ANO Unit 1 - 2014 RO NRC Written Exam KEY

Question No. 1 **QID: 0869** **Point Value: 1**

Answer:

C. "C" RCP Sheared Shaft / Trip ONLY "C" RCP

Question No. 2 **QID: 0870** **Point Value: 1**

Answer:

D. Reduce HPI flow to limit RCS pressure rise

Question No. 3 **QID: 0881** **Point Value: 1**

Answer:

A. Unexplained drop in Makeup Tank level

Question No. 4 **QID: 0029** **Point Value: 1**

Answer:

A. Reflux Boiling

Question No. 5 **QID: 0883** **Point Value: 1**

Answer:

B. RCP Motor Bearing high temperature

Question No. 6 **QID: 0449** **Point Value: 1**

Answer:

D. Stop the DH pump and isolate the DH system from the RCS.

Question No. 7 **QID: 0886** **Point Value: 1**

Answer:

A. P-79A in a shutoff head condition

Question No. 8 **QID: 0395** **Point Value: 1**

Answer:

B. To prevent the ERV opening.

ANO Unit 1 - 2014 RO NRC Written Exam KEY

Question No. 9 **QID: 0887** **Point Value: 1**

Answer:

D. Total FW flow and Linear Range Gamma-Metrics reactor power

Question No. 10 **QID: 0550** **Point Value: 1**

Answer:

D. Ruptured SG leak rate-of-change 20 gpd/hour

Question No. 11 **QID: 0930** **Point Value: 1**

Answer:

A. "B" MSIV CV-2692 closed to isolate potential steam leaks and
"B" EFW Isolation valve CV-2620 closed to prevent EFW flow to the SG

Question No. 12 **QID: 0888** **Point Value: 1**

Answer:

B. Trip 'B' MFW Pump

Question No. 13 **QID: 0496** **Point Value: 1**

Answer:

D. The battery amperage will rise steadily until the design battery capacity is exhausted.

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

Answer:

B. De-energize RS-4.

Question No. 15 **QID: 0890** **Point Value: 1**

Answer:

B. 15 minutes

Question No. 16 **QID: 0346** **Point Value: 1**

Answer:

B. 65 psig

ANO Unit 1 - 2014 RO NRC Written Exam KEY

Question No. 17 **QID: 0896** **Point Value: 1**

Answer:

A. To limit heat input into the RCS while maintaining forced flow.

Question No. 18 **QID: 0891** **Point Value: 1**

Answer:

B. Place the EHC controls in Turbine Manual

Question No. 19 **QID: 0897** **Point Value: 1**

Answer:

A. A dropped rod at <2% power

Question No. 20 **QID: 0893** **Point Value: 1**

Answer:

A. Ensures minimum required SDM is maintained

Question No. 21 **QID: 0895** **Point Value: 1**

Answer:

D. Source Range

Question No. 22 **QID: 0423** **Point Value: 1**

Answer:

C. Trip the reactor and go to 1202.001.

Question No. 23 **QID: 0894** **Point Value: 1**

Answer:

B. Steam Generator Tube Leak 37 gpm

Question No. 24 **QID: 0543** **Point Value: 1**

Answer:

A. Initiating long-term cooling with DHR pumps

ANO Unit 1 - 2014 RO NRC Written Exam KEY

Question No. 25 **QID: 0898** **Point Value: 1**

Answer:

D. 580 gpm

Question No. 26 **QID: 0182** **Point Value: 1**

Answer:

A. Align Pressurizer AUX Spray to LPI system.

Question No. 27 **QID: 0124** **Point Value: 1**

Answer:

B. core delta T stable or droping

Question No. 28 **QID: 0899** **Point Value: 1**

Answer:

D. 5.5 X e6 lbm/hr
2.75 X e6 lbm/hr

Question No. 29 **QID: 0900** **Point Value: 1**

Answer:

D. Letdown flow would be diverted through a relief valve to the Auxiliary Building Equipment Drain Tank

---

Question No. 30 **QID: 0902** **Point Value: 1**

Answer:

B. 320 psig
Channel 1 (PT-1020)

Question No. 31 **QID: 0903** **Point Value: 1**

Answer:

C. B-5

Question No. 32 **QID: 0027** **Point Value: 1**

Answer:

B. Approximately 260 °F

ANO Unit 1 - 2014 RO NRC Written Exam KEY

Question No. 33 **QID: 0905** **Point Value: 1**

Answer:

D. ICW pump P-33B would shift to Nuclear loop, P-33A should auto-start.

Question No. 34 **QID: 0906** **Point Value: 1**

Answer:

B. 2120 psig

Question No. 35 **QID: 0907** **Point Value: 1**

Answer:

A. Reactor Building pressure 19 psia

Question No. 36 **QID: 0908** **Point Value: 1**

Answer:

B. ES Channels 3 & 4

Question No. 37 **QID: 0909** **Point Value: 1**

Answer:

C. 5 & 6
CRD Cooling, Chilled Water, RCP Motor Cooling

Question No. 38 **QID: 0454** **Point Value: 1**

Answer:

C. Maintain "A" RB Spray flow at 1050 to 1200 gpm.

Question No. 39 **QID: 0910** **Point Value: 1**

Answer:

A. 50 °F/hr, minimize stresses on bowed tie rods in S/G

Question No. 40 **QID: 1044** **Point Value: 1**

Answer:

B. Place Feedwater Loop A & B Demands, Diamond, and Rx Demand in manual

ANO Unit 1 - 2014 RO NRC Written Exam KEY

Question No. 41 **QID: 0912** **Point Value: 1**

Answer:

A. 8%

Question No. 42 **QID: 0913** **Point Value: 1**

Answer:

B. Energized
Both Main Generator Output Breakers AND Exciter Field Breaker

Question No. 43 **QID: 0914** **Point Value: 1**

Answer:

C. Directly from 125v DC Bus D02

Question No. 44 **QID: 0915** **Point Value: 1**

Answer:

C. Low Lube Oil Pressure Critical Trouble Alarm
Energizing Emergency Trip Relay (K11)

Question No. 45 **QID: 0917** **Point Value: 1**

Answer:

D. Reinitiate the release permit procedure prior to re-establishing the release.

Question No. 46 **QID: 0918** **Point Value: 1**

Answer:

C. Rising counts on Decay Heat Loop A Process Monitor (RI-3809)

Question No. 47 **QID: 0714** **Point Value: 1**

Answer:

C. Startup valves fail as is,
Low Load valves fail as is.

Question No. 48 **QID: 0919** **Point Value: 1**

Answer:

B. Close CV-1408, go to Decay Heat Vaults AND Close RB Sump Outlet Valves.

ANO Unit 1 - 2014 RO NRC Written Exam KEY

Question No. 49 **QID: 0326** **Point Value: 1**

Answer:

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

Question No. 50 **QID: 1022** **Point Value: 1**

Answer:

B. 150 ; drop

Question No. 51 **QID: 0920** **Point Value: 1**

Answer:

D. Electrical contacts should prevent RPS channel "C" from being placed in bypass

Question No. 52 **QID: 0435** **Point Value: 1**

Answer:

B. Throttle EFW to prevent overcooling.

Question No. 53 **QID: 0568** **Point Value: 1**

Answer:

C. Five

Question No. 54 **QID: 0535** **Point Value: 1**

Answer:

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

Question No. 55 **QID: 0921** **Point Value: 1**

Answer:

C. Loss of power to A-1 bus, perform immediate actions for reactor trip.

Question No. 56 **QID: 0717** **Point Value: 1**

Answer:

D. Sequence inhibit.

ANO Unit 1 - 2014 RO NRC Written Exam KEY

Question No. 57 **QID: 0132** **Point Value: 1**

Answer:

C. 240 to 249 gallons

Question No. 58 **QID: 0922** **Point Value: 1**

Answer:

D. RUB 14 and 15

Question No. 59 **QID: 0058** **Point Value: 1**

Answer:

B. The Intermediate Range channels are overcompensated.

Question No. 60 **QID: 0169** **Point Value: 1**

Answer:

A. PZR Level Control Valve, CV-1235, will open to establish a higher steady-state PZR level.

Question No. 61 **QID: 0312** **Point Value: 1**

Answer:

B. SFP ventilation ducts will be flooded.

Question No. 62 **QID: 0662** **Point Value: 1**

Answer:

C. Both S/Gs can be fed while monitoring tube to shell delta T until primary to secondary heat transfer is established.

Question No. 63 **QID: 0923** **Point Value: 1**

Answer:

A. TBVs at ~895 psig

Question No. 64 **QID: 0929** **Point Value: 1**

Answer:

A. Trip ALL RCPs

ANO Unit 1 - 2014 RO NRC Written Exam KEY

Question No. 65 **QID: 0924** **Point Value: 1**

Answer:

B. P-6B, Diesel Fire Pump, is non-functional

Question No. 66 **QID: 0389** **Point Value: 1**

Answer:

C. Prior to each use,
eB change number

Question No. 67 **QID: 0245** **Point Value: 1**

Answer:

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

Question No. 68 **QID: 0143** **Point Value: 1**

Answer:

A. Acceptable, independent verifications for manual valves can be waived for valve alignments inside High Radiation Areas.

Question No. 69 **QID: 0928** **Point Value: 1**

Answer:

D. 1, 2, 3, 4 & 5

Question No. 70 **QID: 0161** **Point Value: 1**

Answer:

D. Verify SDM within COLR limit within one hour.

Question No. 71 **QID: 0925** **Point Value: 1**

Answer:

C. 15.0 rems/calendar year

Question No. 72 **QID: 0727** **Point Value: 1**

Answer:

B. Perform 1103.013, "RCS Leak Detection."

ANO Unit 1 - 2014 RO NRC Written Exam KEY

Question No. 73 **QID: 1025** **Point Value: 1**

Answer:

D. Scintillation Detector

Question No. 74 **QID: 0234** **Point Value: 1**

Answer:

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

Question No. 75 **QID: 0927** **Point Value: 1**

Answer:

C. Unit 1 WCO
placed on its side

U.S. Nuclear Regulatory Commission

Site-Specific RO Written Examination

Applicant Information	
Name:	
Date: 11/17/14	Facility/Unit: ANO / Unit One
Region: I ☐ II ☐ III ☐ IV ☒	Reactor Type: W ☐ CE ☐ BW ☒ GE ☐
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination, you must achieve a final grade of at least 80.00 percent. Examination papers will be collected 6 hours after the examination begins.

Applicant Certification

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

_____
Applicant's Signature

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

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 1 **QID: 0869**

Given:
Reactor Power - 100%
RCS Loop A Flow - 35 X 10E6 lbm/hr
RCS Loop B Flow - 72 X 10E6 lbm/hr

What condition has caused the given conditions and what actions should be taken in accordance with 1203.031, Reactor Coolant Pump and Motor Emergency, after Reactor Trip Immediate Actions are completed?

A. "A" RCP Sheared Shaft / Trip ONLY "A" RCP

B. "A" RCP Sheared Shaft / Trip ALL RCPs

C. "C" RCP Sheared Shaft / Trip ONLY "C" RCP

D. "C" RCP Sheared Shaft / Trip ALL RCPs

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 2 **QID: 0870**

Given:
- Reactor manually tripped due to excessive Pressurizer Code Safety Valve Leakage
- RCS pressure is 1650 psig
- HPI has been initiated with the following flowrates:
  - CV-1220 flow 135 gpm
  - CV-1221 flow 135 gpm
- Pressurizer level is 317" and rising rapidly
- CET temperatures 555 °F and dropping

What procedurally required actions should be taken as pressurizer level reaches 320 inches and why?

A. Raise HPI flow to prevent ESAS actuation

B. Raise HPI flow to raise RCS pressure to >1700 psig

C. Reduce HPI flow due to PTS concerns

D. Reduce HPI flow to limit RCS pressure rise

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 3 **QID: 0881**

Which of the following is an entry condition for 1203.039, Excess RCS Leakage?

A. Unexplained drop in Makeup Tank level

B. Pressurizer level indications differ by > 16"

C. Erratic Makeup flow and Seal Injection flow

D. Abnormal change in RCS pressure without a change in Pressurizer level

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 4 **QID: 0029**

Given the following plant conditions:

- Reactor trip from full power
- Full ES actuation
- ICCMDS Display Subcooling Margin indicates 0 °F
- ICCMDS CET temperatures are alternating between superheated and saturated conditions.

All EOP actions have been performed for these conditions.

Which of the following describes the primary mode of RCS cooling for these conditions?

A. Reflux Boiling

B. Forced Convection

C. Natural Circulation

D. Natural Conduction

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 5 **QID: 0883**

Given:
- Plant Power 80%
- P-32A, Reactor Coolant Pump Trips

The CRS directs you to check for reverse rotation of P-32A.

Which of the following is an indication of reverse rotation per 1203.031, Reactor Coolant Pump and Motor Emergency?

