FACILITY NAME: Catawba

REPORT NUMBER: 2009-301

FINAL SRO 2009 WRITTEN EXAM

CONTENTS:

- ☐ **Final SRO Written Exam (100 'as given' questions with changes made during administration annotated)**
- ☐ **Reference Handouts Provided To Applicants**
- ☐ **Answer Key**

Location of Electronic Files:
Not applicable.

CATAWBA NUCLEAR STATION

2009 SRO NRC Examination

Question: 1
(1 point)

Unit 1 is operating at 75% power and increasing power following a refueling outage. The following occurs at 1015:

- 1AD-1, E/8 "TURB GEN HI VIBRATION" actuates
- Turbine bearing vibration readings on the OAC indicate:
  - Bearing #9 at 11 mils and stable
  - Bearing #10 at 13 mils and stable

What response is required for these conditions per OP/1/B/6100/010B (Alarm Response for Panel 1AD-1)?

A. Immediately trip the turbine only

B. Immediately trip the reactor and verify the turbine trips automatically

C. Monitor bearing vibrations and if vibration is unchanged at 1017, trip the turbine only

D. Monitor bearing vibrations and if vibration is unchanged at 1017, trip the reactor and verify the turbine automatically trips

---

Question: 2
(1 point)

Unit 1 is operating at 100% power. Given the following conditions and sequence of events:

Initial Conditions

- 1NV-294 (NV Pmps A&B Disch Flow Ctrl) is in manual
- PRT pressure is 6 psig and increasing
- PRT level is 67% and increasing
- The PRT has a small external leak (0.05 gpm)
- Pressurizer pressure is 2235 psig

Final Conditions 10 minutes later

- The crew notes pressurizer pressure is 2197 psig and slowly decreasing
- PRT pressure is 15 psig and increasing
- PRT level is 68% and increasing

Based on the conditions stated above, and assuming no operator action:

1. How (if at all) is charging flow affected?
2. How (if at all) is the external leakage rate from the PRT affected?

A. Charging flow is stable
PRT external leakage rate will increase

B. Charging flow is stable
PRT external leakage rate is stable

C. Charging flow is increasing
PRT external leakage rate is stable

D. Charging flow is increasing
PRT external leakage rate will increase

Question: 3
(1 point)

Unit 1 was operating at 100% power when a LOCA occurred. Given the following conditions:

- The crew is in EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant)
- NC pressure is 1200 psig and stable
- Containment pressure peaked at 2.8 psig and is slowly decreasing
- NC subcooling is 2°F and stable
- Pressurizer level is 18% and slowly increasing
- Total CA flow is 400 gpm and stable
- All S/G NR levels are approximately 21% and slowly increasing

Can safety injection be terminated at this time and why or why <u>not</u>?

A. Yes, safety injection termination criteria are met

B. No, CA flow is too low

C. No, NC subcooling is insufficient

D. No, pressurizer level is too low

Question: 4
(1 point)

Unit 1 was operating at 100% power when a LOCA occurred. Given the following conditions and sequence of events:

- The crew is performing EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant)
- 1A train and 1B train ECCS are RESET
- 1A D/G load sequencer is RESET
- The crew can <u>not</u> reset 1B D/G load sequencer
- An NLO completes the local action(s) required due to the inability to reset 1B D/G load sequencer from the control room
- A complete loss of offsite power occurs
- FWST level is 57% and decreasing

Assuming no further operator action, which ECCS pumps are running 1 minute after the loss of offsite power?

A. 1A NV only

B. 1A NV and 1B NV only

C. 1A NV, 1A NI and 1A ND only

D. 1A NV, 1B NV, 1B NI and 1B ND

Question: 5
(1 point)

Unit 1 is operating in Mode 3. Given the following temperatures on the 1A NCP at 0200 hrs:

- Motor bearing temperature is 187.2°F
- Lower pump bearing temperature is 211.2°F
- #1 seal outlet temperature is 223.2°F
- Motor stator winding temperature is 301.2°F
- All temperatures are increasing at 1°F per minute

What is the earliest time that the 1A NCP must be secured per OP/1/A/6150/002A (Reactor Coolant Pump Operation)?

A. 0208

B. 0210

C. 0212

D. 0214

Question: 6
(1 point)

Unit 1 is in Mode 5 preparing to enter Mode 6 after being shutdown 10 days ago. Given the following conditions and sequence of events:

- NC wide range level is 18% and stable
- 1A ND loop is in service
- ND Pump A Discharge Temperature is 120°F and stable
- ND Hx A Outlet Temperature is 100°F and stable
- The 1A ND pump trips
- The 1B ND pump can not be started

Based on current conditions, what is the minimum time before core boiling occurs?

Reference provided

A. 31-32 minutes

B. 36-37 minutes

C. 47-48 minutes

D. 55-56 minutes

Question: 7
(1 point)

Unit 1 was operating at 100%. Given the following conditions and sequence of events:

- A S/G PORV opened momentarily and caused NC pressure to decrease to 2205 psig
- With NC pressure at 2207 psig, 1AD-2, F/9 "DCS Alternate Action" actuates
- NC pressure is at 2250 psig and slowly increasing when the crew enters AP/1/A/5500/011 (Pressurizer Pressure Anomalies), Case 2, Pressurizer Pressure Increasing

Why will manual action be required to control Pzr pressure?

