig,
RCS temperature is 545 degrees F,
"A" OTSG pressure is 650 psig,
"B" OTSG pressure is 970 psig,
Reactor Building Pressure is 6 psig.

Actions required to stop this transient are found in the:

a. ESAS procedure.

b. Overcooling procedure.

c. Forced Flow Cooldown procedure.

d. Loss of Subcooling Margin procedure.

Question No. 58 **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 at what pressure will the OTSG's be controlled?

a. 895 psig

b. 995 psig

c. 1020 psig

d. 1050 psig

Question No. 59 **QID: 0315**

What is the Condenser vacuum setpoint that interlocks the Turbine Bypass Valves closed?

a. 17 in. Hg

b. 21 in. Hg

c. 23 in. Hg

d. 25 in. Hg

Question No. 60 **QID: 0316**

Which of the following would explain why a loss of bus A1 will cause CV-1206 (RC Pump Seal Injection Block Valve) to close?

(Assume plant is at 100% power)

a. P36A (HPI) pump was the in-service pump.

b. Loss of instrument air to Seal Injection Control Valve, CV-1207.

c. P36C (HPI) pump was the in-service pump.

d. Loss of instrument air to Pressurizer Level Control valve CV-1235.

Question No. 61 **QID: 0317**

Unit One is at 100% power and experiences a loss of 125V DC Bus D02.

Which of the following D02 loads will cause the reactor to trip?

a. MCC D25

b. Panel RA2

c. Inverter Y22

d. Inverter Y28

Question No. 62 **QID: 0318**

You are on watch in the Control Room when the following annunciators go into alarm:

K12-A1, "FIRE"

K12-A2, "FIRE WATER FLOW"

K12-B2, "FIRE PUMP AUTO START"

Then you notice the running Fire Water Pump trips.

Which of the following actions should you take to ensure the Fire Water System can respond to the event in a timely manner?

a. Verify the Electric Fire Pump P-6A starts.

b. Verify the Diesel Fire Pump P-6B starts.

c. Dispatch an operator to place the Temporary Fire Pump in service.

d. Verify the Jockey Fire Water Pump P-11 starts.

Question No. 63 **QID: 0319**

Given:

100% power
Total RCS leakage is .5 gpm
Seal injection flow to each RCP is 9 gpm
Controlled bleedoff flow from each RCP is 1.5 gpm
Letdown flow is maximum for one demineralizer
Pressurizer level is 220"

Approximately how much flow is being added to the RCS via the makeup line?

a. 70-79 gpm

b. 80-89 gpm

c. 90-99 gpm

d. 100-109 gpm

Question No. 64 **QID: 0320**

A dropped rod event has occurred (one CRA in Group 7) and the following conditions exist:

Reactor power = 30% and decreasing.
Turbine output = 320 MWe and decreasing.
Annunciator (K07-C3) HIGH LOAD LIMIT is in fast flash.
Turbine runback is in progress.

What operator action is required?

a. Allow the runback to terminate normally.

b. Take manual control of the turbine and raise load.

c. Take manual control of SG/RX master.

d. Trip the reactor.

Question No. 65 **QID: 0322**

A reactor coolant pump trip has caused a plant runback.

What ensures ICS maintains power steady (does not return to its previous load demand) when the runback is complete?

a. The Unit Master H/A station input tracks the Rate and Load Limited Megawatt demand signal.

b. The ICS runback demand signal is fed directly into the input of the Unit Master H/A station.

c. The input to the Unit Master H/A station is driven by cross limits to match the runback back demand signal.

d. The ICS runback signal will clear only when the Unit Master H/A station output equals actual generated megawatts.

Question No. 66 **QID: 0323**

A plant power escalation is in progress at 28% power.
The following conditions are observed:

Rapid rise in RCS temperature
Rapid rise in RCS pressure
Rapid rise in PZR level
Rapid rise in Main Steam pressure
Megawatt output = zero (0)

What procedure contains the required mitigating operator actions?

a. 1203.001, "ICS Abnormal Operating"

b. 1203.018, "Turbine Trip below 43% Power"

c. 1203.020, "Load Rejection"

d. 1202.001, "Reactor Trip"

Question No. 67 **QID: 0324**

Given:

Reactor tripped on low pressure.
RCS Tave 545 °F and stable
Pressurizer level off-scale high
RCS pressure 1850 psig and rising rapidly
RB sump level 55% and rising

During this transient, which of the following methods will be used to limit the RCS pressure rise, in accordance with RT-14?

a. Cycle ERV as required

b. Secure steaming OTSGs

c. Raise makeup flow

d. Lower letdown flow

Question No. 68 **QID: 0325**

Following a reactor trip, what pressurizer level value (dropping) requires initiation of HPI per RT-2?

a. 110 inches

b. 90 inches

c. 55 inches

d. 30 inches

Question No. 69 **QID: 0326**

Reactor Coolant Pump (P32A) has a 2.6 gallon seal bleedoff flow.

What will happen to seal bleedoff temperature if seal injection is subsequently lost?

a. Rise due to loss of flow to the seal cooler.

b. Rise due to bleedoff in excess of seal cooler capacity.

c. Remain the same due to seal bleedoff cooling flow.

d. Remain the same due to seal recirc flow impeller circulation.

Question No. 70 **QID: 0327**

The RCS pressure setpoints at which the Decay Heat suction isolation valves close are _____ for CV-1050 and _____ for CV-1410.

a. 290 psig, 320 psig

b. 340 psig, 400 psig

c. 320 psig, 385 psig

d. 340 psig, 385 psig

Question No. 71 **QID: 0328**

The plant is operating at 100% and the following indications are observed:

"A" and "B" Main Feedwater Pumps are tripped
CRD groups 1, 2, 3, and 4 are at the out limit.
CRD groups 5, 6, and 7 are at the in limit.
NI-3 indicates 1 E-8 and lowering.

What action should be performed FIRST?

a. Depress the CRD Power Supply Breaker Trip Pushbuttons.

b. Dispatch an operator to open the CRD AC Power Supply Breakers.

c. Commence Emergency Boration per RT-12.

d. Manually insert CRD groups 1, 2, 3, and 4.

Question No. 72 **QID: 0329**

Given:

Plant startup in progress
NI501 at 9 x E4 cps
NI502 at 1 x E5 cps
NR502 is operable and at 5 x E-2% power
NI3 at 2 x E-11 amps
NI4 at 5 x E-11 amps
NI5 thru 8 at 0%

What action should be taken by control room operators?

a. Maintain flux level in the source range

b. Trip the reactor

c. Continue with startup

d. Stabilize power at 1 x E-8 amps

Question No. 73 **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'

Which Emergency Operating Procedure should the CRS transition to?

a. Loss of Subcooling Margin

b. ESAS

c. HPI Cooldown

d. Stay in Tube Rupture

Question No. 74 **QID: 0332**

What EOP action is designed to reduce the rate of leakage into a ruptured OTSG?

a. Controlling reactor coolant system pressure low within the limits of Figure 3.

b. Concurrently performing 1203.014, Control of Secondary System Contamination.

c. Isolation of the OTSG with the ruptured tube.

d. Cooling down the reactor coolant system to less than 500 °F.

Question No. 75 **QID: 0334**

Prior to any automatic or operator actions, which set of parameters would indicate a Main Feedwater Line Break inside of the reactor building?

a. OTSG level dropping
Feedwater flow dropping
RB pressure rising

b. OTSG level rising
Feedwater flow dropping
RB pressure rising

c. OTSG level rising
Feedwater flow rising
RB pressure dropping

d. OTSG level dropping
Feedwater flow rising
RB pressure rising

Question No. 76 **QID: 0335**

Given:

Loss of all Feedwater
HPI core cooling started

What indicates adequate HPI core cooling?

a. CET temperatures stable after 100 minutes.

b. T-cold tracking associated SG T-sat.

c. T-hot tracking CET temperatures.

d. T-hot/T-cold differential temperature dropping.

Question No. 77 **QID: 0336**

Given:

Turbine Lockout Relay DC Failure Alarm (K04-B5),
D11 Loss of Voltage (K01-B7),
Loss of Breaker Position Indicator Lights for Plant Buses on left side of C10.

Which action should be performed?

a. Start both Diesel Generators from C-10.

b. Trip the Generator Output Breakers.

c. Transfer D11 to its Emergency Power Supply.

d. Line up Battery Charger D03A or D03B to the D01 Bus.

Question No. 78 **QID: 0337**

ESAS has actuated. LPI/HPI flows for the past ten minutes have been as follows:

"A" LPI flow--2900 gpm
"B" LPI flow--2850 gpm
"A" HPI pump flow throttled to 100 gpm through CV-1220
"C" HPI pump flow throttled to 100 gpm through CV-1285

An overcurrent has resulted in an A-3 bus lockout and A-1 to A-3 tie breaker A-309 trip. The operator should:

a. restore full HPI flow on "C" HPI pump.

b. close A-308 to power A-3 from #1 EDG.

c. energize bus B-5 from bus B-6

d. start P-36B to supply 100 gpm train through CV-1220.

Question No. 79 **QID: 0338**

All DC power has been lost.
"A" emergency diesel generator (EDG) has been manually started.

Which one of the following operator actions are required to control EDG voltage as EDG load is changed?

a. Select OFF on the auto/manual control and voltage will follow load changes proportionally.

b. Select AUTO on the auto/manual control and adjust the MANUAL voltage adjust rheostat.

c. Select MANUAL on the auto/manual control and voltage will follow load changes proportionally.

d. Select MANUAL on the auto/manual control and adjust the MANUAL voltage adjust rheostat.

Question No. 80 **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. 81 **QID: 0340**

What action is required upon receipt of Liquid Radwaste Process Monitor (RI-4642) high alarm?

a. Start another circ water pump to increase dilution flow.

b. Verify no release in progress at Discharge Flow to Flume.

c. The WCO must be contacted to manually stop the release.

d. Have chemistry sample discharge flume for radionuclides.

Question No. 82 **QID: 0341**

The Corridor #98 smoke detector string must be de-energized to prevent inadvertent actuations while painting in the area.

Which of the following statements accurately assesses the operability of this area's fire SUPPRESSION system?

a. Operable, greater than or equal to 50% of the detectors are operable.

b. Inoperable, less than 50% of the detectors are operable.

c. Operable, as long as the sprinkler valve is placed in a tripped condition.

d. Inoperable, sprinkler valve will not actuate automatically.

Question No. 83 **QID: 0342**

Given:

Reactor at 60% power.

Failed fuel ratio, as indicated by the WCO logs, has dropped by 40%.