A. RCS loop "A" flow lower than expected

B. RCP Motor Bearing high temperature

C. RCP Motor Winding high temperature

D. RCP Speed indication on PMS is negative

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 6 **QID: 0449**

Given:

- The plant is in Cold Shutdown at 100 degrees F.
- The "A" Decay Heat (DH) train has just been placed in service.
- The RCS level is decreasing and the Auxiliary Building sump HI LEVEL alarm is actuated.

What operator action is required?

A. Start makeup pump(s) to maintain RCS level.

B. Open the BWST outlet valve(s) to maintain NPSH to the DH pump.

C. Stop running DH pump and start other DH pump.

D. Stop the DH pump and isolate the DH system from the RCS.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 7 **QID: 0886**

Given:
- Unit 1 is at 100% power
- CRD Cooling Pump, P-79A, is in service
- Reactor Building Pressure rises to 19 psia

What is the impact to the CRD Cooling System?

A. P-79A in a shutoff head condition

B. P-79A in a run out condition

C. P-79A on minimum recirc

D. P-79A will stabilize with a slightly lower flow

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 8 **QID: 0395**

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

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

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

B. To prevent the ERV opening.

C. To maintain pressurizer heaters off during testing.

D. To allow the ERV low setpoint to be calibrated.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 9 **QID: 0887**

What does AMSAC monitor as a backup to the Reactor Protection System in the event of an Anticipated Transient Without Scram (ATWS)?

A. RCS pressure and Power Range reactor power (Bailey)

B. RCS pressure and Linear Range Gamma-Metrics reactor power

C. Total FW flow and Power Range reactor power (Bailey)

D. Total FW flow and Linear Range Gamma-Metrics reactor power

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 10 **QID: 0550**

As ATC you are monitoring parameters following a Reactor Trip with a Steam Generator Tube Rupture.

If Thot is 480 °F, all of the following would REQUIRE isolation of the bad SG per 1202.006, Tube Rupture, EXCEPT:

A. Offsite dose projection meets Alert criteria

B. BWST level 22 ft

C. Ruptured SG level 420"

D. Ruptured SG leak rate-of-change 20 gpd/hour

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 11 **QID: 0930**

Given:
-Reactor is tripped due to a steam line rupture.
-"A" SG pressure 590 psig
-"B" SG pressure 430 psig

Which valves are positioned correctly per RT-6?

A. "B" MSIV CV-2692 closed to isolate potential steam leaks and
"B" EFW Isolation valve CV-2620 closed to prevent EFW flow to the SG

B. "A" MSIV CV-2691 closed to isolate potential steam leaks and
"A" EFW Isolation valve CV-2627 closed to prevent EFW flow to the SG

C. "A" MFW Isolation valve CV-2680 closed and "A" EFW Control valve CV-2645 closed to isolate all MFW and EFW flow to the SG to stop the over cooling affects from "A" SG

D. "B" MFW Isolation valve CV-2630 closed to prevent MFW flow to the SG and
"B" EFW Control valve CV-2647 throttled open to allow trickle feed to the SG

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 12 **QID: 0888**

Given:
- Plant Power 72%
- 'A' MFWP Speed 4300 rpm and steady
- 'B' MFWP Speed 4300 rpm and steady

Subsequently
- ATC reports 'B' MFWP Speed 3800 rpm and lowering
- There is no flow indicated to 'B' Steam Generator
- 'B' Operating Range level is reading 24%

Which INITIAL procedural action is taken per 1203.027, Loss of Steam Generator Feed?

A. Open Feedwater Pump Discharge Crosstie CV-2827

B. Trip 'B' MFW Pump

C. Manually start P-75 AFW Pump

D. Take manual control of 'B' MFW Pump and raise speed

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 13 **QID: 0496**

Unit 1 has been in a station black-out for 1.5 hours with battery bank D06 supplying bus D02 with power without a battery charger online for this entire time.

If the equipment on bus D02 does NOT change, which one of the following statements describes the battery's discharge rate (expressed as amperage) as the battery is expended?

A. The battery amperage will be fairly constant until the design battery capacity is exhausted and then will drop rapidly.

B. The battery amperage will be fairly constant until the design battery capacity is exhausted and then will rise rapidly.

C. The battery amperage will drop steadily until the design battery capacity is exhausted.

D. The battery amperage will rise steadily until the design battery capacity is exhausted.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 14 **QID: 0339**

Inverters are aligned with Y-25 supplying RS-4 and Y-22 supplying RS-2.

Shifting the manual output transfer switch (S-2) on the Y-25 inverter to the "System Output To Y-22" position should:

A. Power RS-2 from Y-25.

B. De-energize RS-4.

C. Parallel RS-2 and RS-4.

D. De-energize RS-2.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 15 **QID: 0890**

Given:
- RCS Pressure 1500 psig
- ESAS Channels 1-4 actuated
- CV-3822, Decay Heat Removal Cooler Service Water E-35A Inlet has failed closed

Per 1104.004, Decay Heat Removal Operating Procedure, of the following whch is the MAXIMUM length of time P-34A, Decay Heat Removal Pump, can be operated in this condition?

A. 5 minutes

B. 15 minutes

C. 25 minutes

D. 35 minutes

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 16 **QID: 0346**

In accordance with 1203.024, Loss of Instrument Air, of the following which is the lowest instrument air pressure that Unit 1 and Unit 2 instrument air systems should remain crossconnected?

A. 80 psig

B. 65 psig

C. 50 psig

D. 35 psig

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 17 **QID: 0896**

Given:
- 1202.004, Overheating EOP has been entered due to loss of all feedwater.
- ALL four RCPs are running

What is the PRIMARY reason for reducing the number of running RCPs to one in each loop in an overheating condition?

A. To limit heat input into the RCS while maintaining forced flow.

B. To ensure Pressurizer spray is available to aid in RCS pressure reduction.

C. To ensure even mixing of RCS due to rising boron concentration in RCS.

D. To maintain flow to limit stresses on SGs from high tube to shell DT.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 18 **QID: 0891**

ANO-1 is at 98% power.
Due to I&C trouble shooting, ICS has been placed in manual per ICS normal operating procedure, 1105.004.
Turbine remains in Integrated Control

Later during the shift, the CBOT reports that Generator MWe load is oscillating by a few megawatts.
The ATC adds that SG pressures have been oscillating as well.

The Dispatcher calls and reports a substation has faulted causing a grid frequency perturbation.

Which of the following actions should be recommended to the CRS to alleviate these oscillations?

A. Place the Generator Automatic Voltage Regulator (AVR) in Manual

B. Place the EHC controls in Turbine Manual

C. Place the S/G Rx Master back in Automatic

D. Place both FW Loop Demands back in Automatic

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 19 **QID: 0897**

In accordance with 1203.003, Control Rod Drive Malfunction Action, which of the following dropped or misaligned control rod scenarios would require a reactor shutdown instead of a control rod recovery attempt?

A. A dropped rod at <2% power

B. A dropped rod at 62% power

C. A rod misaligned by >6.5% for >1 hour

D. A rod misaligned for >24 hours

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 20 **QID: 0893**

What is the reason for Rod Insertion Limits per the COLR?

A. Ensures minimum required SDM is maintained

B. Ensures radial symmetry in the core power distribution

C. Ensures rod worth is approximately the same between the rod groups

D. Ensures RCS peak design pressure will not be exceeded during a rod ejection at low power

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 21 **QID: 0895**

Given:
- Reactor tripped 30 minutes ago due to loss of condenser vacuum
- Condenser vacuum is currently 18" Hg
- Group 6 Rod 4 did not fully insert
- Group 5 Rod 3 did not fully insert
- Emergency Boration in progress

During a brief Critical Parameters are given as follows:
- Pressurizer Level 220 inches
- Both S/G Levels 30 inches
- Both S/G Pressures 1020 psig
- SCM 70 °F
- CET 555 °F
- RCS Pressure 2155 psig
- Source Range 1000 cps

Which of the following is too high for the given conditions?

A. Pressurizer level

B. Subcooling Margin

C. S/G Pressure

D. Source Range

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 22 **QID: 0423**

A power escalation in progress, current power is 50%

The following annunciators alarm and conditions are present:

- MSSV OPEN (K07-C5)
- MAIN STEAM PRESSURE HI/LO (K07-C6)
- PZR LEVEL HI (K09-D3)
- RCS PRESSURE HI/LO (K09-C2)
- GENERATOR L.O. RELAY TRIP (K04-A8)

What operator actions are procedurally REQUIRED?

A. Reduce reactor power to within capacity of main turbine load.

B. Monitor runback to 40% load.

C. Trip the reactor and go to 1202.001.

D. Open Pressurizer Spray (CV-1008) in MAN.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 23 **QID: 0894**

Following a reactor trip, MSLI on 'A' SG had to be actuated to correct an Overcooling event.

The following are observed 20 minutes later:
- TAVE 532 °F and stable
- Pressurizer Level 90 inches and rising at 1 inch/min
- 'B' TBVs are being controlled in Manual
- M/U Flow 58 gpm
- L/D Flow 43 gpm
- Seal Inj Flow 40 gpm
- Seal Bleedoff Flow 6 gpm total
- RB Leak Detector RE-7461 80 cpm
- (T-37A) ICW Surge Tank - 0.8 psid and stable
- (T-37B) ICW Surge Tank - 0.8 psid and stable
- L/D Temperature 95 °F

Where is the RCS Leak and what is the rate?

A. L/D Cooler Leak ; 37 gpm

B. Steam Generator Tube Leak ; 37 gpm

C. L/D Cooler Leak ; 61 gpm

D. Steam Generator Tube Leak ; 61 gpm

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 24 **QID: 0543**

Given:

- Unit 1 is in the EOP for Inadequate Core Cooling, 1202.005.
- Region 4 of Figure 4 has been entered.
- Fuel damage is suspected.

Which of the following will result in HIGHER radiation exposures to personnel in the Aux Building?

A. Initiating long-term cooling with DHR pumps

B. Throttling RB spray before initiating sump recirculation

C. Aligning Pressurizer AUX spray to LPI system prior to initiating sump recirculation

D. Bumping RCPs to promote RCS flow.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 25 **QID: 0898**

Given:
- RCS pressure 1800 psig
- CET average 600 °F
- The B S/G has been isolated
- Due to valve control issues, the ATC is manually feeding EFW
- A S/G Pressure 925 psig
- A S/G level 60"

Per RT-5, which of the following is closest to the MINIMUM rate the ATC is required to feed the A S/G?

A. 340 gpm

B. 370 gpm

C. 410 gpm

D. 580 gpm

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 26 **QID: 0182**

A small break LOCA is in progress.

In accordance with 1203.041, Small Break LOCA Cooldown, which one of the following actions is required to be performed prior to the BWST level reaching 6 feet?

A. Align Pressurizer AUX Spray to LPI system.

B. Secure running Reactor Coolant Pumps.

C. Secure running High Pressure Injection Pumps.

D. Align one LPI train to gravity flow from RCS hot leg to RB sump.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 27 **QID: 0124**

Given:
- Unit tripped from 100% power due a loss of off site power
- Both EDG's are powering vital busses.
- Natural circulation has been established for one hour with Tave at 545°F and Thot 565°F.

In accordance with 1203.013, Natural Circulation Cooldown, with natural circulation established you should expect to see:

A. Thot tracking SG Tsat temperature

B. core delta T stable or dropping

C. Tcold tracking CET temperature

D. TBVs opening periodically to maintain SG pressure

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 28 **QID: 0899**

Given:
- Plant Power 85%
- ICS in full automatic
- One RCP has tripped

In accordance with 1203.022, Reactor Coolant Pump Trip, when the plant stabilizes (without operator action) Main Feedwater flow should be _____ for the RCS loop with two running RCPs and _____ for the RCS loop with one running RCP?

A. 3.0 X e6 lbm/hr
1.5 X e6 lbm/hr

B. 4.125 X e6 lbm/hr
2.06 X e6 lbm/hr

C. 4.4 X e6 lbm/hr
2.2 X e6 lbm/hr

D. 5.5 X e6 lbm/hr
2.75 X e6 lbm/hr

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 29 **QID: 0900**

Given:
- Plant Power 100%
- CZ-9 Vacuum Degasifier Bypass, inadvertently left CLOSED following a tag out.

What impact would the above alignment have on the plant if the ATC were to place CV-1248, 3-Way valve, into the BLEED position?

A. Letdown flow would be isolated, no continuous flow would be indicated on C04

B. Letdown flow would be aligned to the in-service T-12, Clean Waste Receiver Tank

C. Letdown flow would be through the Vacuum Degasifier to the Makeup Tank

D. Letdown flow would be diverted through a relief valve to the Auxiliary Building Equipment Drain Tank

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 30 **QID: 0902**

Which of the following correctly describes the CV-1050 Decay Heat Removal Suction Valve interlock?

CV-1050 closes at _____ and receives its pressure input from ESAS Analog _____ .

A. 290 psig
Channel 1 (PT-1020)

B. 320 psig
Channel 1 (PT-1020)

C. 290 psig
Channel 2 (PT-1041)

D. 320 psig
Channel 2 (PT-1041)

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 31 **QID: 0903**

Which of the following provides motor power to CV-1407, BWST Outlet Valve?