A. All Pzr heaters are on

B. To prevent lifting a Pzr PORV

C. Automatic Pzr spray actuation only is blocked

D. Automatic Pzr spray and automatic PORV actuation are blocked

---

Question: 8
(1 point)

Unit 1 is operating at 100% power. The basis for manually inserting control rods during an ATWS event is to reduce reactor power to:

A. prevent exceeding rated thermal power limits defined in Technical Specifications

B. prevent rapid heatup of the NC system and potential overfill of the pressurizer

C. ensure the only heat being added to the NC system is from core decay heat and NC pump heat

D. ensure there is sufficient steam dump capacity to prevent opening the steam line code safeties

---

Question: 9
(1 point)

Given the following:

- 1A CF pump is out of service for maintenance
- 1B CF pump trips on low lube oil pressure
- The crew enters AP/1/A/5500/006 (Loss of S/G Feedwater), Case I (Loss of CF Supply To S/Gs).

What is the minimum power level which requires a manual reactor trip and what is the basis for manually tripping the reactor above that power level?

A. 5%; to ensure CA can maintain adequate S/G levels

B. 10%; to ensure CA can maintain adequate S/G levels

C. 5%; to ensure an inadvertent mode change does not occur

D. 10%; to ensure an inadvertent mode change does not occur

Question: 10
(1 point)

Regarding the actions of EP/1/A/5000/ECA 0.0 (Loss of All AC Power):

1. What is the basis for rapidly depressurizing intact S/Gs to 165 psig?
2. What is the basis for stopping the depressurization at 165 psig?

A. 1. To enhance natural circulation until forced cooling can be restored
   2. To prevent injecting N2 from the CLAs

B. 1. To enhance natural circulation until forced cooling can be restored
   2. To prevent voiding in the reactor vessel upper head

C. 1. To reduce NC temperature and pressure to minimize NC system inventory loss
   2. To prevent injecting N2 from the CLAs

D. 1. To reduce NC temperature and pressure to minimize NC system inventory loss
   2. To prevent voiding in the reactor vessel upper head

Question: 11
(1 point)

Unit 1 is operating at 75% power and Unit 2 is operating at 100% power when the following switchyard PCBs open:

- PCB 17
- PCB 18
- PCB 19

Which one of the following statements correctly describes the effect on Units 1 and 2?

A. Unit 1 remains at 75% power and Unit 2 runs back to 48% power at 18% /min

B. Unit 1 runs back to 48% power at 18% /min and Unit 2 remains at 100% power

C. Unit 1 remains at 75% power and Unit 2 runs back to 23% power at 25% /min

D. Unit 1 runs back to 23% power at 25% /min and Unit 2 remains at 100% power

---

Question: 12
(1 point)

Unit 1 is operating at 30% power when 1ERPA de-energizes.

Based on the above conditions, which one of the following lists contains operations which would <u>all</u> require manual action? (Evaluate each condition separately)

1. 1A D/G start on a 1ETA blackout
2. 1A D/G FD Day Tank makeup on low level
3. Swap RN to the pond on a Train A Emergency Lo Pit Level
4. Rod withdrawal on a -1.5°F combined error signal
5. Makeup to VCT

A. 1 and 2

B. 3 and 4

C. 1, 3, and 5

D. 2, 4, and 5

Question: 13
(1 point)

Unit 1 NC system temperature is at 335°F and decreasing for a refueling outage. Given the following:

- Vital charger 1ECC fails
- 1EMXA is unavailable to power spare charger 1ECS

1. What other MCC can provide an alternate supply to 1ECS?
2. Does OP/1/A/6350/008 (125VDC/120VAC Vital Instrument and Control Power System) allow alignment of the alternate supply to 1ECS TO SUPPLY POWER TO 1EDC based on current Unit 1 conditions?

A. 1. 1EMXC
   2. Yes

B. 1. 1EMXC
   2. No

C. 1. 1EMXJ
   2. Yes

D. 1. 1EMXJ
   2. No

Question: 14
(1 point)

Units 1 and 2 are operating at 100% power with RN pump 2A running. Given the following conditions and indications:

- An Emergency Lo Pit Level actuation occurs
- The crew is performing AP/0/A/5500/020 (Loss of Nuclear Service Water), Case 2 (Loss of RN Pit Level)
- During a board walkdown, the following are noted:
  - 1RN-53B (Station RN Disch Hdr X-Over) is open
  - 1RN-54A (Station RN Disch Hdr X-Over) is closed

1. Where is RN discharge flow <u>from the D/Gs</u> directed based on current conditions?
2. Which of the above RN valves must be realigned per AP/0/A/5500/020?

A. 1. Standby Nuclear Service Water Pond
   2. 1RN-53B

B. 1. RL discharge piping to Lake Wylie
   2. 1RN-53B

C. 1. Standby Nuclear Service Water Pond
   2. 1RN-54A

D. 1. RL discharge piping to Lake Wylie
   2. 1RN-54A

Question: 15
(1 point)

Unit 1 is in Mode 3. Given the following initial valves and positions/functions:

VALVE	POSITION/FUNCTION
1NV-1A (NC Letdn to Regen Hx Isol)	Open
1CA-149 (S/G 1A CF Byp To CA Nozzle)	Open
1NV-153A (Letdn Hx Otlt 3-Way Vlv)	"DEMIN"
1RN-291 (1A KC HX Outlet Throttle)	"MINIFLOW"

The Instrument Air (VI) system completely depressurizes.

When the VI system is re-pressurized, which one of the following valves will return to its initial position/function with no operator action?

A. 1NV-1A

B. 1CA-149

C. 1NV-153A

D. 1RN-291

Question: 16
(1 point)

Which one of the following indications is used in EP/1/A/5000/ECA-1.2 (LOCA Outside Containment) to verify that a leak outside containment has been successfully isolated?