Identify the value Reactor power should be reduced to.

a. 50% power

b. 40% power

c. 30% power

d. 20% power

Question No. 84 **QID: 0343**

While performing the follow-up actions of 1202.001, Reactor Trip, the CBOR reports K07-A4 "ICS/AUX SYS POWER SUPPLY TROUBLE", is in alarm, and ICS power supply lights on C-13 are NOT lit.

Which of the following actions would be taken to control feedwater flow to the OTSGs?

a. Place both Main Feedwater pump H/A stations in HAND and manually control feedwater flows.

b. Start Aux Feedwater Pump, P-75, and manually control feedwater flow through the Startup Valves.

c. Actuate EFW, verify proper actuation and control per RT-5, and trip both Main Feedwater pumps.

d. Verify that Rapid Feedwater Reduction reduces feedwater flow to establish proper OTSG levels.

Question No. 85 **QID: 0344**

In which of the following sets of post reactor trip responses is the pressurizer spray valve leaking?

a. RCS temperature is going down, RCS pressure is going down, and pressurizer level is going down.

b. RCS temperature is going up, RCS pressure is going up, and pressurizer level is going up.

c. RCS temperature is stable, RCS pressure is going down, and pressurizer level is going down.

d. RCS temperature is stable, RCS pressure is going down, and pressurizer level is stable.

Question No. 86 **QID: 0345**

Given:

"A OTSG N-16 Trouble" is in alarm.
Letdown flow is 70 gpm.
Makeup flow is 90 gpm.
Seal injection flow is 32 gpm.
Seal Bleedoff Flow is 1.5 gpm per RCP
Pressurizer level is constant.

What is the approximate primary to secondary leak rate?

a. ~6 gpm

b. ~12 gpm

c. ~46 gpm

d. ~52 gpm

Question No. 87 **QID: 0346**

Given:

Loss of instrument air transient.
Unit 1 and Unit 2 instrument air systems are crossconnected.

What is the lowest instrument air pressure that Unit 1 and Unit 2 instrument air systems can remain crossconnected?

a. 80 psig

b. 60 psig

c. 55 psig

d. 35 psig

Question No. 88 **QID: 0347**

The main fuel bridge has a spent fuel assembly in route to the RB upender when a seal plate NI cover failure occurs.
Water level in the canal is falling at two inches per minute.

The main fuel bridge operator should:

a. Continue to the upender and insert the assembly for transport to the SFP.

b. Leave the fuel assembly in the mast and evacuate the area.

c. Place the assembly in the fuel rack in the deep end of the canal.

d. Return the assembly to any available location in the reactor vessel.

Question No. 89 **QID: 0348**

A LOCA has occurred with ES actuation of channels 1 through 4. The "ES" HPI pump has failed. Flow from the "OP" HPI pump is as follows:

300 gpm to "A" HPI line.
65 gpm to "B" HPI line.
85 gpm to "C" HPI line.
95 gpm to "D" HPI line.

RCS pressure is 950 psig. All valves are in ES actuated position.

What operator action is required?

a. No action is required.

b. Close the isolation for the line with the highest flow.

c. Throttle the "A" HPI valve until "A" line flow is within 20 gpm of "B" line flow.

d. Throttle the "A" HPI valve until "A" line flow is within 20 gpm of "D" line flow.

Question No. 90 **QID: 0349**

Diesel Generator #1 is running for a surveillance test.
Low reactor coolant system pressure causes a reactor trip and ESAS actuation.

What will the ES Electrical response be?

a. A-3 and A-4 powered from SU #1, both diesel generators running unloaded.

b. A-3 and A-4 powered from SU #1, Diesel Generator # 1 tripped, Diesel Generator # 2 running unloaded.

c. A-3 powered from Diesel Generator #1, A-4 powered from SU #1, Diesel Generator # 2 running unloaded.

d. A-3 powered from Diesel Generator #1, and A-4 powered from Diesel Generator #2.

Question No. 91 **QID: 0350**

Given:

Plant heatup is in progress.
Reactor Coolant System temperature is 445 °F.
Reactor Coolant System pressure is 1550 psig.

ESAS Analog 2 RC pressure transmitter fails LOW.

With no operator action, what effect will this failure have when the plant reaches hot shutdown conditions?

a. Wide range pressure indicator, PI-1040, on C03 is NOT available.

b. Automatic operation of the ERV is NOT available.

c. ESAS is in a 2 of 2 coincidence logic.

d. ESAS is in a 1 of 2 coincidence logic.

Question No. 92 **QID: 0351**

The plant is operating at 75% power.

With no operator action, what effect will a trip of the "A" Reactor Coolant Pump have on the reactor coolant system?

a. "A" loop differential temperature stays constant
"B" loop differential temperature goes up

b. "A" loop differential temperature goes up
"B" loop differential temperature stays constant

c. "A" loop differential temperature stays constant
"B" loop differential temperature stays constant

d. "A" loop differential temperature goes up
"B" loop differential temperature goes up

Question No. 93 **QID: 0352**

With the plant at ~15% power, an uncontrolled rod withdrawal begins.

If no operator action is taken, the MOST LIKELY RPS trip to actuate FIRST will be:

a. High Pressure.

b. High Temperature

c. High Power.

d. Flux/Flow/Imbalance.

Question No. 94 **QID: 0353**

In the event of a double-ended break of the RCS cold leg pipe, the minimum equipment required to limit peak cladding temperature to less than 2200 °F is:

a. Two high pressure injection pumps, two low pressure injection pumps, and both core flood tanks.

b. Two high pressure injection pumps, one low pressure injection pump, and both core flood tanks.

c. One high pressure injection pump, two low pressure injection pumps, and both core flood tanks.

d. One high pressure injection pump, one low pressure injection pump, and both core flood tanks.

Question No. 95 **QID: 0354**

After insertion of a fuel assembly into the core, when will the SRO in Charge of Fuel Handling give the Bridge Operator permission to disengage from the fuel assembly?

a. after stable neutron flux readings have been observed

b. after the Reactor Engineer has verified the Low load limit setpoint

c. after the Reactor Engineer has verified trolley and bridge location

d. after radiation levels on the bridge have been observed

Question No. 96 **QID: 0355**

A procedure change must go through the standard review process instead of interim approval if:

a. The procedure change affects both units.

b. A 50.59 reviewer determines a 50.59 evaluation is required.

c. The procedure change is for a system addressed in the SAR.

d. The procedure being changed is safety related.

Question No. 97 **QID: 0356**

Which of the following is NOT a requirement for a RB Purge Release?

a. Reactor in cold shutdown.

b. SPING 2 operable.

c. No other gaseous releases in progress.

d. RB purge filter unit integrity established.

Question No. 98 **QID: 0357**

During a declared Alert emergency, the TSC Director may NOT assume responsibility for Emergency Direction and Control until:

a. the next shift's Shift Superintendent arrives for shift relief and receives a turnover.

b. the Operations Manager arrives in the Control Room and passes on responsibility for EDC.

c. the TSC Director receives a turnover from the S/S and assumes responsibility for EDC.

d. the emergency is terminated by mutual agreement of the appropriate on and off site agencies.

Question No. 99 **QID: 0358**

If an emergency has been declared and you have Emergency Direction and Control, which responsibilities listed below can NOT be delegated?

1. Initial Accountability of on-site personnel
2. The decision to notify offsite authorities
3. Dispatching Emergency Response Teams
4. Recommending protective actions to the Arkansas Department of Health.

a. 1, 2 and 3 are correct.

b. 1, 2, and 4 are correct.

c. 2 and 4 are correct.

d. 1 and 3 are correct.

Question No. 100 **QID: 0359**

Which of the following event would require a PAR to be issued with the notification of the event?