A. B-1

B. B-3

C. B-5

D. B-7

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 32 **QID: 0027**

The following plant conditions exist:

- Pressurizer temperature is 588 °F
- Pressurizer level is 285 inches and rising
- RCS Pressure is 1400 psig and lowering
- Quench Tank pressure is 0 psig and stable
- The ERV acoustic monitor indicates flow noise

What should be the expected temperature as indicated on the ERV PSV-1000 Outlet Temp on the Safety Parameter Display System (SPDS)?

A. Approximately 212 °F

B. Approximately 260 °F

C. Approximately 280 °F

D. Approximately 588 °F

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 33 **QID: 0905**

Given:
- Plant is at 100% power.
- ICW pump P-33B is in service on Non-Nuclear ICW.
- ICW PUMP AUTO START, K12-A4 alarms

The Nuclear ICW pump has tripped, what should you observe on C09?

A. ICW pump P-33A would auto-start, P-33B should be unchanged.

B. ICW pump P-33C would auto-start, P-33B should be unchanged.

C. ICW pump P-33B would shift to Nuclear loop, P-33C should auto-start.

D. ICW pump P-33B would shift to Nuclear loop, P-33A should auto-start.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 34 **QID: 0906**

Uni1 is at 100% power.
The ATC observes RCS pressure is slowly dropping.

Of the following, which is the MIMIMUM pressure where Pressurizer Heater Bank 4 should automatically be energized?

A. 2105 psig

B. 2120 psig

C. 2135 psig

D. 2140 psig

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 35 **QID: 0907**

Given:

Plant is operating at 100% power.
A plant transient occurs.

Which of the following parameters should indicate a failure of the Reactor Protection System (RPS), and require the operator to manually trip the reactor?

A. Reactor Building pressure 19 psia

B. RCS pressure 1850 psig

C. RCS Thot 615 °F

D. NI power 103%

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 36 **QID: 0908**

Which of the following will cause a FULL actuation of EFW?

A. ES Channels 1 & 2

B. ES Channels 3 & 4

C. ES Channels 5 & 6

D. ES Channels 7 & 8

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 37 **QID: 0909**

Complete the following statement:

ESAS Channel _____ will automatically isolate _____ to the Reactor Building.

A. 3 & 4
CRD Cooling, Chilled Water, RCP Motor Cooling

B. 3 & 4
Reactor Building Leak Detector, Fire Water, Letdown

C. 5 & 6
CRD Cooling, Chilled Water, RCP Motor Cooling

D. 5 & 6
Reactor Building Leak Detector, Fire Water, Letdown

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 38 **QID: 0454**

A large break LOCA is in progress.

- RCS pressure is ~ 25 psig.
- RB pressure is 45 psia and trending down.
- Shift to RB Sump Suction has just been completed.

Subsequently, annunciator K11-C7, "RB SPRAY P35B ES FAILURE" alarms.

Per procedure 1202.010, ESAS, which of the following actions should be taken?

A. Close Decay Heat Supply to Makeup Pump Suction CV-1276.

B. Establish maximum flow through "A" RB Spray Pump.

C. Maintain "A" RB Spray flow at 1050 to 1200 gpm.

D. Throttle "B" LPI Pump flow to 2800 gpm.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 39 **QID: 0910**

Given:
- RCS Temperature 500 °F
- Turbine Bypass Valves being used to control cooldown
- Plant shutdown in progress for 1R25

Per 1102.010, Plant Shutdown and Cooldown, what is the MAXIMUM cooldown rate and what is it based on?

A. 50 °F/hr, minimize stresses on bowed tie rods in S/G

B. 50 °F/hr, prevent brittle fracture of the Rx Vessel due to neutron embrittlement

C. 100 °F/hr, minimize stresses on bowed tie rods in S/G

D. 100 °F/hr, prevent brittle fracture of the Rx Vessel due to neutron embrittlement

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 40 **QID: 1044**

Given:

- The plant is operating at 100% power
- SASS mismatch alarm (K07-B4)
- "A" Tcold TI-1015 rising
- "B" Tcold TI-1046 rising
- "A" MFW flow FI-2628 slowly rising
- "B" MFW flow FI-2678 slowly lowering

Per 1203.001, ICS Abnormal Operations, which of the following actions are REQUIRED to be performed?

A. Place SG Rx Master, Turbine EHC, and both Turbine Bypass valves in manual

B. Place Feedwater Loop A & B Demands, Diamond, and Rx Demand in manual

C. Place Loop A & B Demands in manual ONLY

D. Place Diamond and Rx Demand in manual ONLY

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 41 **QID: 0912**

Which of the following is the LOWEST power level when an EFIC actuation on loss of BOTH MFW Pumps will occur during a plant shutdown?

A. 8%

B. 9%

C. 10%

D. 11%

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 42 **QID: 0913**

While checking for Proper Electrical Response per RT-19, you find the Main Generator Output Breakers and Exciter Field Breaker CLOSED.

What is the correct action to take based on 125V DC Bus D01 status?

If D01 is _____ ,then open _____.

A. Energized
Both Main Generator Output Breakers ONLY

B. Energized
Both Main Generator Output Breakers AND Exciter Field Breaker

C. De-Energized
Both Main Generator Output Breakers ONLY

D. De-Energized
Both Main Generator Output Breakers AND Exciter Field Breaker

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 43 **QID: 0914**

What is the power supply to DC Distribution Panel RA2?

A. Directly from 125v DC Bus D01

B. From 125v DC Bus D01 via Distribution Panel D11

C. Directly from 125v DC Bus D02

D. From 125v DC Bus D02 via Distribution Panel D21

Question No. 44 **QID: 0915**

The #1 EDG just tripped during a surveillance test.

If a positive crankcase pressure tripped the EDG, this should be indicated by _____ and the Emergency Diesel Generator was tripped by _____.

A. High Crankcase Pressure Critical Trouble Alarm
Energizing Emergency Trip Relay (K11)

B. High Crankcase Pressure Critical Trouble Alarm
De-Energizing Emergency Trip Relay (K11)

C. Low Lube Oil Pressure Critical Trouble Alarm
Energizing Emergency Trip Relay (K11)

D. Low Lube Oil Pressure Critical Trouble Alarm
De-Energizing Emergency Trip Relay (K11)

Question No. 45 **QID: 0917**

Given:
- A release of Waste Gas Decay Tank T-18C is in progress.
- RADIATION MONITOR TROUBLE, K10-C1, alarms
- Gaseous Radwaste Monitor RI-4830 FAILURE ALARM light is on
- Automatic valve closures were verified to have occurred

Which of the following procedurally required actions should be taken for the above conditions?

A. Reset RI-4830 and re-establish the release per the release permit.

B. A licensed operator, other than the individual who initially adjusted RI-4830, shall reset RI-4830 and re-establish the release per the release permit.

C. Perform an independent verification of the release lineup per the ODCM and re-establish the release per the release permit.

D. Reinitiate the release permit procedure prior to re-establishing the release.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 46 **QID: 0918**

Given:
- 'A' DHR Train in service
- Chemistry reports 0.5% Failed Fuel

Which of the following would indicate a leak in DH Cooler (E-35A)?

A. Rising counts on SW Loop I Process Monitor (RI-3814)

B. Rising counts on SW Loop II Process Monitor (RI-3815)

C. Rising counts on Decay Heat Loop A Process Monitor (RI-3809)

D. Rising counts on Failed Fuel Process Monitor (RI-1237)

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 47 **QID: 0714**

A Loss of Instrument Air has occurred.

What is the expected position of the Startup (CV-2623 and CV-2673) and Low Load Control Valves (CV-2622 and 2672)?

A. Startup valves fail closed,
Low Load valvess fail closed.

B. Startup valves fail closed,
Low Load valves fail as is.

C. Startup valves fail as is,
Low Load valves fail as is.

D. Startup valves fail as is,
Low Load valves fail closed.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 48 **QID: 0919**

1203.002, Alternate Shutdown AOP, is in progress.

While RO #1 is manually opening CV-1408, BWST OUTLET, RO #1 notices significant flow noise and vibration indicating ~1000 gpm flow.

What should RO #1 do based on the above conditions?

A. ONLY Close CV-1408, piping failure is indicated.

B. Close CV-1408, go to Decay Heat Vaults AND Close RB Sump Outlet Valves.

C. Throttle CV-1408, reduce the flow rate to prevent waterhammer as the piping fills.

D. Continue opening CV-1408, flow is expected due to HPI Pump running.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 49 **QID: 0326**

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

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

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

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

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

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

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 50 **QID: 1022**

Given:

Plant at 100%
Letdown flow 80 gpm indicated on FI-1236
Letdown pressure 50 psig on PI-1237

Subsequently, CV-1244 and CV-1245 Letdown DI Inlet Isolation valves lose power.

With no operator action what would be the expected automatic response of the pressurizer level control system ?

PI-1237 would read _____ psig and Makeup Tank Level will _____ .

A. 150 ; rise

B. 150 ; drop

C. 50 ; rise

D. 50 ; drop

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 51 **QID: 0920**

Given:
- Unit 1 is at 100% power.
- I&C is performing a surveillance on the "A" RPS channel.
- NI input to ICS is selected to "C" RPS channel.

What should occur if someone inserted the key and placed "C" RPS channel in bypass?

A. Reactor trip

B. "A" RPS channel should automatically be removed from bypass

C. Two RPS channels should be in bypass

D. Electrical contacts should prevent RPS channel "C" from being placed in bypass

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 52 **QID: 0435**

Given:
- Reactor tripped due to loss of all offsite power.
- RCS T cold is 535°F and dropping.
- RCS pressure 1800 psig and dropping.
- OTSG pressures are ~910 psig and dropping.
- "A" OTSG level is 210" and rising.
- "B" OTSG level is 195" and rising.
- "A" EFW flow is 370 gpm.
- "B" EFW flow is 350 gpm.

Which of the following is an appropriate response to the above conditions in accordance with RT-5, Verify Proper EFW Actuation and Control?

A. Maintain >590 gpm to each SG in HAND.

B. Throttle EFW to prevent overcooling.

C. Select Reflux Boiling setpoint.

D. Actuate MSLI on both OTSGs.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 53 **QID: 0568**

Given:

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

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

A. One

B. Three

C. Five

D. Seven

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 54 **QID: 0535**

Instrument Air pressure has dropped to 50 psig.

Which of the following manual or automatic actions should be performed or will occur in response to the low Instrument Air pressure?

Note: All actions for higher pressures have been completed at the required pressure and answer the question considering only the action for the current pressure.

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

B. Unit 1 to Unit 2 Instrument Air cross-connect automatically opens.

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

D. Close Letdwon Cooler Outlet to isolate letdown

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 55 **QID: 0921**

iven

- Plant at 100% power
- P-2B Condensate Pump OOS
- Inadvertent actuation of ES Channel #1
- S/U #1 OOS for maintenance LCO 3.8.1.A 72 hour Time Clock in effect

What should be the impact to the plant due to this malfunction AND which of the following procedural actions would have the HIGHEST priority to mitigate the effects?

A. #1 Emergency Diesel Generator would start, reset the tripped channel and secure EDG

B. Red Train High Pressure Injection would occur, override and throttle HPI

C. Loss of power to A-1 bus, perform immediate actions for reactor trip.

D. All Seal Return isolates, realign RCP seal bleed off.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 56 **QID: 0717**

Given:

Reactor Power is 100%.
The Group 7 Rods average position is 92% withdrawn.

An operator moves the group 6 rod 4 Relative Position Indication (RPI) to 0%.
Group 6 has 8 rods.

What is the expected result?

A. Asymmetric rod runback.

B. Asymmetric rod alarm.

C. Out inhibit.

D. Sequence inhibit.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 57 **QID: 0132**

The makeup tank has decreased from 81 inches to 73 inches. Assuming that the level decrease was due to a loss of RCS inventory, how much has been lost?

A. 220 to 229 gallons

B. 230 to 239 gallons

C. 240 to 249 gallons

D. 250 to 259 gallons

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 58 **QID: 0922**

Which of the following list of pressurizer heaters are ALL vital powered?

A. Banks 1 and 3

B. Banks 4 and 5

C. Bank 2 and RUB 13

D. RUB 14 and 15

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 59 **QID: 0058**

A startup is in progress.
The reactor is critical.
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 10-9 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.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 60 **QID: 0169**

Given:

- Plant is at 100% power.
- PZR level transmitter LT-1001 selected via HS-1002 on C04.
- PZR temperature element TE-1001A selected via HS-1000 on C04.

The PZR temperature indicator, TI-1000, on C04 drops suddenly to 50°F (bottom of scale).

Without operator action, what will be the effect on the PZR Level Control System?

A. PZR Level Control Valve, CV-1235, will open to establish a higher steady-state PZR level.

B. PZR Level Control Valve, CV-1235, will go full closed causing PZR level to continuously lower.

C. PZR Level Control Valve, CV-1235, will close to establish a lower steady-state PZR level.

D. PZR Level Control Valve, CV-1235, will go full open to continuously raise PZR level.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 61 **QID: 0312**

The WCO reports the Spent Fuel Pool level is +1.5 ft.