A. ND Pump discharge pressure increasing

B. Pressurizer level increasing

C. ND/NS room sump levels decreasing

D. Reactor coolant pressure increasing

Question: 17
(1 point)

Unit 1 is operating at 100%. Given the following conditions and sequence of events:

Initial Conditions

- The crew tripped the reactor due to a loss of all feedwater
- EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) was completed
- The crew was depressurizing the S/Gs to feed from the condensate booster pumps per EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink)

Current Conditions

- Bleed and feed criteria have been met and the crew is establishing bleed and feed per EP/1/A/5000/FR-H.1

1. Which cold leg accumulators provide backup motive force to open the PZR PORVs?
2. What is the function of the NC PORVs when establishing bleed and feed in EP/1/A/5000/FR-H.1?

A. 1. A and B
   2. To provide for adequate NC system heat removal until secondary heat sink can be restored

B. 1. A and B
   2. To depressurize the NC system to protect the S/G tubes from creep failure

C. 1. C and D
   2. To provide for adequate NC system heat removal until secondary heat sink can be restored

D. 1. C and D
   2. To depressurize the NC system to protect the S/G tubes from creep failure

---

Question: 18
(1 point)

Unit 1 was operating at 100% power. Given the following sequence of events:

0300 Reactor trip occurred due to a general warning
0320 Safety injection actuated due to a large break LOCA
0322 1B NI pump trips due to a faulty breaker
0350 Loss of emergency coolant recirculation occurred and the crew entered EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation)
0351 NV and NI pump status are determined as follows:
- 1A NV pump flow is 180 gpm and stable
- 1B NV pump flow is 170 gpm and stable
- 1A NI pump flow is 340 gpm and stable
- 1B NI pump is tagged out

0420 The crew is performing step 19b RNO of EP/1/A/5000/ECA-1.1 to establish the appropriate safety injection flow per Enclosure 5

When the actions required per Step 19b RNO are complete, which ECCS pump(s) are in service?

Reference provided

A. 1A NI pump

B. 1A NV pump and 1B NV pump

C. 1A NV pump and 1A NI pump

D. 1B NV pump and 1A NI pump

Question: 19
(1 point)

Unit 1 is operating at 100% power. Given the following:

- While performing the RCCA movement test, control rod H-8 slips into the core to 200 steps withdrawn
- All other Bank D control rods are at 216 steps withdrawn as indicated on DRPI and step demand counters
- The crew is performing AP/1/A/5500/014 (Control Rod Misalignment) and currently referring to OP/1/A/6150/008 (Rod Control)

1. What is the maximum time allowed to restore rod H-8 to within limits per Technical Specification 3.1.4 (Rod Group Alignment Limits)?
2. Which control rod lift coil(s) will be disconnected per OP/1/A/6150/008 (Rod Control), when initially attempting to recover control rod H-8?

A. 1. 30 minutes
   2. Rod H-8

B. 1. 30 minutes
   2. All rods in the affected bank except H-8

C. 1. 1 hour
   2. Rod H-8

D. 1. 1 hour
   2. All rods in the affected bank except H-8

Question: 20
(1 point)

Unit 1 is increasing power when the following OAC indications are noted:

OAC reading	Point Color
N-35 - 3.12E-5 amps	GREEN
N-36 - 2.75E-6 amps	GREEN
N-41 - 11.3%	BLUE
N-42 - 11.2%	GREEN
N-43 - 0.0%	MAGENTA
N-44 - 10.8%	GREEN

1. Which intermediate range instrument is reading correctly?
2. What does the BLUE color of the OAC point for N-41 indicate?

A. 1. N-35
   2. The OAC point quality is "suspect"

B. 1. N-35
   2. The OAC point quality is "bad"

C. 1. N-36
   2. The OAC point quality is "suspect"

D. 1. N-36
   2. The OAC point quality is "bad"

Question: 21
(1 point)

Unit 1 was operating at 50% power. Given the following:

- A steam generator tube leak occurred on 1A S/G
- The crew depressurized the NC system per AP/1/A/5500/010 (Reactor Coolant Leak), Case I (Steam Generator Tube Leak)
- Both ICC monitors are unavailable
- Current NC pressure is 665 psig
- Core exit thermocouple temperatures are 488°F
- T-Colds are 487.7°F

1. Based on current conditions, what subcooling value would the ICC monitors be reading if they were available?
2. Based on current conditions, what is steam header pressure?

Reference provided

A. 1. -8 ° F
   2. 608 psig

B. 1. -8 °F
   2. 593 psig

C. 1. +12° F
   2. 608 psig

D. 1. +12° F
   2. 593 psig

Question: 22
(1 point)

The Spent Fuel Pool Ventilation (VF) system is operating in unfiltered mode when a recycle paper bin near the Spent Fuel Pool truck bay doors catches fire and smoke is drawn into the VF system supply ductwork.

1. What affect will this condition have on the operation of the VF system?
2. How is this fire classified?

A. 1. The VF Supply fan trips only
   2. Class A

B. 1. The VF Supply fan trips only
   2. Class B

C. 1. The VF Supply fan trips and the VF Filtered Exhaust fans will swap to filter mode
   2. Class A

D. 1. The VF Supply fan trips and the VF Filtered Exhaust fans will swap to filter mode
   2. Class B

Question: 23
(1 point)

Unit 1 is operating at 100% power. Given the following:

- A small break LOCA occurs
- The crew is performing EP/1/A/5000/ES-1.2 (Post LOCA Cooldown and Depressurization)
- All NC pumps are secured

1. What is the NC cooldown rate specified in this procedure?
2. Which method is the <u>first</u> choice for the NC system depressurization for the given conditions?