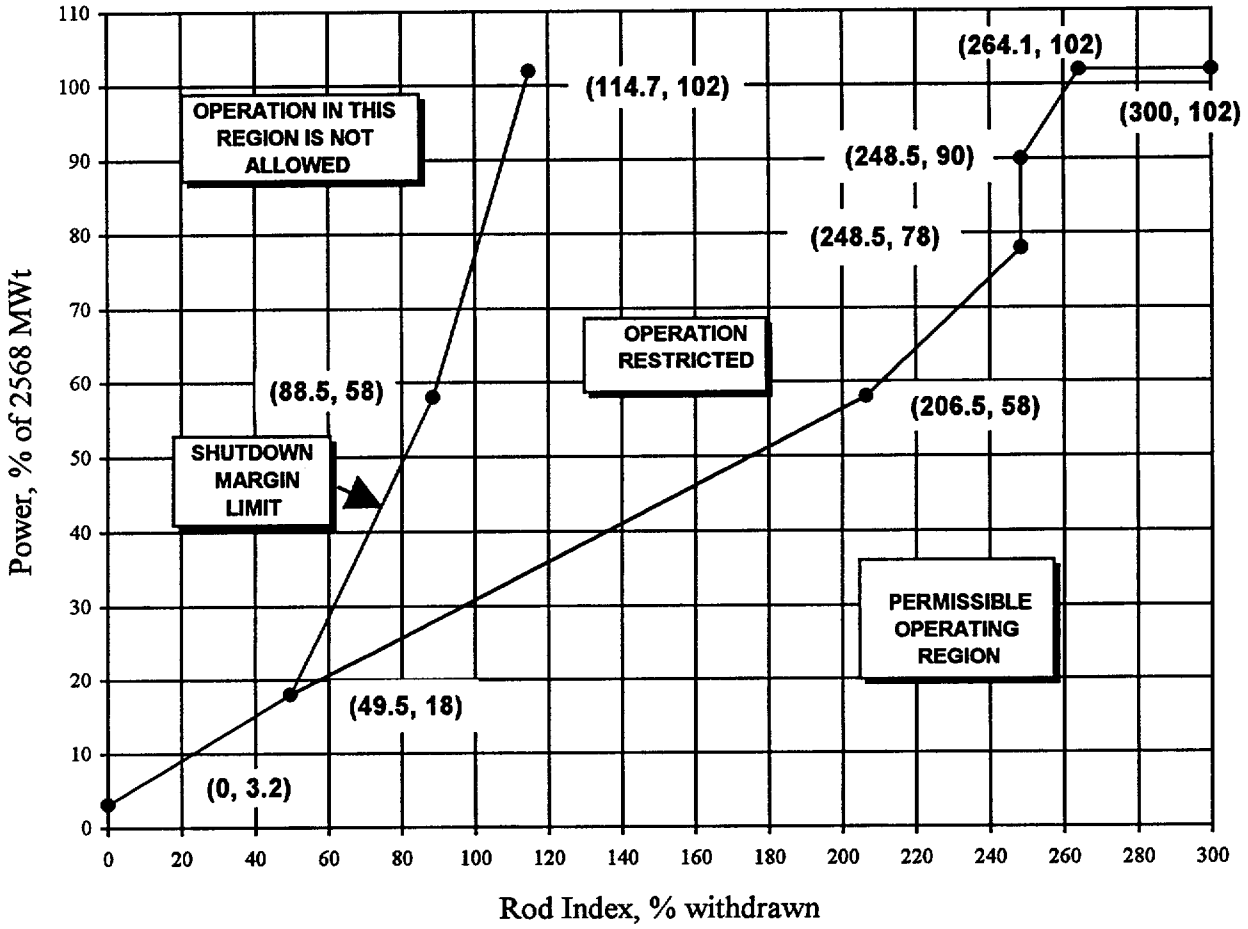
a. Loss of ALL Vital DC buses

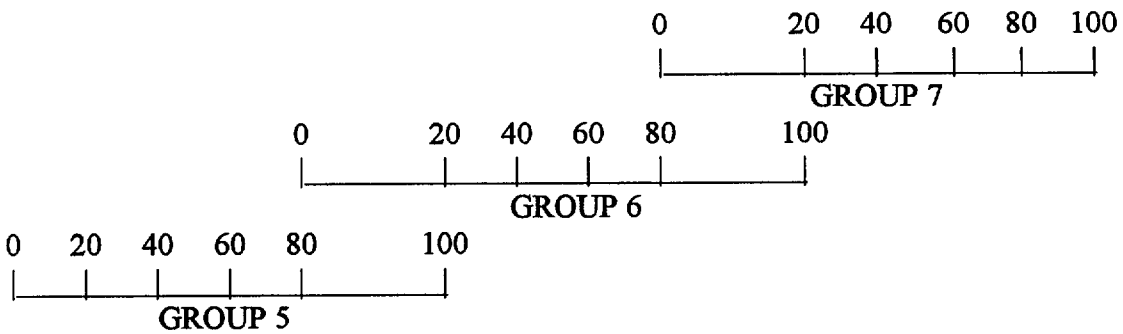
b. OTSG Tube Rupture >50 gpm with stuck MSSV

c. Station Blackout

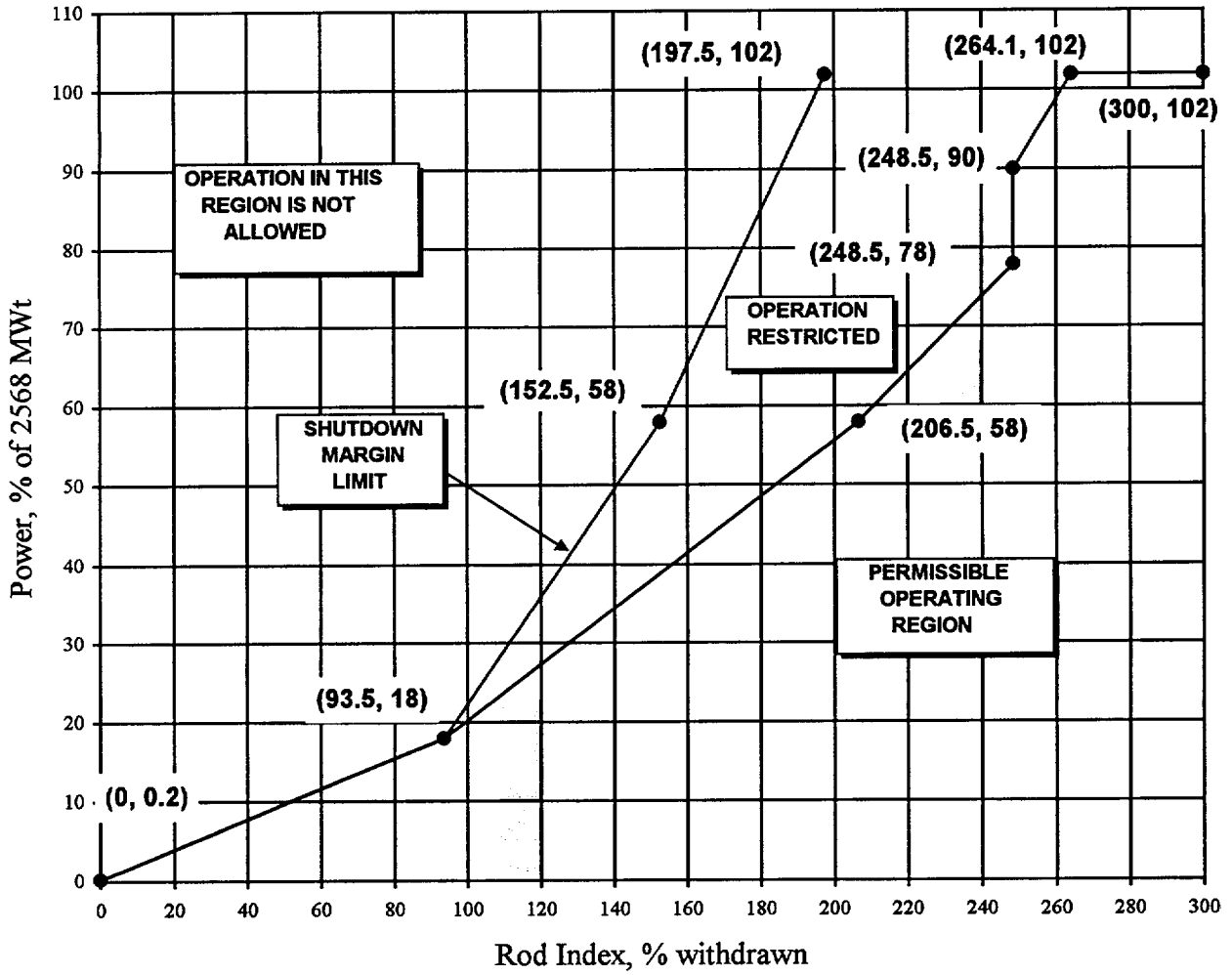
d. CETs indicate superheat conditions within Region 4

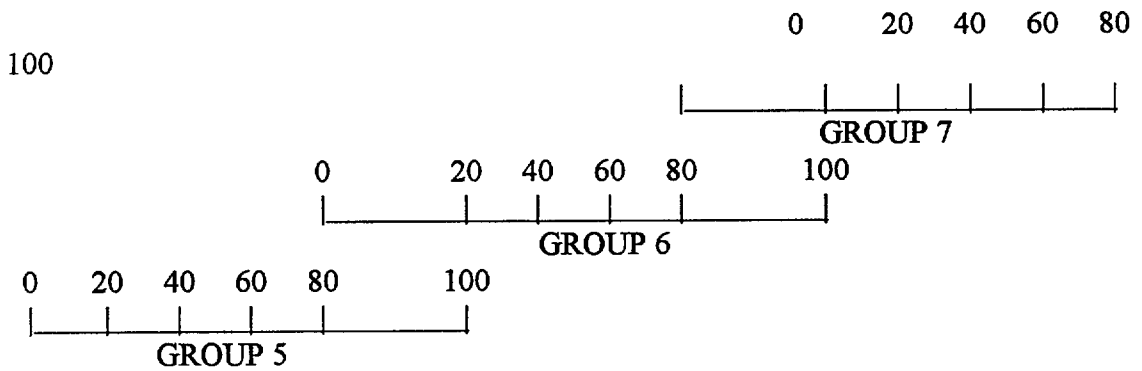
Rod Position Setpoints for 4-Pump Operation From 0 to 300 ± 10 EFPD -- ANO-1 Cycle 15