What action / concern could this level pose for Spent Fuel Pool operations or fuel handling in the SFP?

A. SFP lower water temperature limit will be exceeded.

B. SFP ventilation ducts will be flooded.

C. Area dose rates will rise.

D. SFP must be sampled within 5 hours.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 62 **QID: 0662**

Given:
Recovery from an Overheating condition is in progress.
Auxiliary Feedwater Pump, P-75 is the only available source of water.
"A" S/G level is 18 inches and stable.
"B" S/G level is 21 inches and lowering.
CET Temperature is 610 °F
RCS Pressure is 2150 psig

Per RT-16, Feeding Intact SG, which of the following indicate the proper action to take and why?

A. Neither S/G can be fed due to unanalyzed stresses of feeding a dry S/G with Aux Feedwater.

B. "A" S/G can not be fed until primary to secondary heat transfer is established. "B" S/G can be fed while monitoring tube to shell delta T for unanalyzed stresses of feeding a dry S/G with Aux Feedwater.

C. Both S/Gs can be fed while monitoring tube to shell delta T until primary to secondary heat transfer is established.

D. Both S/Gs can be fed, tube to shell delta T is not a concern until primary to secondary heat transfer is established, then maintain tube to shell delta T within limits.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 63 **QID: 0923**

Given:
- Reactor Power reduced to 25% due to lowering condenser vacuum
- Condenser vacuum is 25" Hg
- Main Turbine was manually tripped 30 minutes ago
- Instrument Air pressure is 75 psig and slowly dropping.

How is SG pressure being controlled for these conditions?

A. TBVs at ~895 psig

B. TBVs at ~995 psig

C. ADVs at ~1020 psig

D. MSSVs at 1050 - 1100 psig

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 64 **QID: 0929**

Given:
- RCS pressure 1760 psig and dropping
- Unit 1 Reactor tripped
- ICCMDS CETs indicate 618 °F
- ICCMDS display for SCM shows -1°F and is flashing
- ICCMDS timer is displaying "1:46"

Which of the following procedural actions are required for these conditions?

A. Trip ALL RCPs

B. Trip one RCP in each loop and perform rapid RCS cooldown

C. Go to 1202.004, Overheating

D. Go to 1202.005, Inadequate Core Cooling

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 65 **QID: 0924**

Given:
- In preparation for a surveillance test an operator is transferring A SW bay from the lake to the ECP.
- During the transfer, SG-5 fails to open.
- The operator tries to open SG-1 but it will not open.
- The operator also tries to open SG-3 but it will not open.

What is the impact on the Fire Protection System?

A. P-6A, Electric Fire Pump, is non-functional

B. P-6B, Diesel Fire Pump, is non-functional

C. P-11, Jockey Fire Pump is non-functional

D. Temporary Fire Pump can not be operated

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 66 **QID: 0389**

Given:

-A job is in progress that will last for several weeks.
-The procedure has been verified at the start of the job.
-A pre-job brief has been completed for all participants.

How often at a MINIMUM should the procedure for this job be verified current and what source is used?

A. Once every 24 hours,
eB change number

B. Once every 24 hours,
the work order reference

C. Prior to each use,
eB change number

D. Prior to each use,
the work order reference

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 67 **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.

Per Conduct of Operations, 1015.001, 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 measured torque value required to remove the valve from its seat is verified below the limit.

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

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 68 **QID: 0143**

Given:

- The plant is shut down for Refueling.
- A Core Flood system valve alignment is in progress inside Controlled Access.
- The primary sample room has become a high radiation area due to hydrogen peroxide cleanup.
- The first check was made on SS-81, Core Flood Tanks Sample Isolation, but the Shift Manager decided to waive the second check to reduce exposure to high radiation.

Per Conduct of Operations, 1015.001, which one of the following statements most accurately describes why the Shift Manager's decision is acceptable or unacceptable?

A. Acceptable, independent verifications for manual valves can be waived for valve alignments inside High Radiation Areas.

B. Unacceptable, independent verification should not be waived if remote valve position indication is provided.

C. Acceptable, independent verification can be waived at any time with the Shift Manager's approval as long as the reason is documented.

D. Unacceptable, independent verifications cannot be waived for valve alignments without the approval of the Manager of Plant Operations.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 69 **QID: 0928**

Which of the following lists ALL of the MODES of applicability for Technical Specification 2.1.2, RCS Pressure Safety Limit?

A. 1 & 2 ONLY

B. 1, 2 & 3 ONLY

C. 1, 2, 3 & 4 ONLY

D. 1, 2, 3, 4 & 5

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 70 **QID: 0161**

Given:

- Power escalation is in progress following a shutdown.
- Reactor power is 35%.
- Rod 6 of Group 7 drops.

Which of the following actions should be taken?

A. Insert all regulating rods in sequential mode.

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

C. Verify plant stabilizes at 320 MWe after ICS runback.

D. Verify SDM within COLR limit within one hour.

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 71 **QID: 0925**

What is the federal occupational exposure limit to the LDE (Lens Dose Equivalent) in accordance with 10CFR20?

A. 0.1 rems/calendar year

B. 5.0 rems/calendar year

C. 15.0 rems/calendar year

D. 50.0 rems/calendar year

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 72 **QID: 0727**

Given:

Unit is at 100% Power,
Received Annunciator K10-B2, "PROC MONITOR RADIATION HI"

Upon investigation you discover "RB Atmos Gaseous Monitor" RI-7461 in High alarm and slowly rising.

What action is required for this alarm in accordance with "Annunciator K10 Corrective Action" 1203.012I?

A. Have Radiation Protection perform an air sample.

B. Perform 1103.013, "RCS Leak Detection."

C. Adjust RI-7461 alarm setpoint per 1305.001 Sup 5

D. Commence plant shutdown per 1203.045, "Rapid Plant Shutdown."

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 73 **QID: 1025**

What type of detectors are 2RITS-8001A/B, Control Room Emergency Ventilation System?

A. Proportional Detector

B. Geiger - Mueller Detector

C. Ion Chamber Detector

D. Scintillation Detector

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 74 **QID: 0234**

During a SGTR, which of the following actions is performed specifically to reduce plant personnel exposure?

A. Maintaining RCS pressure low within limits of Fig. 3.

B. Steaming bad SG to maintain tube-to-shell DT <150°F.

C. Aligning HPI to provide PZR Aux Spray.

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

ANO Unit 1 - 2014 RO NRC Written Examination

Question No. 75 **QID: 0927**

The Fire Brigade responded to a fire in the Startup Boiler building.
The fire was extinguished by partially expending a local fire extinguisher.

The _____ will report the fire was extinguished, the fire extinguisher would be _____, and Unit 2 Mechanical Maintenance would be notified.

A. Unit 1 WCO
hung in its assigned location

B. Unit 2 WCO
hung in its assigned location

C. Unit 1 WCO
placed on its side

D. Unit 2 WCO
placed on its side

ANO Unit 1 - 2014 SRO NRC Written Exam KEY

Question No. 76 **QID: 0871** **Point Value: 1**

Answer:

B. 1203.039, Excess RCS Leakage

Question No. 77 **QID: 0872** **Point Value: 1**

Answer:

A. Initiate a Condition Report

Question No. 78 **QID: 0873** **Point Value: 1**

Answer:

C. 1202.012, Repetitive Tasks, RT-10 Verify Proper ESAS Actuation

Question No. 79 **QID: 1026** **Point Value: 1**

Answer:

B. Perform rapid cooldown per 1202.008, Blackout

Question No. 80 **QID: 0874** **Point Value: 1**

Answer:

D. Per 1202.007, Degraded Power, Verify ACW Isolation (CV-3643) and BOTH SW to ICW Coolers Supply Valves closed

Question No. 81 **QID: 1042** **Point Value: 1**

Answer:

C. T.S. 3.3.4 - CRD Trip Devices

Question No. 82 **QID: 0875** **Point Value: 1**

Answer:

B. High Power Trip

Question No. 83 **QID: 0876** **Point Value: 1**

Answer:

D. Establish RCS cooldown at > 100°F/hr but ≤ 240°F/hr

ANO Unit 1 - 2014 SRO NRC Written Exam KEY

Question No. 84 **QID: 0544** **Point Value: 1**

Answer:

C. Enter 1203.042 "Refueling Abnormal Operation".

Question No. 85 **QID: 1027** **Point Value: 1**

Answer:

C. 1203.002, Alternate Shutdown
Safety Parameter Display System

Question No. 86 **QID: 0607** **Point Value: 1**

Answer:

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

Question No. 87 **QID: 0466** **Point Value: 1**

Answer:

B. 1203.039, Excess RCS Leakage

Question No. 88 **QID: 0350** **Point Value: 1**

Answer:

A. Initiate administrative controls to document and correct the failure.

Question No. 89 **QID: 0932** **Point Value: 1**

Answer:

C. PM on Steam Supply Valve CV-2617,
Open power supply breaker B-6241 and lock CV-2617 in the OPEN position

Question No. 90 **QID: 1040** **Point Value: 1**

Answer:

D. T.S. 3.8.7 Condition A, Inverters - Operating

Question No. 91 **QID: 0744** **Point Value: 1**

Answer:

B. 1203.012F, "SASS Mismatch" ACA

ANO Unit 1 - 2014 SRO NRC Written Exam KEY

Question No. 92 **QID: 0855** **Point Value: 1**

Answer:

D. Control Turbine Bypass valves (TBVs) to quickly reduce SG pressures to reseat the MSSV per 1202.001, Reactor Trip.

Question No. 93 **QID: 1041** **Point Value: 1**

Answer:

A. Outage Control Center reports that the reactor has been subcritical for 90 hours

Question No. 94 **QID: 0885** **Point Value: 1**

Answer:

C. 0600

Question No. 95 **QID: 0409** **Point Value: 1**

Answer:

D. A change to the acceptance criteria for the LPI pumps' surveillance.

Question No. 96 **QID: 0879** **Point Value: 1**

Answer:

B. is NOT
Shift Manager

Question No. 97 **QID: 0931** **Point Value: 1**

Answer:

A. The worker's Supervisor AND Radiation Protection Manager ONLY.

Question No. 98 **QID: 0816** **Point Value: 1**

Answer:

A. Skin dose from Beta

Question No. 99 **QID: 1023** **Point Value: 1**

Answer:

C. EOF Emergency Director

ANO Unit 1 - 2014 SRO NRC Written Exam KEY

Question No. 100 **QID: 1043** **Point Value: 1**

Answer:

B. RCS Leak Rate

U.S. Nuclear Regulatory Commission

Site-Specific SRO Written Examination

Applicant Information	
Name:	
Date: 11/17/14	Facility/Unit: ANO / Unit One
Region: I ☐ II ☐ III ☐ IV ☒	Reactor Type: W ☐ CE ☐ BW ☒ GE ☐
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination you must achieve a final grade of at least 80.00 percent overall, with 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require a final grade of 80.00 percent to pass. You have 8 hours to complete the combined examination, and 3 hours if you are only taking the SRO portion.

Applicant Certification

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

_____
Applicant's Signature

Results		
RO/SRO-Only/Total Examination Values	75 / 25 / 100	Points
Applicant's Scores	____ / ____ / ____	Points
Applicant's Grade	____ / ____ / ____	Percent

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 76 **QID: 0871**

Unit 1 is at 100% power when the following conditions are noted:

- M/U Tank Level 85" and trending down at 1"/min
- M/U Flow 41 gpm and stable
- Pressurizer Level 220" and stable
- K08-A7 "RCP SEAL INJ FLOW LO" is in alarm
- Seal Injection Flows:
  A - 15 gpm
  B - 3 gpm
  C - 3 gpm
  D - 3 gpm

What procedure should be used to mitigate the given conditions?

A. 1203.031, Reactor Coolant Pump and Motor Emergency, Section 1 Seal Degradation

B. 1203.039, Excess RCS Leakage

C. 1203.031, Reactor Coolant Pump and Motor Emergency, Section 2 Seal Failure

D. 1203.012G, ACA - RCP Seal Injection Flow Low

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 77 **QID: 0872**

****REFERENCES PROVIDED********

Given:
- RCS Temperature is 280 F
- 'A' Decay Heat Removal Pump is in service
- SPDS indicates P-34A flow 3000 gpm
- FIS-1401 (C18) has failed low (DHR Loop A Flow)

The CRS should declare FIS-1401 INOPERABLE and _____.

A. Initiate a Condition Report

B. Perform a Safety Function Determination

C. Enter T.S. 3.5.3 Condition A, ECCS-Shutdown action statement

D. Enter T.S. 3.3.15 Condition A, PAM Instrumentation action statement

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 78 **QID: 0873**

Given:
- ESAS actuation has occurred due to a steam line break inside the Reactor Building.

Based on the above condition, which procedure SPECIFICALLY directs tripping Reactor Coolant Pumps?