A. 1. As close as possible without exceeding 100°F in an hour
   2. NV auxiliary spray

B. 1. At the maximum rate
   2. NV auxiliary spray

C. 1. As close as possible without exceeding 100°F in an hour
   2. NC PORV

D. 1. At the maximum rate
   2. NC PORV

Question: 24
(1 point)

Unit 1 was operating at 100% power. Given the following:

- A large steam line break occurred 20 minutes ago
- All MSIVs fail to close by any means
- NC cold leg temperatures are 248°F and slowly decreasing
- NC pressure is 520 psig and slowly increasing
- The crew has completed EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)

1. Based on current conditions, which procedure will the crew transition to when EP/1/A/5000/E-0 is exited?
2. At what point during this steam line break accident is the reactor vessel most susceptible to failure and why?

A. 1. EP/1/A/5000/FR-P.1 (Response to Imminent Pressurized Thermal Shock)
   2. During the initial cooldown because total stress on the inner wall of the vessel is higher at this time

B. 1. EP/1/A/5000/E-2 (Faulted Steam Generator Isolation)
   2. During the initial cooldown because total stress on the inner wall of the vessel is higher at this time

C. 1. EP/1/A/5000/FR-P.1 (Response to Imminent Pressurized Thermal Shock)
   2. During the subsequent heatup after the S/Gs depressurize because total stress on the outer wall of the vessel is higher at this time

D. 1. EP/1/A/5000/E-2 (Faulted Steam Generator Isolation)
   2. During the subsequent heatup after the S/Gs depressurize because total stress on the outer wall of the vessel is higher at this time

---

Question: 25
(1 point)

Given the following:

- 1A S/G pressure is 1212 psig and increasing
- 1A S/G level is approximately 18% N/R level and stable
- The crew is performing EP/1/A/5000/FR-H.4 (Response to Loss of Normal Steam Release Capabilities)
- Operators have been dispatched to manually operate the 1A S/G PORV

1. How will 1A S/G indicated level <u>initially</u> respond when the PORV is opened?
2. What is the reason for this response?

A. 1. Indicated level will initially decrease
   2. Increased voiding in the S/G downcomer region

B. 1. Indicated level will initially increase
   2. Increased voiding in the S/G downcomer region

C. 1. Indicated level will initially decrease
   2. Increased voiding in the S/G tube bundle area

D. 1. Indicated level will initially increase
   2. Increased voiding in the S/G tube bundle area

Question: 26
(1 point)

Unit 1 is operating at 100% power. Given the following:

- A main steam line ruptures in containment
- NC Tcold temperatures are 278°F and slowly decreasing
- Containment pressure is 3.2 psig and increasing
- No NS pump flow is indicated
- All S/G NR levels are offscale low
- CA flow is 640 gpm
- The crew is preparing to exit EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)

Which one of the following procedures is the crew <u>required</u> to enter next?

A. EP/1/A/5000/E-2 (Faulted Steam Generator Isolation)

B. EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink)

C. EP/1/A/5000/FR-P.2 (Response to Anticipated Pressurized Thermal Shock Condition)

D. EP/1/A/5000/FR-Z.1 (Response to High Containment Pressure)

Question: 27
(1 point)

Unit 1 is operating at 100% power. Given the following:

- At 1100 a large break LOCA occurs
- At 1215, when the crew is in EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant), waiting for the time to swap to hot leg recirc, containment sump level is 13 feet and slowly increasing

1. If containment sump level is increasing at a constant rate of 0.25 feet per minute, at what time is entry into EP/1/A/5000/FR-Z.2 (Response to Containment Flooding) required?
2. What signal closes valves inside containment that are not qualified for submergence?

A. 1. 1225
   2. St

B. 1. 1245
   2. St

C. 1. 1225
   2. Sp

D. 1. 1245
   2. Sp

Question: 28
(1 point)

Regarding the reactor coolant pump motor stator:

1. What system provides cooling water?
2. What signal will isolate that cooling water source?

A. 1. KC
   2. Phase A

B. 1. KC
   2. Phase B

C. 1. YV
   2. Phase A

D. 1. YV
   2. Phase B

Question: 29
(1 point)

Unit 1 was decreasing power from 100%. Given the following:

- Pressurizer level was 53%
- Reactor power was 85%
- The power decrease was halted when the crew noted that 1NV-294 (NV Pumps A & B Disch Flow Ctrl) was <u>not</u> maintaining pressurizer level at program level
- 1NV-294 was placed in manual and adjusted to restore pressurizer level to program level

1. When the crew discovered 1NV-294 was not maintaining program level, how did actual level compare to program level?
2. When 1NV-294 is repaired, what operator action(s) will be <u>required</u> to restore automatic pressurizer level control?

A.
1. Actual level was lower than program level
2. Place 1NV-294 in automatic only

B.
1. Actual level was lower than program level
2. Place 1NV-294 in automatic and restore the Pressurizer Level Master to automatic using the DCS soft controls

C.
1. Actual level was higher than program level
2. Place 1NV-294 in automatic only

D.
1. Actual level was higher than program level
2. Place 1NV-294 in automatic and restore the Pressurizer Level Master to automatic using the DCS soft controls

---

Question: 30
(1 point)

Unit 1 is operating at 100% power.

For current conditions, what is the normal position of 1ND-33 (ND Sys Rtn To FWST) and how is this position administratively controlled?