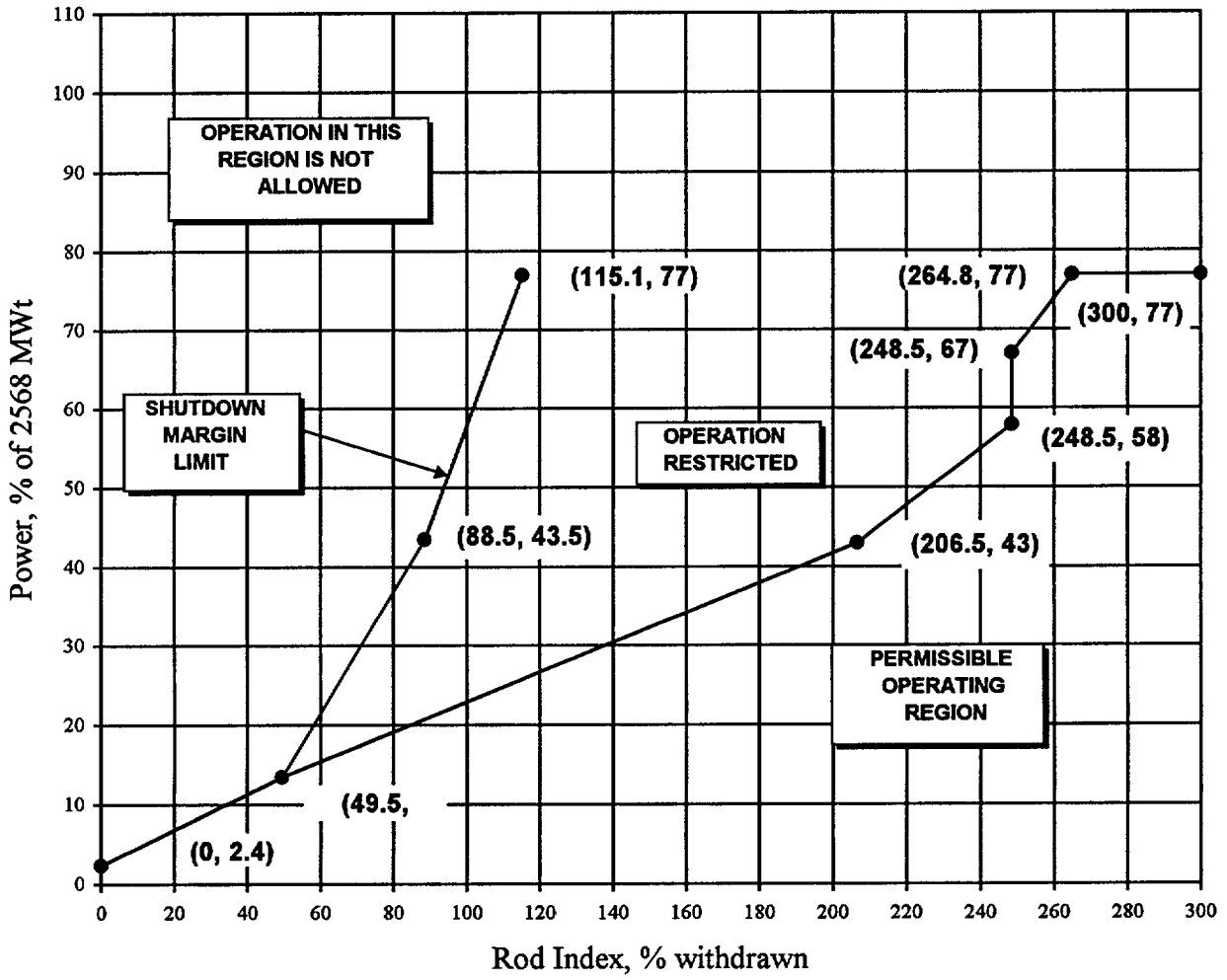


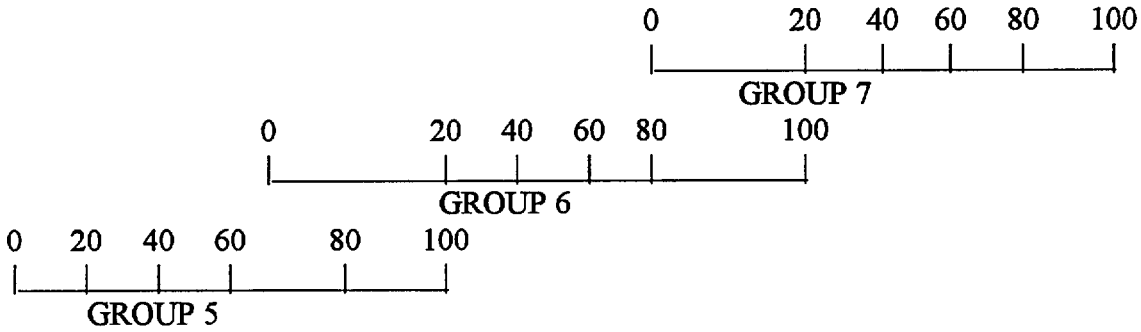
Rod Position Setpoints for 4-Pump Operation From 300 ± 10 EFPD to EOC -- ANO-1 Cycle 15



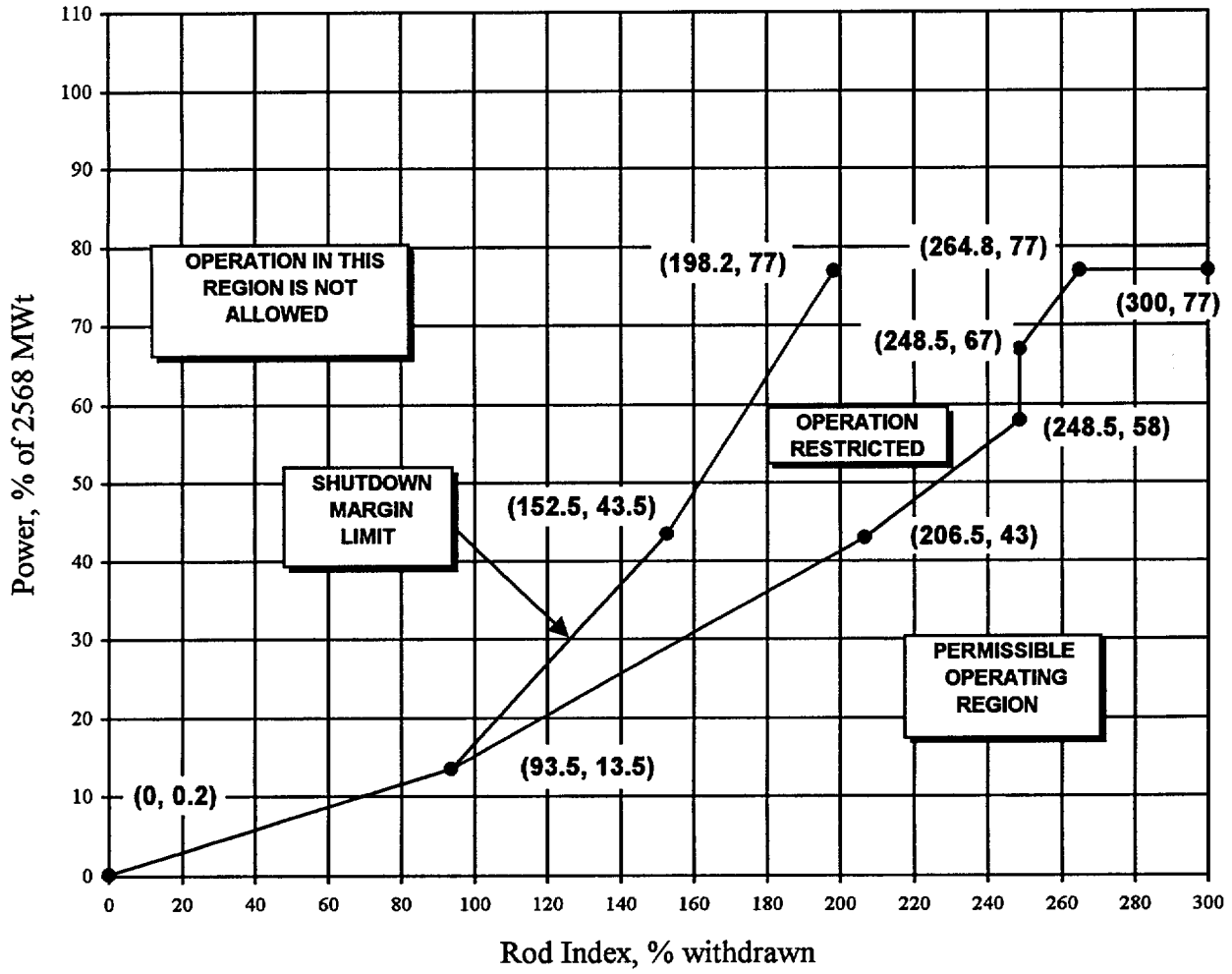


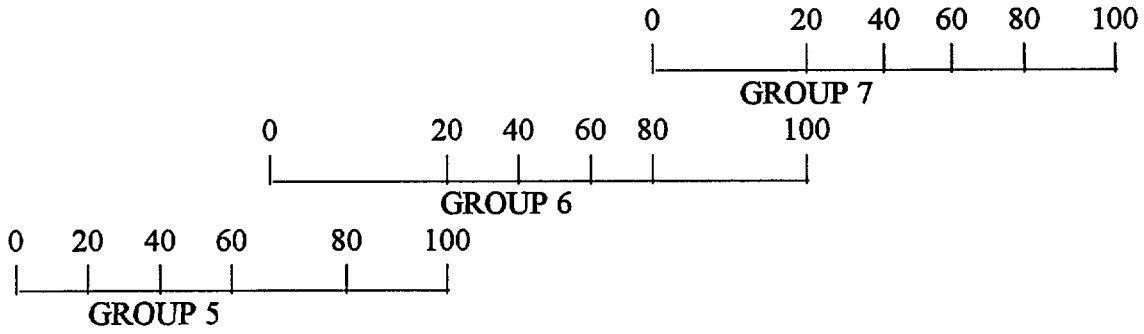
Rod Position Setpoints for 3-Pump Operation From 0 to 300 ± 10 EFPD -- ANO-1 Cycle 15



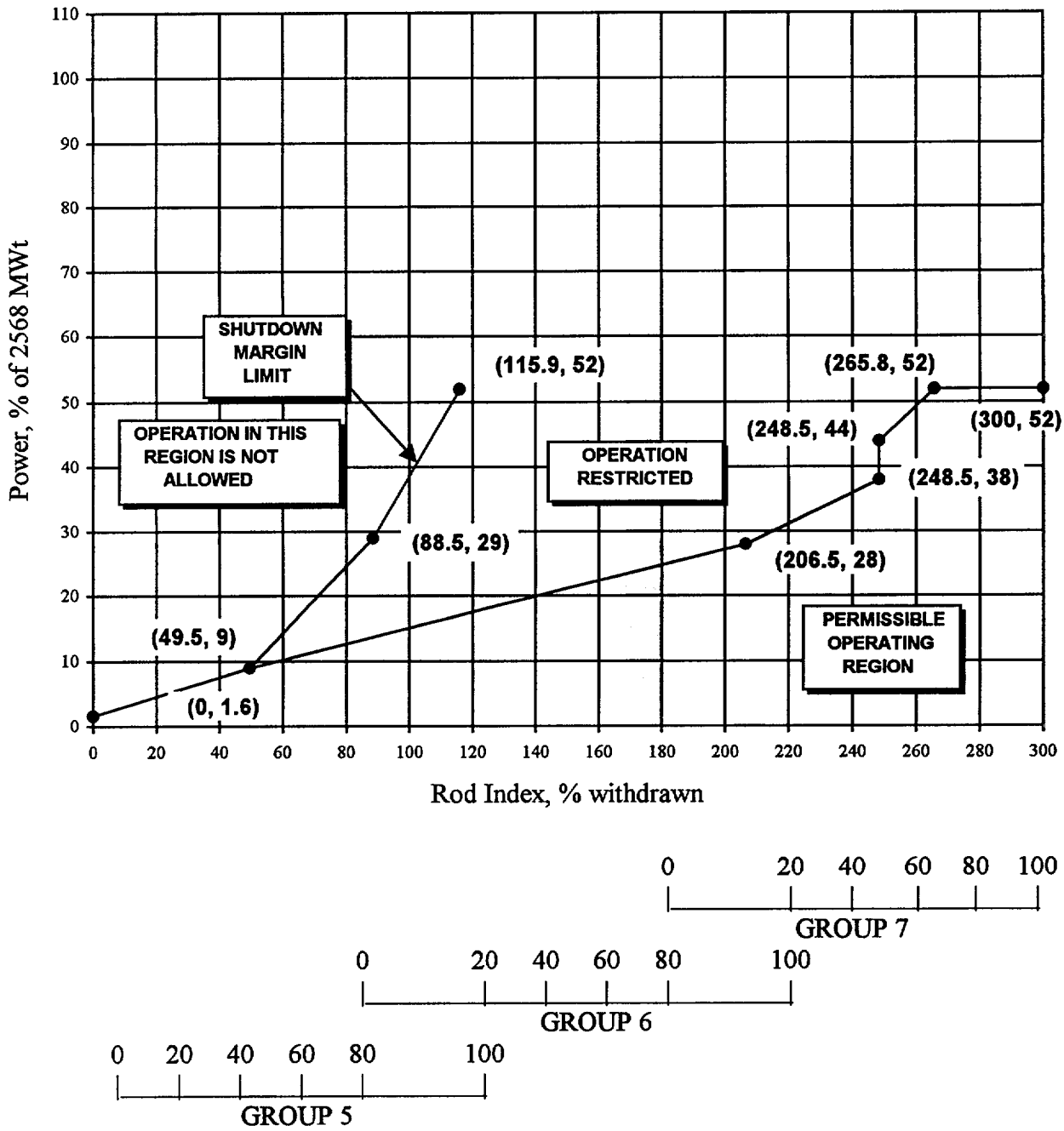


Rod Position Setpoints for 3-Pump Operation From 300 ± 10 EFPD to EOC -- ANO-1 Cycle 15