A. 1202.010, ESAS

B. 1202.003, Overcooling

C. 1202.012, Repetitive Tasks, RT-10 Verify Proper ESAS Actuation

D. 1203.031, Reactor Coolant Pump and Motor Emergency

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 79 **QID: 1026**

Given:
- Both units have tripped due to a loss of offsite power
- SU1 voltage 15.3 KV
- SU2 voltage 60.1 KV
- K01-A2 "EDG1 TRIP" in alarm
- K02-B7 "A4 L.O. RELAY TRIP" in alarm
- CETs 600 °F
- RCS pressure 1850 psig
- RVLMS Level 1 and 2 indicate "Dry"

Based on the above conditions, which of the following procedure actions are required to be performed?

A. Go to 1202.002, Loss of Subcooling Margin

B. Perform rapid cooldown per 1202.008, Blackout

C. Perform RT-4, Initate HPI Cooling

D. Dispatch operator to perform Att. 2, Recovery from Blackout Breaker Alignment and UV Relay Defeat, of 1202.008, Blackout.

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 80 **QID: 0874**

Given:
- Tornado touched down in the switchyard 30 minutes ago
- Emergency Diesel Generators are supplying their respective busses,
- Only P-4A Service Water Pump is running

Which Emergency Operating Procedure AND action is required for the given conditions?

A. Per 1202.007, Degraded Power, Close P-4A to P-4B Crossties (CV-3644 & CV-3646)

B. Per 1203.030, Loss of Service Water, Close P-4A to P-4B Crossties (CV-3644 & CV-3646)

C. Per 1203.030, Loss of Service Water, Verify ACW Isolation (CV-3643) and BOTH SW to ICW Coolers Supply Valves closed

D. Per 1202.007, Degraded Power, Verify ACW Isolation (CV-3643) and BOTH SW to ICW Coolers Supply Valves closed

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 81 **QID: 1042**

Given
- Plant is operating at 100% power
- Annunciator "SHUNT TRIP DC POWER TROUBLE" (K08-D2) is in alarm

Which of the following Technical Specifications should be entered per the ACA?

A. T.S. 3.3.2 - RPS Manual Reactor Trip

B. T.S. 3.3.3 - RPS Reactor Trip Module

C. T.S. 3.3.4 - CRD Trip Devices

D. T.S. 3.8.4 - DC Sources - Operating

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 82 **QID: 0875**

Given
- Reactor Power 100%

In accordance with Technical Specification bases which RPS Trip Setpoint is designed to protect against a rod withdrawl accident?

A. Rx Power/Imbalance/Flow Trip

B. High Power Trip

C. High Temperature Trip

D. High Pressure Trip

Question No. 83 **QID: 0876**

Given:
- Reactor was tripped due to an 'A' SG Tube Leak
- 'A' SG level is 390 inches and rising at a rate of 6"/min
- 'B' SG is 30 inches and stable

What procedural required action should be taken FIRST based on the given conditions?

A. Trip both MFW Pumps

B. Place BOTH EFW Steam Supply Valves in MANUAL and closed

C. Establish RCS cooldown at ≤ 100°F/hr

D. Establish RCS cooldown at > 100°F/hr but ≤ 240°F/hr

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 84 **QID: 0544**

During core offload in a refueling outage, a Spent Fuel Handling Machine (SFHM) operator is moving an irradiated fuel assembly to it's designated storage location in the Spent Fuel Pool (SFP).

Due to a limit switch failure, the bridge makes contact with the SFP level transmitter (LI-2004) on the East wall of the SFP. This also results in the fuel assembly making contact with the wall.

LI-2004 fails high and the SFHM operator reports that no bubbles can be seen emerging from the fuel assembly. The SFP Area Radiation Monitor (RE-8009) readings are normal.

What action should be taken?

A. Enter LCO 3.7.13 for "SFP Level" due to the failure of LI-2004.

B. Enter LCO 3.9.6 for "Refueling Canal Water Level" since fuel movement is in progress.

C. Enter 1203.042 "Refueling Abnormal Operation".

D. Enter 1506.001, "Fuel and Control Component Handling".

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 85 **QID: 1027**

A fire in the Cable Spreading Room has occurred.

Which procedure is required for this occurrence AND which monitoring system has indications that will NOT be affected by this fire?

A. 1203.002, Alternate Shutdown
Dasey Panel

B. 1203.029, Remote Shutdown
Dasey Panel

C. 1203.002, Alternate Shutdown
Safety Parameter Display System

D. 1203.029, Remote Shutdown
Safety Parameter Display System

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 86 **QID: 0607**

Given:

- P-36A is the in-service Makeup Pump.
- Pressurizer level has dropped from 220" to 218" in 10 minutes.

- P-36A suction pressure is 40 psig and going down slowly.
- Makeup Tank level is 78" and trending down slowly.

- Seal Injection flow is oscillating from 38 to 43 gpm.
- MU-34D HPI temperature TE-1069A is reading 255°F.
- Aux. Building sump level is going up.

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

A. 1203.039, Excess RCS Leakage

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

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

D. 1203.032, HPI Line Temperature High

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 87 **QID: 0466**

Given:

- Plant is at 100%
- CBOR reports Makeup Tank level is unexpectedly trending down
- Annunciator K10-B2 "PROC MONITOR RADIATION HI" is in alarm
- Annunciator K08-C7 "RCP BLEEDOFF TEMP HI" subsequently alarms
- SE reports the process monitor is for Nuclear ICW

Which of the following contains the SPECIFIC guidance for mitigation of this event?

A. 1203.012I, Annunciator K10 Corrective Action, K10-B2 "PROC MONITOR RADIATION HI"

B. 1203.039, Excess RCS Leakage

C. 1203.012G, Annunciator K08 Corrective Action, K08-C7 "RCP BLEEDOFF TEMP HI"

D. 1203.031, Reactor Coolant Pump and Motor Emergency

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 88 **QID: 0350**

Given: the plant is operating at 100% power.

ESAS Analog 2 RC pressure transmitter fails LOW due to loss of instrument power.

What action below will allow compliance with Technical Specifications and allow continued plant operation at 100% power?

A. Initiate administrative controls to document and correct the failure.

B. Continued power operation is not allowed, plant shutdown is required.

C. Immediately trip one of the two remaining operable channels.

D. Test ES components associated with Analog Channel 2 within 24 hours.

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 89 **QID: 0932**

Given:
- Unit 1 is at 100% power
- It is a GREEN train maintenance week

Two MOV (Motor Operated Valve) PMs are on the schedule for the Turbine Driven EFW Pump P-7A.

Which of the following GREEN train maintenance activities can you APPROVE for work and which action will maintain operability of P-7A?

A. PM on Steam Admission Valve CV-2613,
Open power supply breaker D-2512 and lock CV-2613 in the OPEN position

B. PM on Steam Admission Valve CV-2613,
Open power supply breaker D-2512 and lock CV-2613 in the CLOSED position

C. PM on Steam Supply Valve CV-2617,
Open power supply breaker B-6241 and lock CV-2617 in the OPEN position

D. PM on Steam Supply Valve CV-2617,
Open power supply breaker B-6241 and lock CV-2617 in the CLOSED position

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 90 **QID: 1040**

********** Reference Provided **********

Given:
- Plant is shutdown
- RCS Temperature - 225 °F
- RCS Pressure - 185 psig
- Service Water Loop I has been declared inoperable

In accordance with 1203.030, Loss of Service Water, ALL of the following T.S. action statements should be entered EXCEPT:

A. T.S. 3.4.6 Condition A, RCS Loops - MODE 4

B. T.S. 3.7.7 Condition A, Service Water System

C. T.S. 3.8.1 Condition B, AC Sources - Operating

D. T.S. 3.8.7 Condition A, Inverters - Operating

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 91 **QID: 0744**

Given:

Plant power 100%
TE-1015 "A" Loop Narrow Range T-cold INSTANTLY fails low

What procedure should be used for this condition?

A.1203.001, "ICS Abnormal Operation"

B. 1203.012F, "SASS Mismatch" ACA

C. 1202.001, "Reactor Trip"

D. 1203.012F, "Feedwater is Reactor Limited" ACA

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 92 QID: 0855

Following a reactor trip, the following conditions exist:

- Both SG pressures are LOWERING
- A SG pressure 971 psig
- B SG pressure 940 psig
- K07-C5 "MSSV OPEN" is in alarm
- SPDS indicates that the open MSSV is on the "B" SG.

Which of the following procedural actions would be used in response to the above conditions?

A. Actuate EFW and MSLI for "B" SG, verify proper actuation and control using RT-6, per 1202.001, Reactor Trip.

B. Control Turbine Bypass valves (TBVs) to quickly reduce SG pressures to reseat the MSSV per 1202.003, Overcooling.

C. Actuate EFW and MSLI for "B" SG, verify proper actuation and control using RT-6, per 1202.003, Overcooling.

D. Control Turbine Bypass valves (TBVs) to quickly reduce SG pressures to reseat the MSSV per 1202.001, Reactor Trip.

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 93 **QID: 1041**

Which of the following conditions would require the SRO in charge of fuel handling to prevent moving fuel in the Reactor Building?

A. Outage Control Center reports that the reactor has been subcritical for 90 hours.

B. National Weather Service declares a Tornado Watch in effect for Conway County.

C. One Control Room Emergency Air Conditioning System (CREACS) inoperable for the past 5 days.

D. Reactor Building Radiation monitor RE-8017 inoperable, and portable survey instrument is being monitored on the fuel handling bridge.

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 94 **QID: 0885**

The plant is at 100% power on New Year's Eve night shift.
The on-duty CRS has a heart attack and must be transported to St. Mary's at 0430.

What is the LATEST time at which a replacement CRS must be in the Control Room BEFORE Technical Specifications are violated?

A. 0400

B. 0500

C. 0600

D. 0700

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 95 **QID: 0409**

Which of the following changes would require a 10 CFR 50.59 Evaluation per EN-LI-101, 10 CFR 50.59 Evaluations, rather than only a PAD review per EN-LI-100, Process Applicability Determination?

A. A change that removes a step in a procedure that has been evaluated in another procedure's change.

B. A change that adds a reference in the reference section of a procedure.

C. A change to correct a HPI valve number in 1104.002, Makeup & Purification Procedure.

D. A change to the acceptance criteria for the LPI pumps' surveillance.

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 96 **QID: 0879**

In accordance with EN-WM-100, Work Request (WR) Generation, Screening and Classification, an approved Work Order Package _____ required for Priority 1 (Emergency) maintenance prior to performing work and authorization to begin the work must be approved at a MINIMUM by the _____ .

A. is
Shift Manager

B. is NOT
Shift Manager

C. is
Work Week Manager

D. is NOT
Work Week Manager

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 97 **QID: 0931**

A worker arrives on site with 1.3 Rem accumulative dose for the calendar year.
The worker's NRC form 4 is on file.
The worker's expected exposure will be 1.6 Rem for his assigned job.

In accordance with Entergy administrative procedures, which of the SPECIFIC authorizations listed below is required to extend the worker's TEDE exposure limit?

A. The worker's Supervisor AND Radiation Protection Manager ONLY.

B. The worker's Supervisor, Radiation Protection Manager, AND
Plant General Manager.

C. Radiation Protection Manager, Plant General Manager AND Site Vice President.

D. Radiation Protection Manager AND EOF Emergency Director ONLY.

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 98 **QID: 0816**

Which portion of the body will receive the highest dose from a damaged fuel assembly that was removed from the core 200 days ago?

A. Skin dose from Beta

B. Whole body dose from Gamma

C. Extremities dose from Beta

D. Internal Organ dose from Gamma

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 99 **QID: 1023**

Given:
- An Alert has been declared on Unit 1 30 minutes ago.
- All notifications have been made for the Alert.

The U-1 Shift Manager tells the CRS he will be leaving the Control Room to meet with the Security Shift Commander.

Who can the U-1 Shift Manager turn over Emergency Direction and Control to before leaving the Control Room?

A. Unit 2 Shift Manager

B. Operations Manager

C. EOF Emergency Director

D. TSC Director

ANO Unit 1 - 2014 SRO NRC Written Examination

Question No. 100 **QID: 1043**

Given:

- Plant tripped
- ESAS Actuated
- P-35A RB Spray pump OOS
- P-35B RB Spray Pump flow - 1150 gpm
- RB Pressure 46 psia
- RCS leak rate is 62 gpm
- Chemistry sample indicates RCS activity is 150 µCi/gm dose equivalent I-131
- Radiation levels at SA-229 are 500 mR/hr

Of the above conditions which one is classified as a fission product barrier failure?