A. Closed; white tagged in position

B. Closed; locked in position

C. Open; white tagged in position

D. Open; locked in position

Question: 31
(1 point)

Unit 1 is operating at 100% power when a large break LOCA occurs.

- The crew has just transitioned to EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation) and no manual actions have been taken

1. Based on the above conditions, which ECCS pump(s) are currently taking suction from the containment sump?
2. If ND is <u>required</u> to be aligned for <u>hot</u> <u>leg</u> <u>recirculation</u>, to which NC hot legs will ND inject?

A. 1. ND pumps only
   2. B and C NC hot legs only

B. 1. ND pumps only
   2. All 4 hot legs

C. 1. NV pumps, NI pumps, ND pumps
   2. B and C NC hot legs only

D. 1. NV pumps, NI pumps, ND pumps
   2. All 4 hot legs

Question: 32
(1 point)

Unit 1 was operating at 100% power when it experienced a steam line break accident resulting in a safety injection and the crew has entered EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).

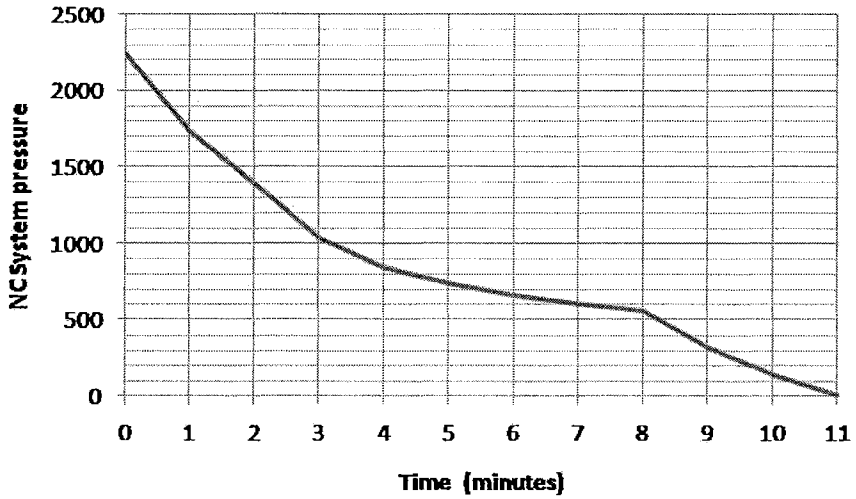
Which one of the following completes the statement below?

Per Enclosure 1 of EP/1/A/5000/E-0, when NC pressure decreases to less than _____ the crew will close 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol) and when NC pressure increases to greater than _____ the crew will re-open these valves.

	Closed	Re-opened
A.	1500 psig	2000 psig
B.	1500 psig	1955 psig
C.	1620 psig	2000 psig
D.	1620 psig	1955 psig

Question: 33
(1 point)

Unit 1 was operating at 100% power when a LOCA occurred at Time 0. Given the NC System pressure trend shown below:



Which of the following describes when each of the ECCS pumps listed begins to inject flow into the NC system?

	NI Pumps	ND Pumps
A.	Between 0 and 1 minute	Between 8 and 9 minutes
B.	Between 1 and 2 minutes	Between 8 and 9 minutes
C.	Between 0 and 1 minute	Between 9 and 10 minutes
D.	Between 1 and 2 minutes	Between 9 and 10 minutes

Question: 34
(1 point)

Unit 1 completed NC fill and vent activities following a forced outage. Given the following:

- A nitrogen blanket was placed on the pressurizer during the outage
- NC level is 85% and stable
- The crew is in the process of drawing a bubble in the pressurizer

1. Per Selected Licensee Commitment 16.5-4 (Pressurizer), what is the limit on pressurizer heat up rate?
2. Per OP/1/A/6100/001 (Controlling Procedure for Unit Startup), when a pressurizer PORV is opened, what indication verifies nitrogen venting is complete?

A. 1. 100°F in any one hour period
   2. PRT temperature equalizes with Pzr steam space temperature

B. 1. 100°F in any one hour period
   2. PRT level increases <u>without</u> a corresponding PRT pressure increase

C. 1. 80°F in any one hour period
   2. PRT temperature equalizes with Pzr steam space temperature

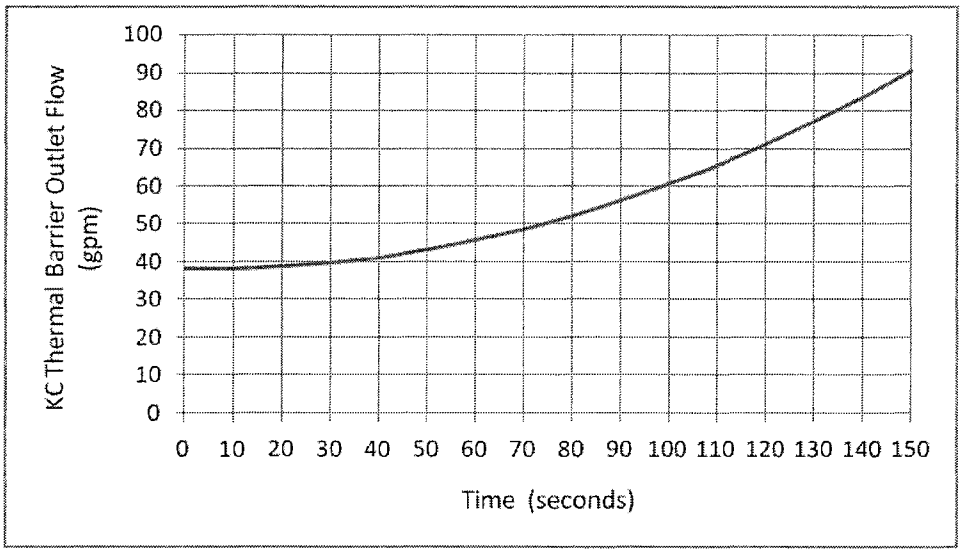
D. 1. 80°F in any one hour period
   2. PRT level increases <u>without</u> a corresponding PRT pressure increase