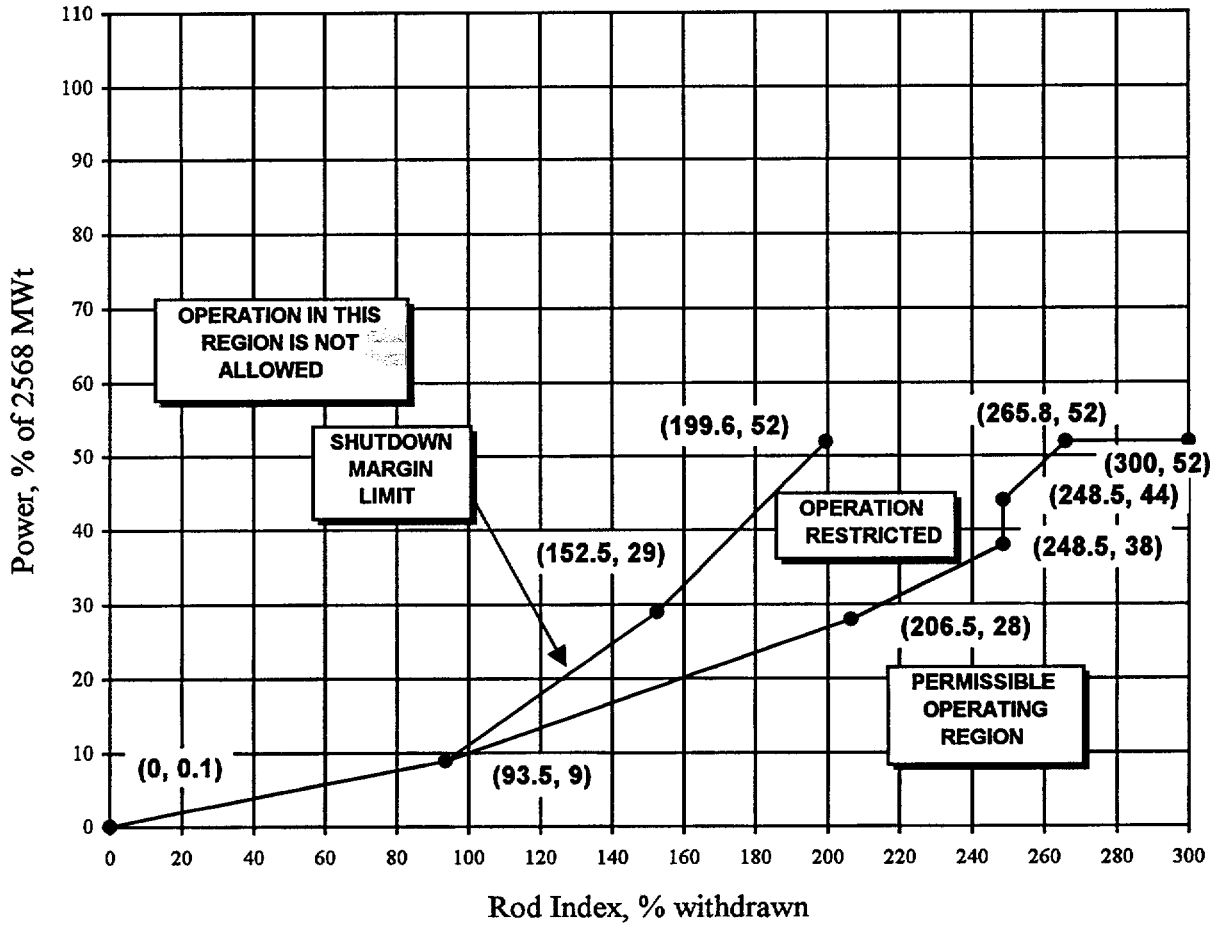




Rod Position Setpoints for 2-Pump Operation From 0 to 300 ± 10 EFPD -- ANO-1 Cycle 15



Rod Position Setpoints for 2-Pump Operation From 300 ± 10 EFPD to EOC -- ANO-1 Cycle 15



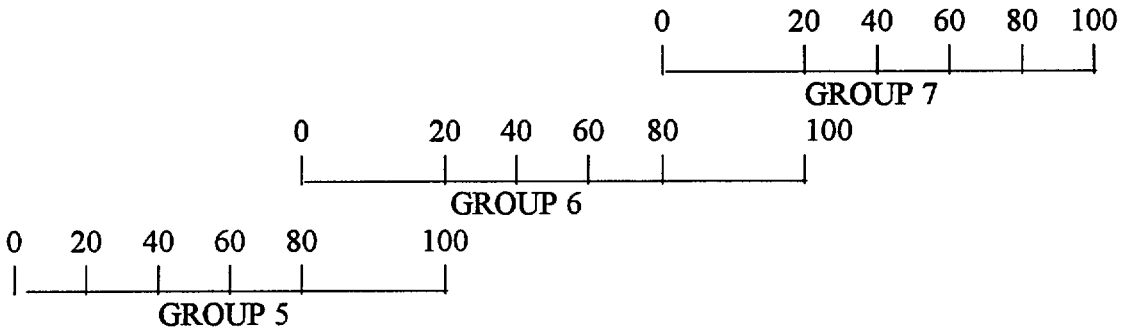
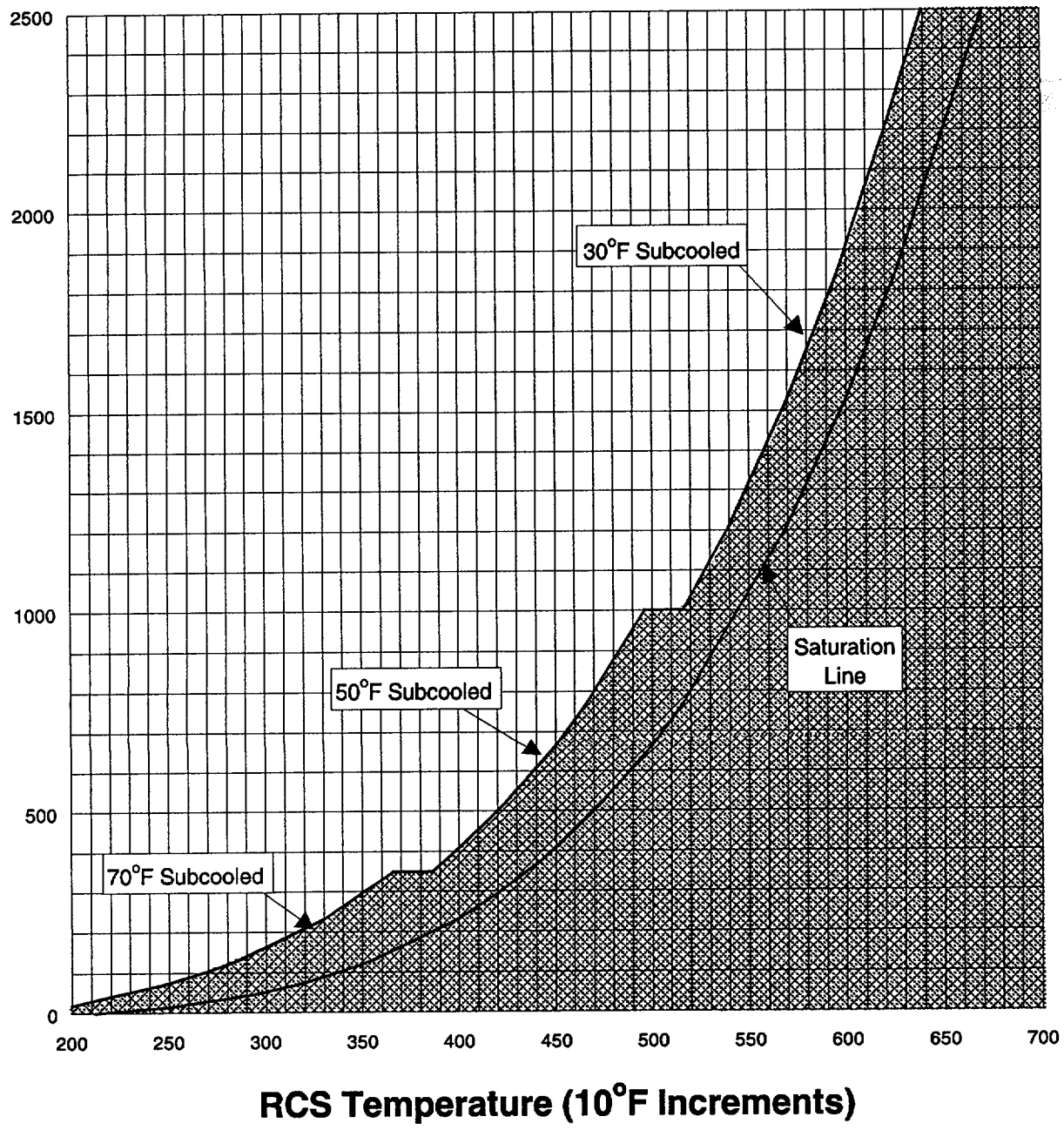