A. Reactor Building Pressure

B. RCS Leak Rate

C. Coolant Activity

D. Radiation Levels

RO reference handout should contain:

- Steam Tables
- EOP Figures

SRO reference handout should contain:

- Tech Specs 3.3.15, 3.5.3, and last 2 pages of 1104.004 operability section (for question 77)
- 1102.010, Att. A (for question 90)

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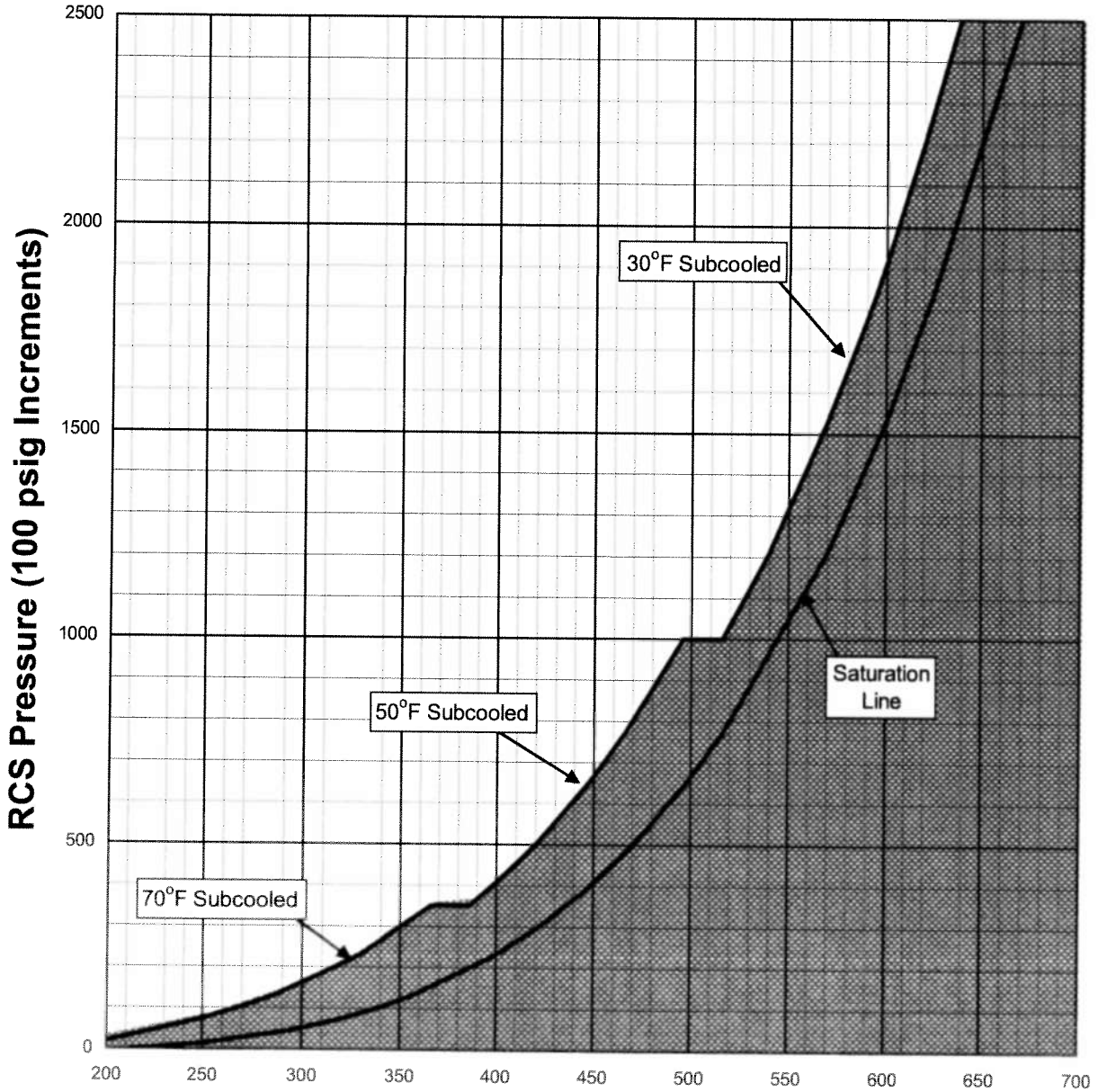
EXAMINATION
REFERENCE
MATERIAL
RO