---

Question: 35
(1 point)

Unit 1 is in Mode 3. Given the following:

- 1AD-6, E/1 (NCP A Thermal Barrier KC Outlet Hi/Lo Flow) actuates
- The flow trend below:



1. At what time on the above graph should 1KC-394A (NC Pump 1A Therm Bar Otlt) have automatically closed?
2. If the NCP 1A thermal barrier can <u>not</u> be isolated from the KC System by any means, how is over pressurization of the KC surge tanks prevented?

A. 1. 100 seconds
   2. The KC surge tanks vent line is large enough to prevent over pressurization

B. 1. 130 seconds
   2. The KC surge tanks vent line is large enough to prevent over pressurization

C. 1. 100 seconds
   2. The KC surge tanks relief valve to the KC drain sump is large enough to prevent over pressurization

D. 1. 130 seconds
   2. The KC surge tanks relief valve to the KC drain sump is large enough to prevent over pressurization

---

Question: 36
(1 point)

Unit 1 was operating at 100%. Given the following conditions and sequence of events:

- A slight cooldown of the NC system causes the "C" PZR heaters to be full "on"
- A single channel of pressurizer pressure failed offscale high
- A second channel of pressurizer pressure failed offscale low

Assuming no operator actions, what affect does this combination of channel failures have on the Pressurizer Pressure Control system?

A. The Pressurizer Pressure Master swaps to manual and pressure will increase to the reactor trip setpoint

B. The Pressurizer Pressure Master swaps to manual and pressure will increase until 1NC-32B and 1NC-36B open

C. The Pressurizer Pressure Master remains in automatic and pressure is controlled based on the average of the 2 unaffected channels

D. The Pressurizer Pressure Master remains in automatic and pressure is controlled based on the highest of the 2 unaffected channels

---

Question: 37
(1 point)

Unit 1 is increasing power following a refueling outage. Given the following:

- At 45% reactor power, the P-8 permissive failed "as-is"
- Reactor power is currently at 50%

Based on the current conditions:

1. What is the condition of the P-8 "Hi Pwr Lo Flo Rx Trip Block" status light on 1SI-18?
2. If one NC pump were to trip, would an automatic reactor trip occur?

A. 1. Lit
   2. Yes

B. 1. Lit
   2. No

C. 1. Dark
   2. Yes

D. 1. Dark
   2. No

Question: 38
(1 point)

Unit 1 is in Mode 3 and reducing NC pressure and temperature for a refueling outage. Given the following:

- Pressurizer pressure channel 2 fails "as-is" at 1985 psig
- Other pressurizer pressure channels indicate as follows:
  - Channel 1 is 1972 psig and slowly decreasing
  - Channel 3 is 1965 psig and slowly decreasing
  - Channel 4 is 1951 psig and slowly decreasing
- No operator actions have been taken

Of the <u>remaining</u> channels that input into the P-11 circuit, how many of these must be below the P-11 setpoint before "ECCS TRN A/B PZR PRESS" can be blocked?

A. 1 of the other 2

B. 2 of the other 2

C. 1 of the other 3

D. 2 of the other 3

Question: 39
(1 point)

Unit 1 was operating at 100% power with lower containment temperature stable at 107°F. Given the following events:

- 1A,1B, and 1C Lower Containment Ventilation Units (LCVU's) are in service
- LCVU 1B fan trips on over-current

Based on the conditions above, what is the first action OP/1/A/6450/001 (Containment Ventilation (VV) Systems) specifies to provide additional cooling to lower containment?

A. Start 1D LCVU in LOW speed

B. Place 1A and 1C LCVUs in "MAX" cooling only

C. Place 1A and 1C LCVUs in "MAX" cooling and HIGH speed

D. Start 1D LCVU in HIGH speed and place 1A and 1C LCVUs in HIGH speed

---

Question: 40
(1 point)

Unit 1 is operating at 100% power. Given the following:

Initial Conditions

- Lower Containment Vent Unit (LCVU) status and outlet temperatures per the OAC are:

LCVU	Status	Outlet Temperature readings	
1A	Running	1 - 108.1°F	2 - 107.5°F
1B	Running	1 - 109.9°F	2 - 108.9°F
1C	Running	1 - 112.4°F	2 - 111.2°F
1D	Secured	1 - 105.6°F	2 - 104.4°F

Current Conditions

- The crew notes that 1B LCVU has just tripped
- OAC temperature readings as stated above have not begun to change yet

Based on current plant conditions, and per PT/1/A/4600/002A (Mode 1 Periodic Surveillance Items):

1. What temperature would be recorded for "Primary Containment Lower Compartment Average Air Temp"?
2. What are the Technical Specification temperature range limits for lower containment temperature?