FIGURE 1
Saturation and Adequate SCM



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

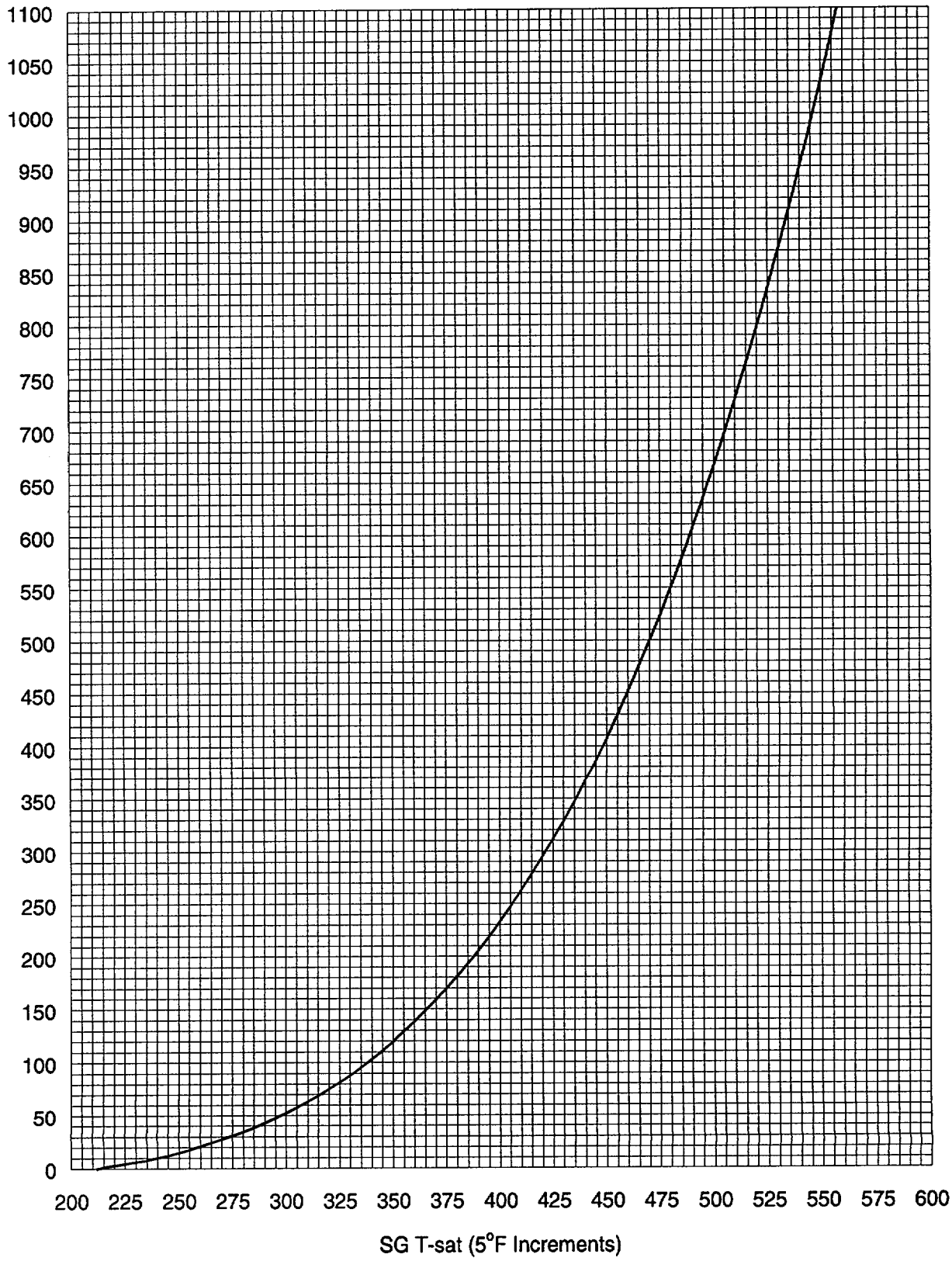


FIGURE 3
RCS Pressure vs Temperature Limits

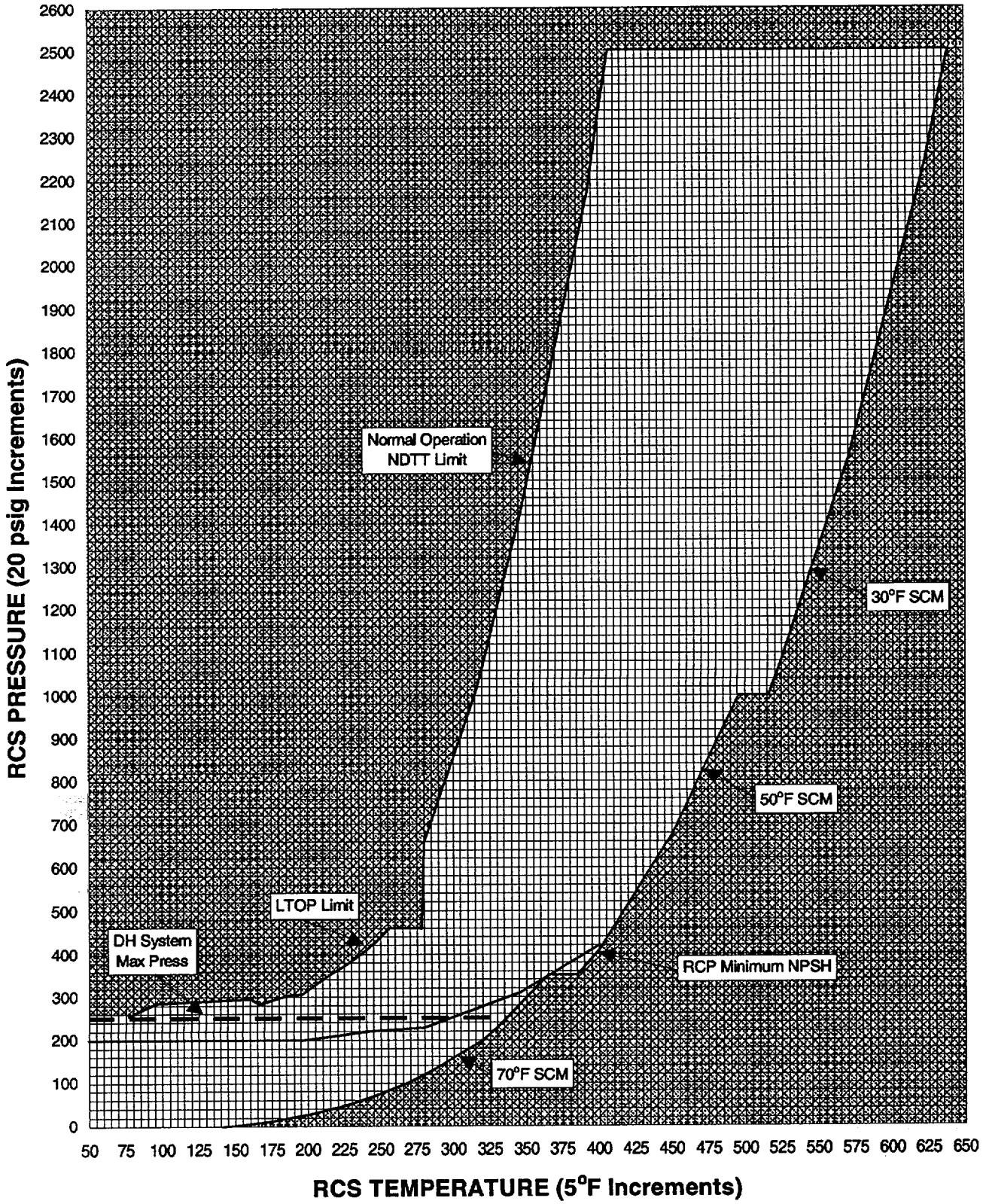


FIGURE 4
Core Exit Thermocouple for Inadequate Core Cooling

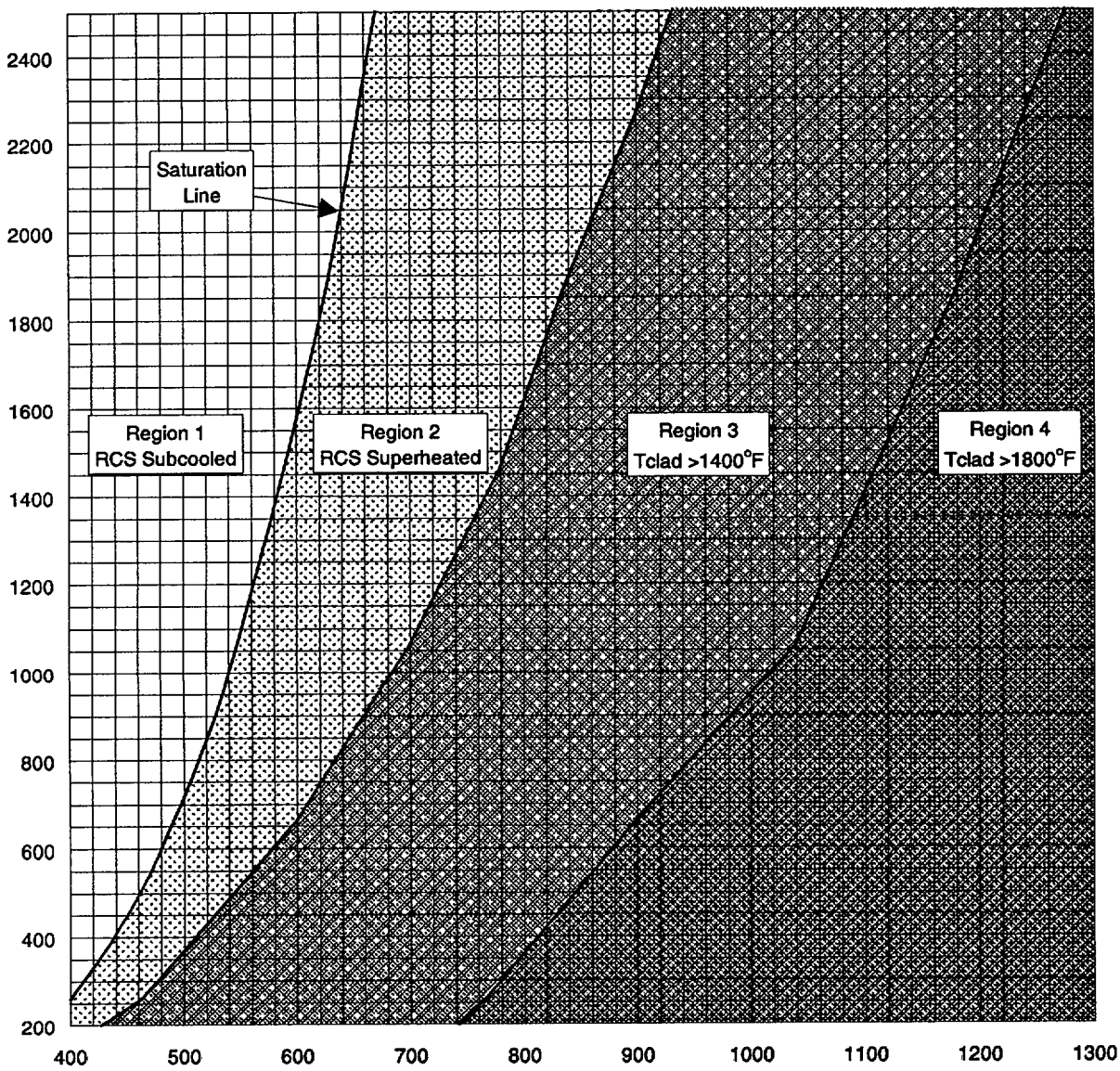


FIGURE 5

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

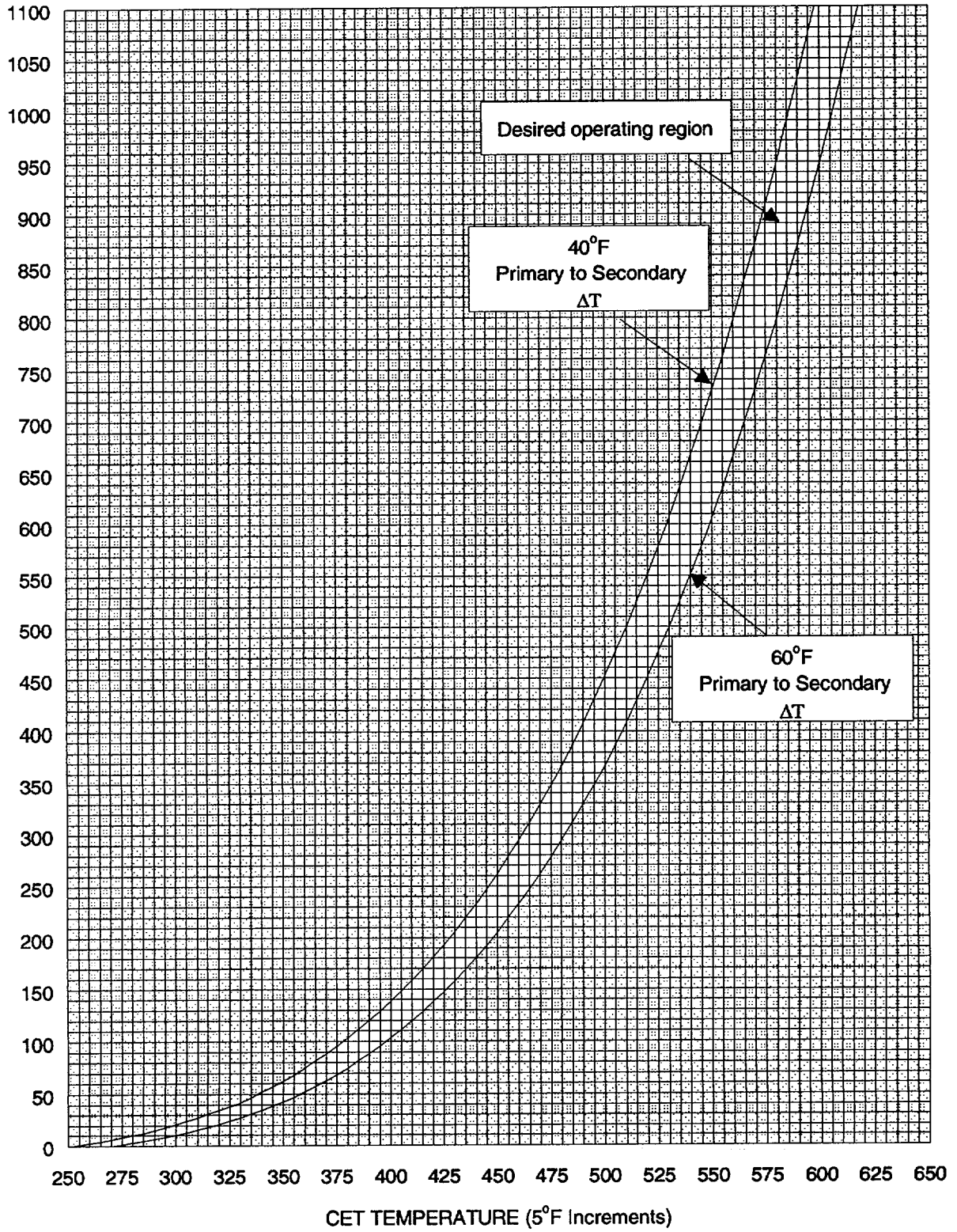
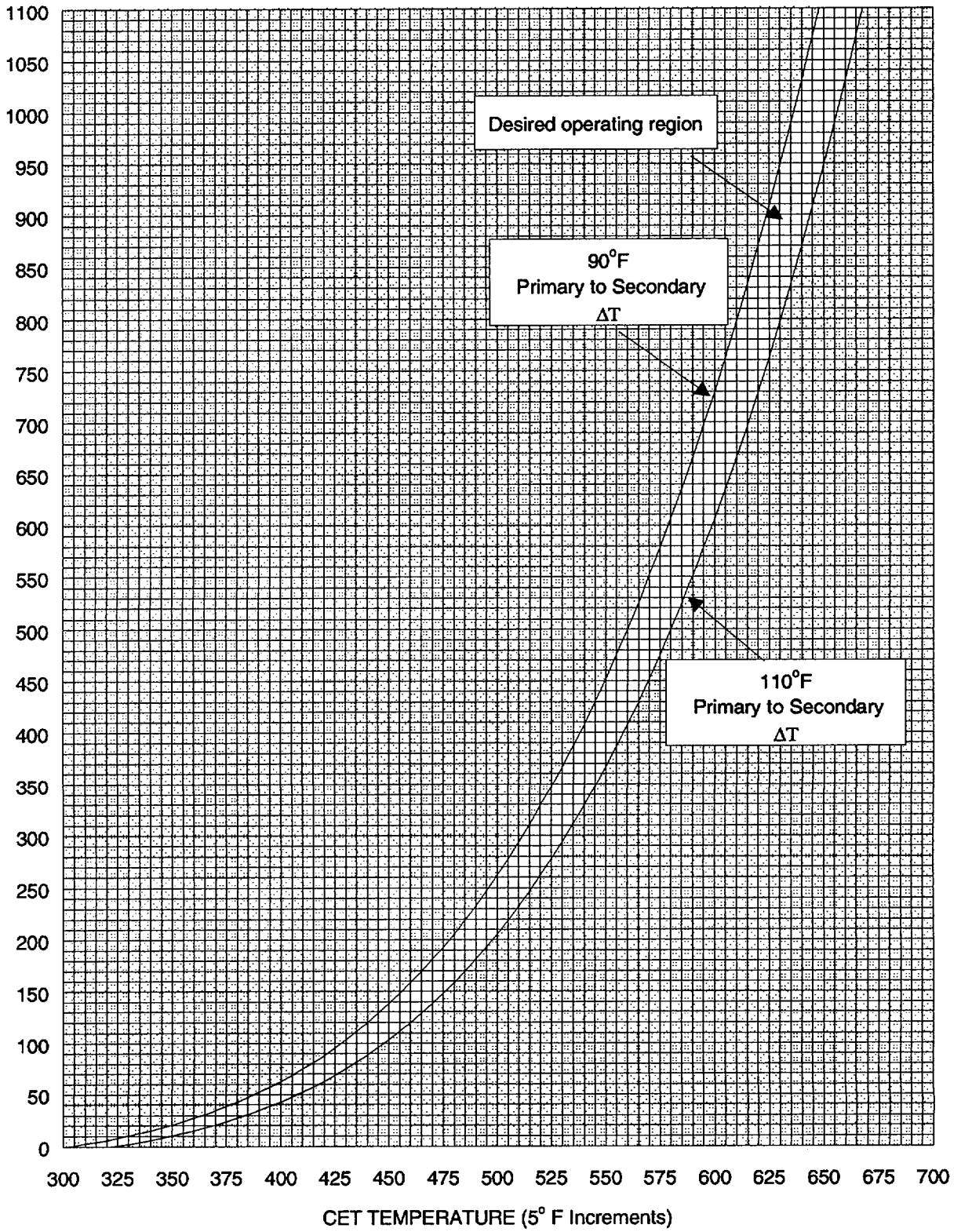


FIGURE 6

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



ANO Unit 1 - 1999 Senior Reactor Operator License Exam Key *9/20/99*

Question No. 1 **QID: 0030** **Point Value: 1**

Answer:

a. Restoration of adequate subcooling margin.

Question No. 2 **QID: 0058** **Point Value: 1**

Answer:

b. The Intermediate Range channels are overcompensated.

Question No. 3 **QID: 0158** **Point Value: 1**

Answer:

c. 6 days

Question No. 4 **QID: 0204** **Point Value: 1**

Answer:

d. EDG 2 is inoperable because EDG 2 Fuel Oil Transfer Pump P-16B is inoperable.

Question No. 5 **QID: 0217** **Point Value: 1**

Answer:

b. 6 feet

Question No. 6 **QID: 0240** **Point Value: 1**

Answer:

a. Core Exit Thermocouple TE-1152 will be removed from the average.

Question No. 7 **QID: 0241** **Point Value: 1**

Answer:

a. Service Water Loop 1 and Discharge Flume process radiation monitors alarm.