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

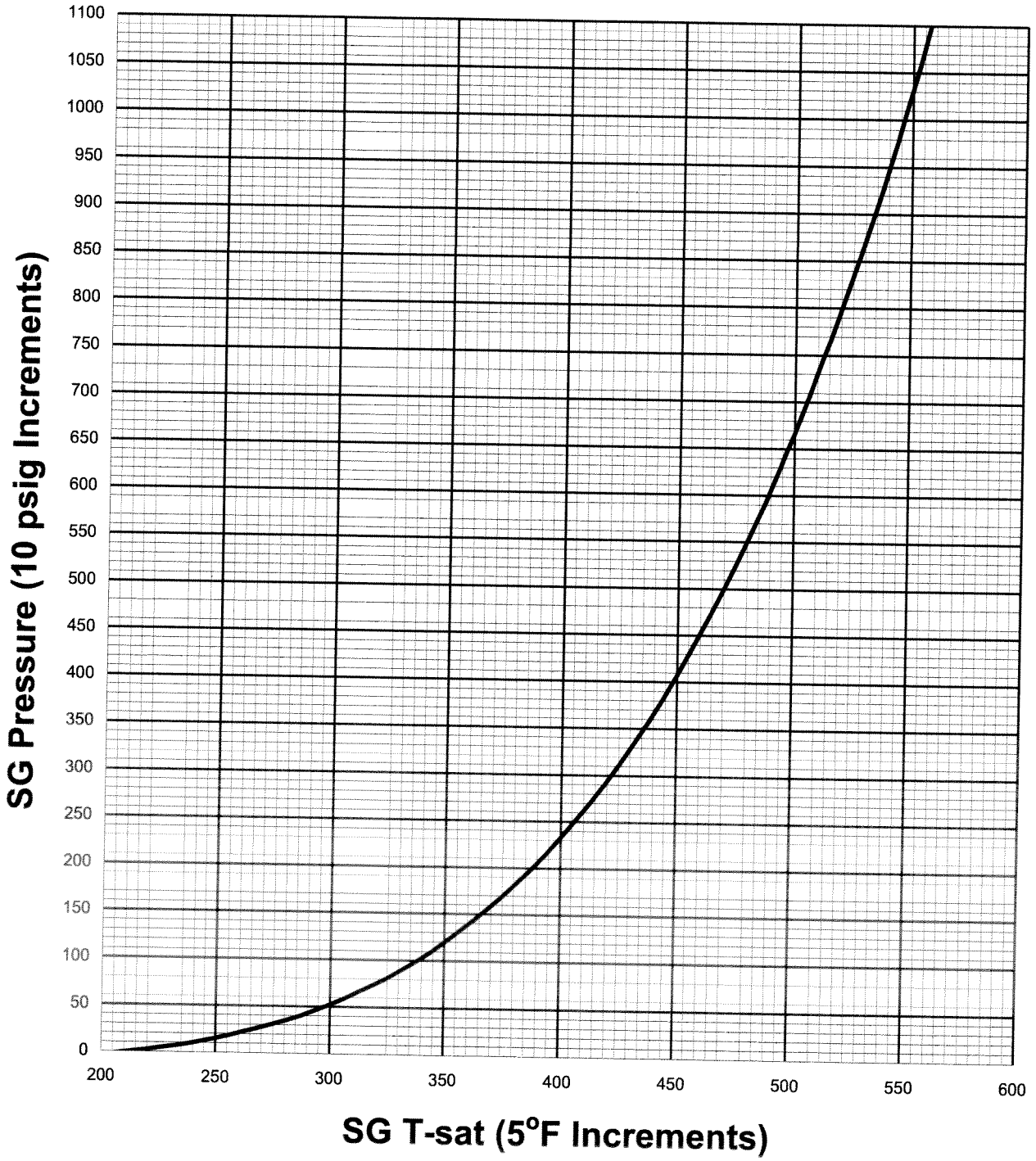


FIGURE 3
RCS Pressure vs Temperature Limits

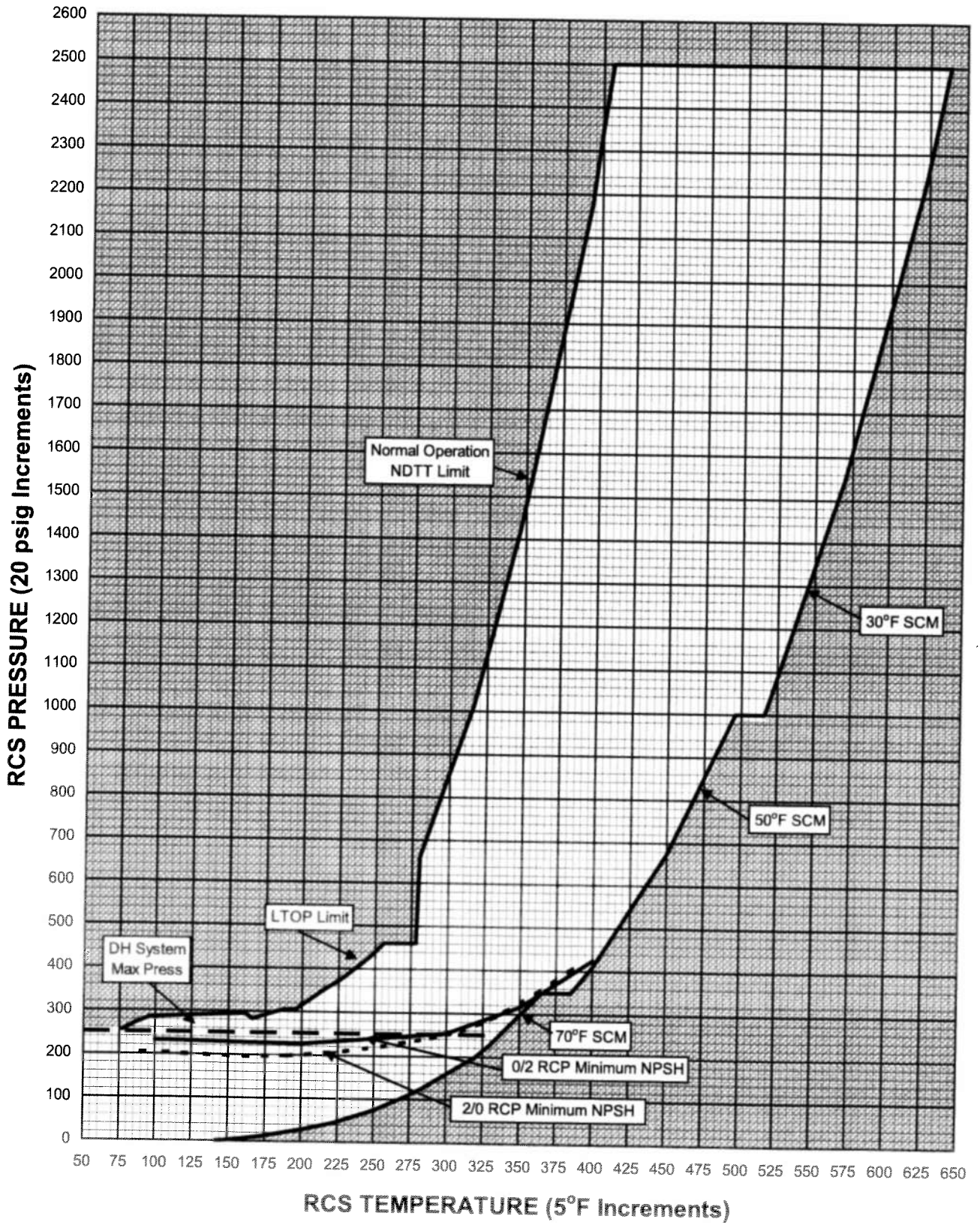


FIGURE 4
Core Exit Thermocouple for Inadequate Core Cooling

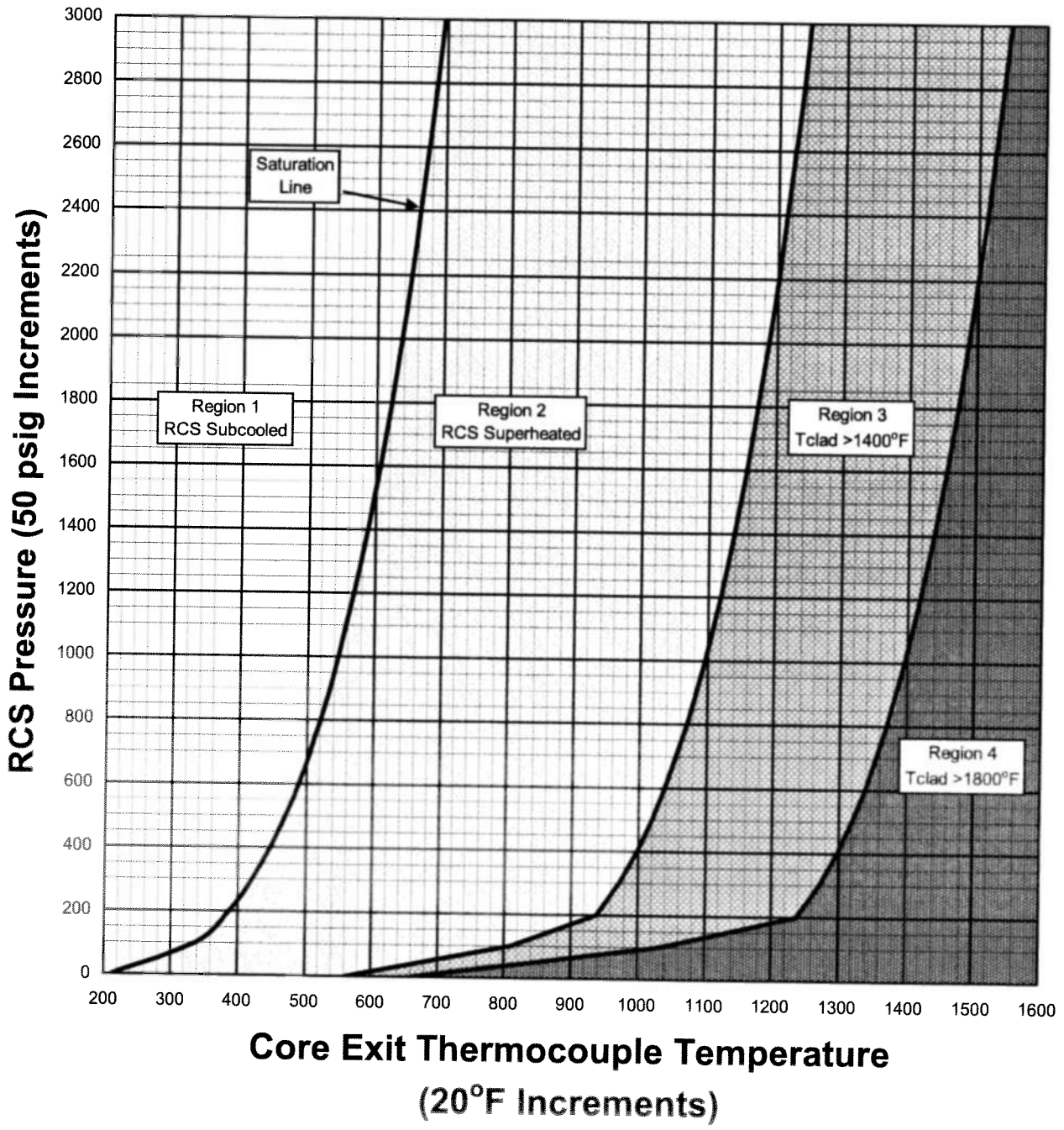


FIGURE 5

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

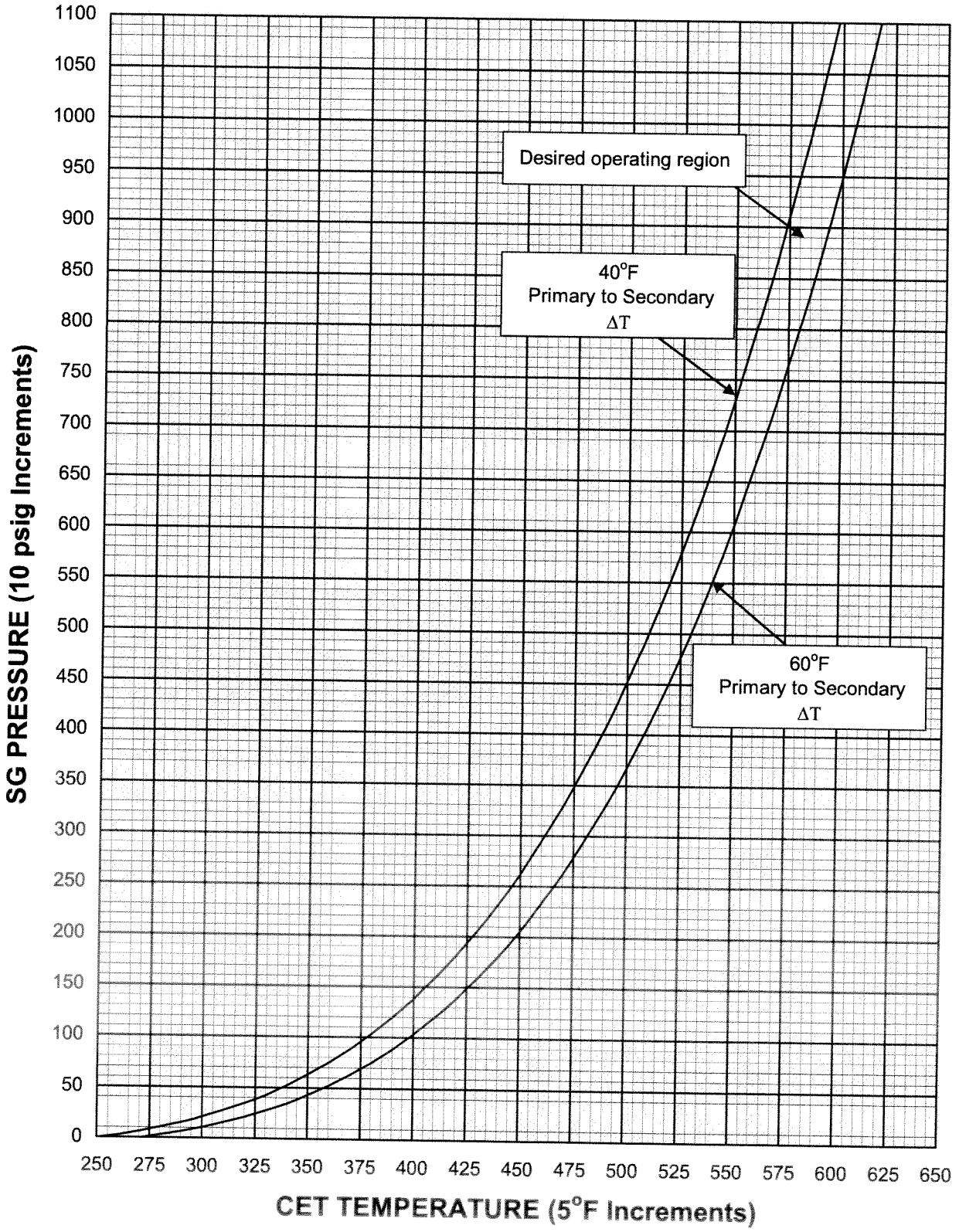
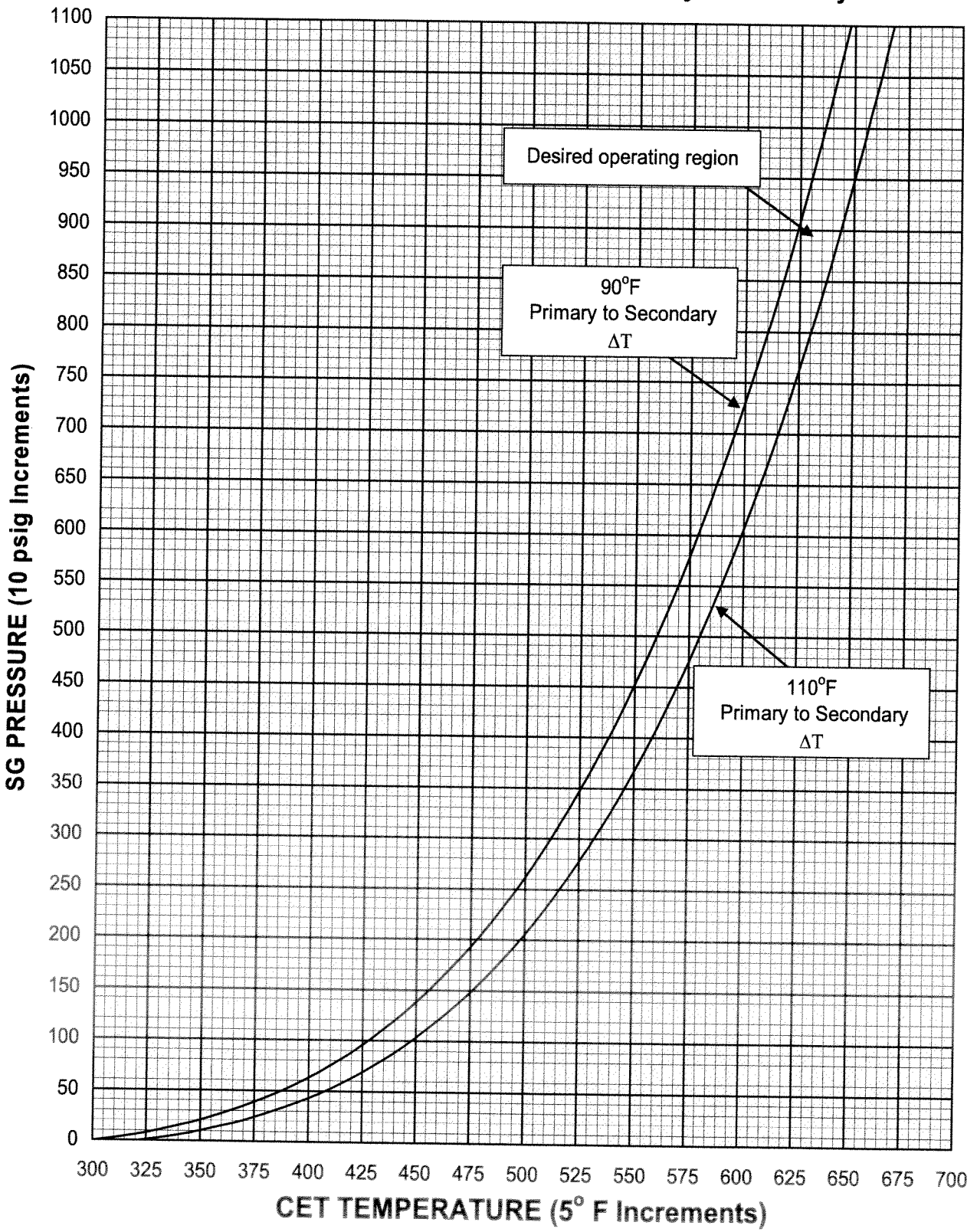


FIGURE 6

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



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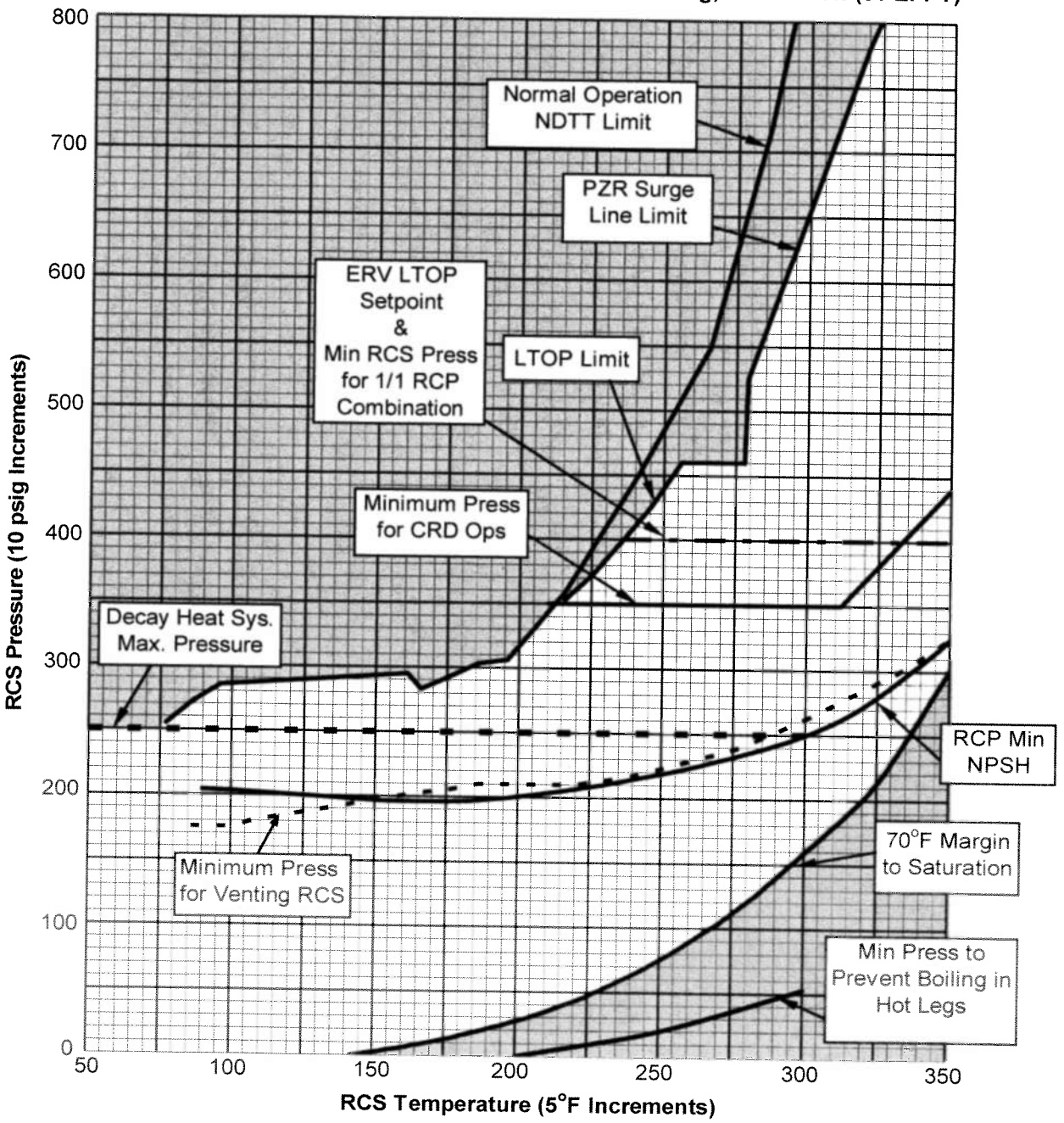
ATTACHMENT A