A. 1. 108.5°F
   2. 60°F – 120°F

B. 1. 109.8°F
   2. 60°F – 120°F

C. 1. 108.5°F
   2. 100°F – 120°F

D. 1. 109.8°F
   2. 100°F – 120°F

Question: 41
(1 point)

Which one of the following lists of conditions would <u>all</u> result in 1NF-228A (NF Supply Containment Isolation Valve) closing? (Evaluate each condition separately)

1. Manual Phase A
2. Manual Phase B
3. Loss of instrument air
4. Glycol Expansion Tank Lo Lo Level
5. Trip of all running Ice Condenser Glycol Pumps

A. 1 and 5

B. 2 and 5

C. 1, 3 and 4

D. 2, 3 and 4

Question: 42
(1 point)

One hour ago, Unit 1 was operating at 100% power when a LOCA occurred requiring a reactor trip and safety injection. Given the following:

- The automatic and manual swap to cold leg recirculation failed and both ND pumps have been secured
- The crew implemented EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation)
- Current conditions are:
  - Containment pressure is 11.2 psig and slowly increasing
  - FWST level is 4.9% and decreasing

For the current conditions, how many of each type of pump listed is required to be running?

	NV	NS
A.	1	1
B.	1	0
C.	0	1
D.	0	0

Question: 43
(1 point)

Unit 1 was operating at 100% power when a 6 gpm tube leak occurred in 1A S/G.
Given the following:

- The crew is operating the turbine controls in manual to quickly reduce load per AP/1/A/5500/009 (Rapid Downpower)
- Current power level is 30% and decreasing

1. Assuming a stable tube leakage rate, how does 1EMF-71 (S/G A Leakage) count rate for current conditions compare to the 100% power readings?
2. Per NSD 513 (Primary to Secondary Leak Monitoring Program), which method(s) is/are used to monitor S/G leak rate based on the current power level?

A. 1. Lower counts now than when power was at 100%
   2. 1EMF-33 (Condenser Air Ejector Exhaust) only

B. 1. The same counts now as when power was at 100%
   2. 1EMF-33 (Condenser Air Ejector Exhaust) only

C. 1. Lower counts now than when power was at 100%
   2. 1EMF-33 (Condenser Air Ejector Exhaust) and 1EMF-71

D. 1. The same counts now as when power was at 100%
   2. 1EMF-33 (Condenser Air Ejector Exhaust) and 1EMF-71

Question: 44
(1 point)

Unit 1 is in Mode 3 preparing for reactor startup. Given the following 1SV-19 (S/G 1A PORV) nitrogen bottle pressures:

- Bottle #1 – 1970 psig
- Bottle #2 – 2165 psig

What action (if any) is <u>required</u> for 1SV-19 per Selected Licensee Commitment 16.10-1 (Steam Vent to Atmosphere)?

A. No action is required

B. Immediately take action to restore the nitrogen supply to operable status only

C. Immediately enter the applicable conditions of Technical Specification 3.7.4 (S/G PORVs) only

D. Immediately take action to restore the nitrogen supply to operable status and immediately enter the applicable conditions of Technical Specification 3.7.4 (S/G PORVs)

Question: 45
(1 point)

Unit 1 is operating at 100% power. Given the following conditions:

Initial Conditions
- 1CF-37 (S/G 1B CF Ctrl) is in manual and throttled
- 1CF-39 (S/G 1B CF Byp Ctrl) is in manual and full open
- S/G 1B Level is 66% and stable

Current Conditions
- 1CF-37 has just been placed in automatic

Based on current conditions:

1. How will 1CF-37 respond?
2. What is the status of 1B S/G level control?

A. 1. Throttle further open
   2. Automatic

B. 1. Throttle further open
   2. Manual

C. 1. Throttle further closed
   2. Automatic

D. 1. Throttle further closed
   2. Manual

Question: 46
(1 point)

Initial conditions:

- Unit 1 was operating at 100% power
- A loss of offsite power occurred
- The reactor tripped

30 minutes later the following sequence of events occurred:

- All CA pumps are running
- Train "A" CA is RESET
- Train "B" CA is <u>not</u> RESET
- The CA common suction piping from condensate grade sources ruptures
- 1AD-5, E/1 "CA Pumps Train A Loss of Norm Suct" actuates
- 1AD-5, E/2 "CA Pumps Train B Loss of Norm Suct" actuates

One minute later, what is the status of the CA system assuming no operator action?

A. 1A CA pump is tripped
CAPT #1 is tripped
1B CA pump suction is shifted to the RN system

B. 1A CA pump suction is shifted to the RN system
CAPT #1 suction is shifted to the RN system
1B CA pump is tripped

C. 1A CA pump suction is shifted to the RN system
CAPT #1 is tripped
1B CA pump is tripped

D. 1A CA pump is tripped
CAPT #1 suction is shifted to the RN system
1B CA pump suction is shifted to the RN system

Question: 47
(1 point)

Given the following:

- The incoming breaker to 1ETB spuriously opened
- 1B D/G automatically started and loaded
- While monitoring D/G operating parameters, the crew noted that D/G 1B "VOLTS" was 4000 V
- Voltage was adjusted to normal

How did 1B D/G output "AMPS" and "P/F" indications respond to this adjustment?

	AMPS	P/F
A.	increase	more lagging
B.	increase	stay the same
C.	decrease	more lagging
D.	decrease	stay the same

Question: 48
(1 point)

Unit 1 is operating at 100% power. Given the following:

- A complete loss of offsite power occurs
- All D/G load sequencing is complete

Which one of the following Fire Protection (RF/RY) system pumps does not have an available power supply?

A. RY pump A

B. RF Jockey Pump A

C. RY Pump C

D. RF Jockey Pump C

Question: 49
(1 point)

Which one of the following sets of equipment receives power from the 250VDC Auxiliary Power System?