Question No. 8 **QID: 0243** **Point Value: 1**

Answer:

b. Planned dose shall not exceed 10 Rem TEDE.

Question No. 9 **QID: 0244** **Point Value: 1**

Answer:

d. System engineer closes a valve while troubleshooting a water hammer concern.

Question No. 10 **QID: 0245** **Point Value: 1**

Answer:

d. The valve must be stroked electrically.

Question No. 11 **QID: 0246** **Point Value: 1**

Answer:

c. Check against the number on the brass tag on the key ring.

Question No. 12 **QID: 0247** **Point Value: 1**

Answer:

d. Control Board Operator or Shift Superintendent.

Question No. 13 **QID: 0248** **Point Value: 1**

Answer:

a. Lockout relay trip deenergizes A-2.

Question No. 14 **QID: 0249** **Point Value: 1**

Answer:

d. 50 Rem/year

Question No. 15 **QID: 0251** **Point Value: 1**

Answer:

a. Exit the area and notify Health Physics.

Question No. 16 **QID: 0252** **Point Value: 1**

Answer:

b. Reactor coolant temperature goes below 525 °F.

Question No. 17 **QID: 0253** **Point Value: 0**

Answer:

d. The main feedwater block valves close immediately in fast speed.

Question No. 18 **QID: 0254** **Point Value: 1**

Answer:

b. EFW Pump P-7A trip/throttle valve does not indicate full open.

Question No. 19 **QID: 0255** **Point Value: 1**

Answer:

c. RPS will trip the plant and start Emergency Feedwater on loss of both Main Feedwater Pumps.