{4.3.4} **Allowable RCS Pressure vs. Temperature During Cooldown, Low Range**
For all RCP Combinations EXCEPT P-32A and B running, C and D off (31 EFPY)



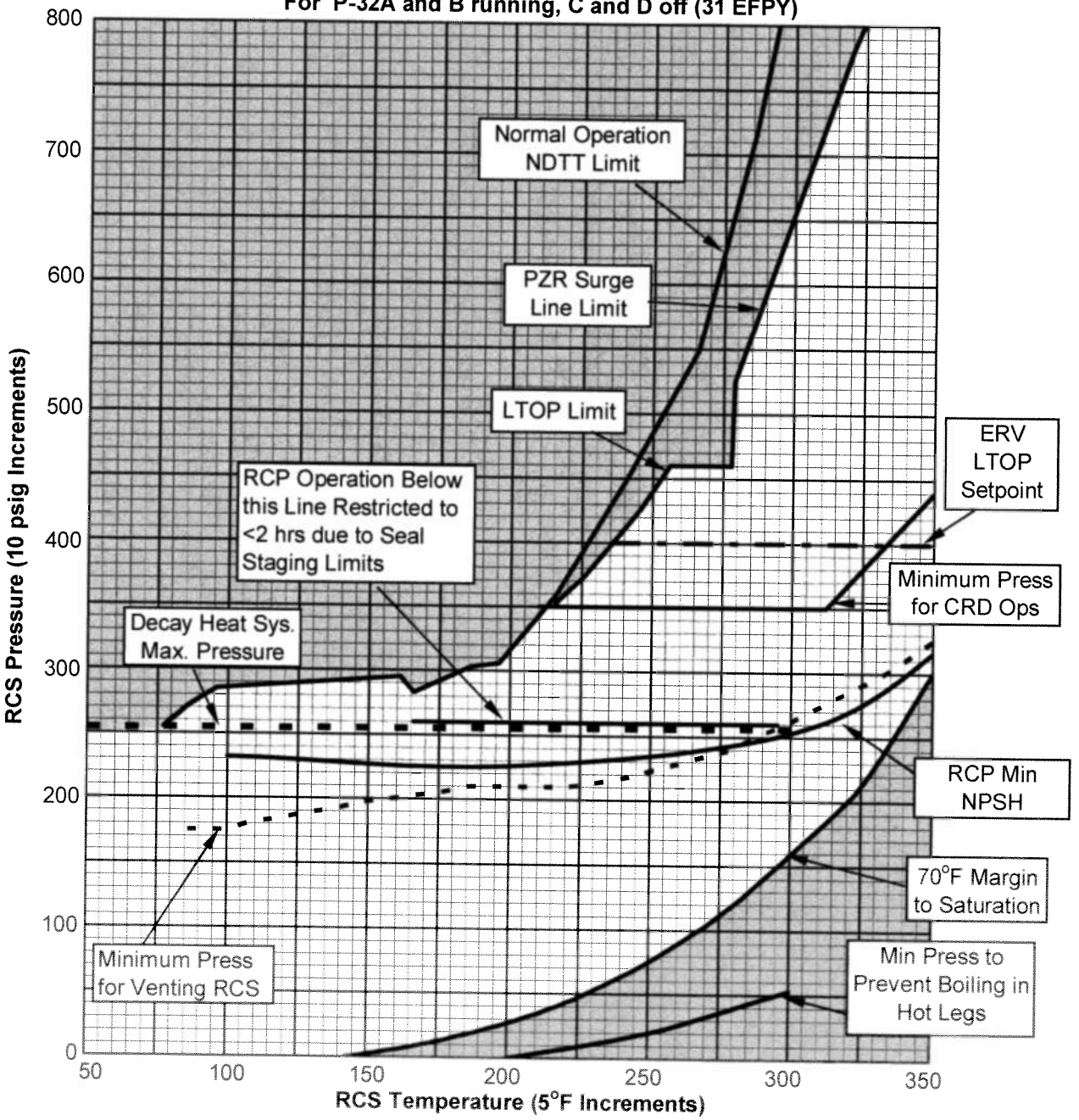
NOTE

1) Maximum step change of 15°F is allowed when removing all RCPs from operation with DH system operating. (T-cold used for plotting cooldown rate prior to stopping all RCPs minus DH Cooler Outlet Temperature)
2) The appropriate ramp drop is allowed both before and after the step change.
3) Decay heat system max pressure includes 10 psig instrument accuracy.
4) RCS Temperature Maximum Cooldown Rate ≥ 150°F 50°F/hr
   < 150°F 25°F/hr
5) If RCPs are operating between 180°F to 150°F, maximum RCS cooldown rate is limited to 2°F/hr.
6) Minimum RCS temperature is 76°F.

{4.3.4}

ATTACHMENT A

Allowable RCS Pressure vs. Temperature During Cooldown, Low Range
For P-32A and B running, C and D off (31 EFPY)



NOTE

1) Maximum step change of 15°F is allowed when removing all RCPs from operation with DH system operating. (T-cold used for plotting cooldown rate prior to stopping all RCPs minus DH Cooler Outlet Temperature)
2) The appropriate ramp drop is allowed both before and after the step change.
3) Decay heat system max pressure includes 10 psig instrument accuracy.
4) RCS Temperature Maximum Cooldown Rate ≥ 150°F 50°F/hr
   < 150°F 25°F/hr
5) If RCPs are operating between 180°F to 150°F, maximum RCS cooldown rate is limited to 2°F/hr.
6) Minimum RCS temperature is 76°F.

23.11 Instruments Removed from Service

As a general rule, flow measurements derived from differential pressure across a restriction are inaccurate below 10% of the flow span. Under zero flow conditions, readings between 0 and 5% of indicated flow span are to be expected and do not necessarily represent a need for instrument calibration. Under zero flow conditions, if the indicated flow is above 10% of the flow span it will be required to be calibrated, but will not be considered inoperable.

When a channel includes more than one qualified control room indication, such as both an indicator and a recorder, or an indicator and Safety Parameter Display System readout, etc., only one indication is required for channel operability (TS 3.3.15 Bases).

23.12 Failed LPI Flow Instruments

Any qualified indication can serve to meet the requirements of TS 3.3.15-1.19 Condition "A". LPI flow indicators FIS-1401 and FIS-1402, SPDS and FIRS-1500 meet the requirements of TS 3.3.15-1.19. An inoperable LPI flow instrument (i.e. transmitter and/or associated instrument loop) requires the following actions to be performed:

23.12.1 Declare associated train of LPI inoperable and applicable TS LCO (3.5.2 or 3.5.3) not met based on Support SSC inoperability.

23.12.2 Enter TS 3.3.15 Condition A.

23.12.3 Perform one of the following:

A. Enter one of the applicable Tech Specs:

- If RCS >350°F, then enter TS 3.5.2 Condition A.
- If RCS ≤350°F, then enter TS 3.5.3 Condition A.

B. IF desired to enter TS 3.0.6, THEN perform the following:

NOTE

Compliance with the Conditions and Required Action of TS 3.5.2 or TS 3.5.3 may be delayed until it is determined that LCO 3.0.6 cannot be applied.

1. IF opposite train and required support equipment are operable, THEN perform 1015.045, Unit 1 Safety Function Determination Program (refer to Att. 2 of the procedure).

a. IF opposite train is inoperable, THEN enter applicable TS 3.5.2 or TS 3.5.3.

2. IF SM/CRS determines TS 3.0.6 is applicable, THEN enter TS 3.0.6 AND immediately perform a Safety Function Determination as directed by 1015.045.

   a. IF entry into TS 3.0.6 is NOT approved for use per 1015.045, THEN enter applicable Conditions and Required Actions of TS 3.5.2 or TS 3.5.3.

23.13 Removing LPI Flow Instruments from Service

RB Spray, HPI and LPI flow instrumentation is used in the Emergency Operating Procedures in part, to verify system flow is proper prior to shifting suction source from the BWST to the RB Sump. Typically, when a flow transmitter is removed from service, the system becomes inoperable, however the pump and injection flowpath could still function and operate upon an actuation signal. In this case, should it be necessary to shift suction to the RB Sump, the operator cannot verify proper flow, hence the pump might need to be secured to ensure adequate NPSH to the other operating ECCS pumps. The Shift Manager should be consulted before securing the ECCS pump as it might be the only operating pump which has no flow indication.

23.13.1 Prior to removing an LPI flow transmitter from service, install a caution tag on the handswitch for associated flow injection valve which states:

"The flow transmitter associated with this flowpath is OOS. If required to shift suction source from the BWST to the RB Sump, consult with Shift Manager to determine need to secure pump."

3.3 INSTRUMENTATION

3.3.15 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.15 The PAM instrumentation for each Function in Table 3.3.15-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

---NOTE---
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to prepare and submit a Special Report.	Immediately
C. One or more Functions with two required channels inoperable.	C.1 Restore one channel to OPERABLE status.	7 days
D. Required Action and associated Completion Time of Condition C not met.	D.1 Enter the Condition referenced in Table 3.3.15-1 for the channel.	Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. As required by Required Action D.1 and referenced in Table 3.3.15-1.	E.1 Be in MODE 3. AND E.2 Be in MODE 4.	6 hours 12 hours
F. As required by Required Action D.1 and referenced in Table 3.3.15-1.	F.1 Initiate action to prepare and submit a Special Report.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------
These SRs apply to each PAM instrumentation Function in Table 3.3.15-1.

SURVEILLANCE		FREQUENCY
SR 3.3.15.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
SR 3.3.15.2	----------NOTE---------- Neutron detectors are excluded from CHANNEL CALIBRATION. --- Perform CHANNEL CALIBRATION.	 18 months

Table 3.3.15-1
Post Accident Monitoring Instrumentation

FUNCTION	REQUIRED CHANNELS	CONDITIONS REFERENCED FROM REQUIRED ACTION D.1
1. Wide Range Neutron Flux	2	E
2. RCS Hot Leg Temperature	2	E
3. RCS Hot Leg Level	2	F
4. RCS Pressure (Wide Range)	2	E
5. Reactor Vessel Water Level	2	F
6. Reactor Building Water Level (Wide Range)	2	E
7. Reactor Building Pressure (Wide Range)	2	E
8. Penetration Flow Path Automatic Reactor Building Isolation Valve Position	2 per penetration flow path[(a)(b)]	E
9. Reactor Building Area Radiation (High Range)	2	F
10. Deleted		
11. Pressurizer Level	2	E
12. a. SG "A" Water Level – Low Range	2	E
b. SG "B" Water Level – Low Range	2	E
c. SG "A" Water Level – High Range	2	E
d. SG "B" Water Level – High Range	2	E
13. a. SG "A" Pressure	2	E
b. SG "B" Pressure	2	E
14. Condensate Storage Tank Level	2	E
15. Borated Water Storage Tank Level	2	E
16. Core Exit Temperature (CETs per quadrant)	2	E
17. a. Emergency Feedwater Flow to SG "A"	2	E
b. Emergency Feedwater Flow to SG "B"	2	E
18. High Pressure Injection Flow	2	E
19. Low Pressure Injection Flow	2	E
20. Reactor Building Spray Flow	2	E

(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(b) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.3 ECCS - Shutdown

LCO 3.5.3 Two LPI trains shall be OPERABLE.

---NOTE---
An LPI train may be considered OPERABLE during alignment and when aligned for decay heat removal, if capable of being manually realigned to the LPI mode of operation.

APPLICABILITY: MODE 3 with Reactor Coolant System (RCS) temperature ≤ 350°F, MODE 4.

ACTIONS

---NOTE---
LCO 3.0.4.b is not applicable to ECCS DHR loops.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One LPI train inoperable.	A.1 Restore LPI train to OPERABLE status.	48 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 ---NOTE--- Only required if one DHR train is OPERABLE. --- Be in MODE 5.	24 hours
C. Two LPI trains inoperable.	C.1 Initiate action to restore one LPI train to OPERABLE status. AND C.2 ---NOTE--- Only required if one DHR train is OPERABLE. --- Be in MODE 5.	Immediately 24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.3.1	----------NOTE---------- An LPI train may be considered OPERABLE during alignment and operation for DHR, if capable of being manually realigned to the LPI mode of operation. ---------- For all equipment required to be OPERABLE, the following SRs are applicable: SR 3.5.2.1, SR 3.5.2.4, SR 3.5.2.2, SR 3.5.2.5. SR 3.5.2.3,	In accordance with applicable SRs