Question No. 20 **QID: 0256** **Point Value: 1**

Answer:

b. Maintains adequate service water flow to the Reactor Building Coolers when ES actuates.

Question No. 21 **QID: 0257** **Point Value: 1**

Answer:

c. Inverter Y-11 failed resulting in a loss of power.

Question No. 22 **QID: 0259** **Point Value: 1**

Answer:

c. Prevents degrading T36A/B resin by shutting CV1221 (letdown isolation).

Question No. 23 **QID: 0260** **Point Value: 1**

Answer:

b. Instrument air line to the Lower North Piping Room ruptures.

Question No. 24 **QID: 0261** **Point Value: 1**

Answer:

d. Condensate pump P-2B will remain off since Main Feedwater Pump P-1B is not latched.

Question No. 25 **QID: 0262** **Point Value: 1**

Answer:

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

Question No. 26 **QID: 0263** **Point Value: 1**

Answer:

b. Group 6 at 56 %

Question No. 27 **QID: 0267** **Point Value: 1**

Answer:

c. "B" Reactor Coolant Pump seal cooler leak.

Question No. 28 **QID: 0271** **Point Value: 1**

Answer:

b. A Waste Control Operator must independently verify release path alignment prior to release.

Question No. 29 **QID: 0272** **Point Value: 1**

Answer:

b. 2 and 3

Question No. 30 **QID: 0273** **Point Value: 1**

Answer:

c. Normal ventilation ducts are isolated automatically.

Question No. 31 **QID: 0278** **Point Value: 1**

Answer:

c. Pressurizer spray isolation valve, CV-1009, is failed open.

Question No. 32 **QID: 0279** **Point Value: 1**

Answer:

a. Verify 1202.008, Att. 1, "Blackout Breaker Alignment UV Defeat", complete then close feeder breakers from startup transformer #1.

Question No. 33 **QID: 0280** **Point Value: 1**

Answer:

a. Reactor Coolant Pump P-32C trip.

Question No. 34 **QID: 0281** **Point Value: 1**

Answer:

d. P-4A and P-4C

Question No. 35 **QID: 0282** **Point Value: 1**

Answer:

a. P-33B and P-33C started
P-33A to P-33B suction and discharge crosstie valves open
P-33B to P-33C suction and discharge crosstie valves closed

Question No. 36 **QID: 0283** **Point Value: 1**

Answer:

a. Declare Group 7 INOPERABLE and borate the plant to Hot Shutdown.

Question No. 37 **QID: 0285** **Point Value: 1**

Answer:

b. Quickly reduce the lowest SG pressure to 700 psig or the MSSV open alarm is clear.

Question No. 38 **QID: 0286** **Point Value: 1**

Answer:

c. 540 degrees F.

Question No. 39 **QID: 0287** **Point Value: 1**

Answer:

a. Prevent Main Turbine blade damage due to excessive heating.

Question No. 40 **QID: 0288** **Point Value: 1**

Answer:

a. Pressurizer automatic heater control is inoperable.

Question No. 41 **QID: 0289** **Point Value: 1**

Answer:

c. below the secondary side water level.

Question No. 42 **QID: 0291** **Point Value: 1**

Answer:

d. To allow for removal of DC power from the EFW flow control valves and to prevent overcooling.

Question No. 43 **QID: 0292** **Point Value: 1**

Answer:

a. If less than two minutes has elapsed, then trip all RCPs.

Question No. 44 **QID: 0294** **Point Value: 1**

Answer:

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

Question No. 45 **QID: 0297** **Point Value: 1**

Answer:

c. Actuate the Overspeed Protection Controller.

Question No. 46 **QID: 0298** **Point Value: 1**

Answer:

a. The SW valves to the RB Cooler on that channel will open.

Question No. 47 **QID: 0302** **Point Value: 1**

Answer:

b. Take actions to establish primary to secondary heat transfer cooling.

Question No. 48 **QID: 0303** **Point Value: 1**

Answer:

d. RCS Makeup Block Valve CV-1234 receives a close signal.

Question No. 49 **QID: 0304** **Point Value: 1**

Answer:

d. Letdown coolers outlet CV-1221 would close.

Question No. 50 **QID: 0305** **Point Value: 1**

Answer:

c. HOLD the handswitch in the CLOSED position.

Question No. 51 **QID: 0306** **Point Value: 1**

Answer:

d. Reactor Coolant Pump trip at 95% power.

Question No. 52 **QID: 0308** **Point Value: 1**

Answer:

b. Out Inhibit lamp ON

Question No. 53 **QID: 0309** **Point Value: 1**

Answer:

a. Reactor Demand and both Feedwater Loop Demands.

Question No. 54 **QID: 0310** **Point Value: 1**

Answer:

d. Prevent post-accident debris from clogging the reactor building spray header nozzles.

Question No. 55 **QID: 0311** **Point Value: 1**

Answer:

c. The reactor building purge outlets should be opened first.

Question No. 56 **QID: 0312** **Point Value: 1**

Answer:

c. This volume of water provides adequate shielding for activities in the SFP.

Question No. 57 **QID: 0313** **Point Value: 1**

Answer:

b. Overcooling procedure.

Question No. 58 **QID: 0314** **Point Value: 1**

Answer:

c. 1020 psig

Question No. 59 **QID: 0315** **Point Value: 1**

Answer:

b. 21 in. Hg

Question No. 60 **QID: 0316** **Point Value: 1**

Answer:

a. P36A (HPI) pump was the in-service pump.

Question No. 61 **QID: 0317** **Point Value: 1**

Answer:

b. Panel RA2

Question No. 62 **QID: 0318** **Point Value: 1**

Answer:

b. Verify the Diesel Fire Pump P-6B starts.

Question No. 63 **QID: 0319** **Point Value: 1**

Answer:

c. 90-99 gpm

Question No. 64 **QID: 0320** **Point Value: 1**

Answer:

c. Take manual control of SG/RX master.

Question No. 65 **QID: 0322** **Point Value: 1**

Answer:

a. The Unit Master H/A station input tracks the Rate and Load Limited Megawatt demand signal.

Question No. 66 **QID: 0323** **Point Value: 1**

Answer:

b. 1203.018, "Turbine Trip below 43% Power"

Question No. 67 **QID: 0324** **Point Value: 1**

Answer:

a. Cycle ERV as required

Question No. 68 **QID: 0325** **Point Value: 1**

Answer:

d. 30 inches

Question No. 69 **QID: 0326** **Point Value: 1**

Answer:

b. Increase due to bleedoff in excess of seal cooler capacity.

Question No. 70 **QID: 0327** **Point Value: 1**

Answer:

c. 320 psig, 385 psig

Question No. 71 **QID: 0328** **Point Value: 1**

Answer:

a. Depress the CRD Power Supply Breaker Trip Pushbuttons.

Question No. 72 **QID: 0329** **Point Value: 1**

Answer:

a. Maintain flux level in the source range

Question No. 73 **QID: 0331** **Point Value: 1**

Answer:

c. HPI Cooldown

Question No. 74 **QID: 0332** **Point Value: 1**

Answer:

a. Controlling reactor coolant system pressure low within the limits of Figure 3.

Question No. 75 **QID: 0334** **Point Value: 1**

Answer:

d. OTSG level dropping
Feedwater flow rising
RB pressure rising

Question No. 76 **QID: 0335** **Point Value: 1**

Answer:

a. CET temperatures stable after 100 minutes.

Question No. 77 **QID: 0336** **Point Value: 1**

Answer:

c. Transfer D11 to its Emergency Power Supply.

Question No. 78 **QID: 0337** **Point Value: 1**

Answer:

a. restore full HPI flow on "C" HPI pump.

Question No. 79 **QID: 0338** **Point Value: 1**

Answer:

d. Select MANUAL on the auto/manual control and adjust the MANUAL voltage adjust rheostat.

Question No. 80 **QID: 0339** **Point Value: 1**

Answer:

b. de-energize RS-4.

Question No. 81 **QID: 0340** **Point Value: 1**

Answer:

b. Verify no release in progress at Discharge Flow to Flume.

Question No. 82 **QID: 0341** **Point Value: 1**

Answer:

d. Inoperable, sprinkler valve will not actuate automatically.

Question No. 83 **QID: 0342** **Point Value: 1**

Answer:

c. 30% power

Question No. 84 **QID: 0343** **Point Value: 1**

Answer:

c. Actuate EFW, verify proper actuation and control per RT-5, and trip both Main Feedwater pumps.

Question No. 85 **QID: 0344** **Point Value: 1**

Answer:

d. RCS temperature is stable, RCS pressure is going down, and pressurizer level is stable.

Question No. 86 **QID: 0345** **Point Value: 1**

Answer:

c. ~46 gpm

Question No. 87 **QID: 0346** **Point Value: 1**

Answer:

b. 60 psig

Question No. 88 **QID: 0347** **Point Value: 1**

Answer:

d. Return the assembly to any available location in the reactor vessel.

Question No. 89 **QID: 0348** **Point Value: 1**

Answer:

d. Throttle the "A" HPI valve unitl "A" line flow is within 20 gpm of "D" line flow.

Question No. 90 **QID: 0349** **Point Value: 1**

Answer:

a. A-3 and A-4 powered from SU #1, both diesel generators running unloaded.

Question No. 91 **QID: 0350** **Point Value: 1**

Answer:

c. ESAS is in a 2 of 2 coincidence logic.

Question No. 92 **QID: 0351** **Point Value: 1**

Answer:

d. "A" loop differential temperature goes up
"B" loop differential temperature goes up

Question No. 93 **QID: 0352** **Point Value: 1**

Answer:

a. High Pressure

Question No. 94 **QID: 0353** **Point Value: 1**

Answer:

d. One high pressure injection pump, one low pressure injection pump, and both core flood tanks.

Question No. 95 **QID: 0354** **Point Value: 1**

Answer:

a. after stable neutron flux readings have been observed

Question No. 96 **QID: 0355** **Point Value: 1**

Answer:

b. The 50.59 review indicates an evaluation is required.

Question No. 97 **QID: 0356** **Point Value: 1**

Answer:

b. SPING 2 operable.

Question No. 98 **QID: 0357** **Point Value: 1**

Answer:

c. the TSC Director receives a turnover from the S/S and assumes responsibility for EDC.

Question No. 99 **QID: 0358** **Point Value: 1**

Answer:

c. 2 and 4 are correct.

Question No. 100 **QID: 0359** **Point Value: 1**

Answer:

d. CETs indicate superheat conditions within Region 4