A. CF Pump Control Power and Turbine Emergency Bearing Oil Pump

B. Deadlight Panels and Turbine Emergency Bearing Oil Pump

C. CF Pump Control Power and 6.9 KV Switchgear Control Power

D. Deadlight Panels and 6.9 KV Switchgear Control Power

Question: 50
(1 point)

Unit 1 is operating at 100% power. Given the following conditions and sequence of events:

Initial Conditions

- A blackout occurs on 1ETA
- All 1A D/G sequencing is complete
- 1AD-11, A/8 "125VDC Diesel Gen A Control Pwr Sys Trbl" actuates
- 1AD-11, B/7 "D/G 1A Panel Trouble" actuates
- 1A D/G Panel alarm E/5 "Loss of DC Control Power" actuates

Final Conditions

- Normal power is restored to 1ETA
- 1A D/G is secured
- The annunciators listed above are still lit

Based on the final conditions:

1. Which of the following methods could have been used to secure the 1A D/G locally?
2. Will 1A D/G start on a subsequent 1ETA blackout?

A. 1. The RUN/STOP knob only
   2. Yes

B. 1. The RUN/STOP knob only
   2. No

C. 1. The RUN/STOP knob or the STOP pushbutton
   2. Yes

D. 1. The RUN/STOP knob or the STOP pushbutton
   2. No

Question: 51
(1 point)

Unit 1 is in Mode 3 preparing for a reactor startup. Given the following:

- 1ETA experiences a blackout
- The 1A D/G starts and is sequencing on loads per the accelerated sequence
- Half way through the accelerated sequence, the fuel racks stick in an open position causing D/G speed to rapidly increase

1. What is the setpoint for the D/G overspeed trip?
2. For the conditions stated above will the D/G trip on overspeed if the setpoint is exceeded?

A. 1. 495 rpm
   2. No

B. 1. 495 rpm
   2. Yes

C. 1. 517.5 rpm
   2. No

D. 1. 517.5 rpm
   2. Yes

Question: 52
(1 point)

Unit 1 was operating at 50% power when a power spike causes a 1EMF-33 (CSAE EXHAUST) Trip 2 alarm.

What manual actions (if any) does OP/1/B/6100/010X (Annunciator Response to Radiation Monitoring Panel 1RAD-1) direct the operator to take to place systems affected by this EMF alarm in their post alarm condition?

A. Swap "Unit 1 CSAE EXH" discharge from "UNIT VENT" to "AUTO"

B. Close 1BB-48 (BB Pumps Disch to TB Sump)

C. Close S/G Sample valves

D. None

Question: 53
(1 point)

Both units are operating at 100% power. Given the following:

- Only 1A RN pump in service
- An 86N relay actuates on 1ETB

Based on the above conditions, which RN pumps are operating one minute later?

A. 1A only

B. 1A and 1B only

C. 1A and 2B only

D. 1A, 1B, and 2B only

Question: 54
(1 point)

Unit 1 automatically trips from 100% power and the crew entered EP/1/A/5000/E-0 (Reactor Trip or Safety Injection). Given the following conditions and sequence of events:

- Both trains of CA SYS VLV RESET are "RESET"
- CA flow is throttled to maintain proper S/G levels
- A complete loss of VI pressure occurs

How is manual control of the CA flow control valves and CA flow affected by the loss of VI pressure?

A. Control of the CA flow control valves is immediately lost and CA flow will immediately decrease

B. Control of the CA flow control valves is immediately lost and CA flow will immediately increase

C. Control of the CA flow control valves is maintained for at least 1 hour, and then CA flow will decrease

D. Control of the CA flow control valves is maintained for at least 1 hour, and then CA flow will increase

---

Question: 55
(1 point)

Unit 1 was operating at 100% power. At 1000, a secondary steam leak occurred in the Unit 1 containment. The crew has started a controlled shutdown using AP/1/A/5500/009 (Rapid Downpower). Containment pressure and temperature trends indicate:

Time	Temperature	Pressure
1000	113°F	0.15 psig
1005	117°F	0.28 psig
1010	119°F	0.42 psig
1015	122°F	0.48 psig
1020	126°F	0.65 psig
1025	129°F	0.91 psig

No manual operator actions have been taken related to LCVU operation.

During which time period did the Lower Containment Ventilation Units (LCVUs) cooling water bypass valves (full flow valves) automatically open?

A. Between 1005 and 1010

B. Between 1010 and 1015

C. Between 1015 and 1020

D. Between 1020 and 1025

Question: 56
(1 point)

Unit 1 was in Mode 3 at 557°F and 2235 psig with shutdown banks withdrawn in preparation for startup. Given the following conditions and sequence of events:

- 1TXS is red tagged
- A fault results in a loss of all loads on the short side of 1TC

Which MG set(s) has/have a power supply available and what procedure is entered to address the above conditions?

A. Only 1B MG set; EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)

B. Only 1B MG set; AP/1/A/5500/004 (Loss of Reactor Coolant Pump)

C. 1A and 1B MG sets; EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)

D. 1A and 1B MG sets; AP/1/A/5500/004 (Loss of Reactor Coolant Pump)

Question: 57
(1 point)

Unit 1 is in a mid loop condition conducting a vacuum refill of the NC system at the end of a refueling outage.

Which one of the following reactor vessel level instruments will provide the greatest accuracy for this condition?

A. NC level loop indication

B. Sight glass loop indication

C. Ultrasonic level indication

D. RVLIS lower range indication

Question: 58
(1 point)

Unit 1 is operating at 100%. Given the following indications:

- Pressurizer level is 61% and increasing
- Spray valves have throttled open and pressurizer pressure is slowly decreasing towards normal pressure
- Charging flow initially decreased and has stabilized at a lower flow rate
- Letdown flow is 0 gpm
- All pressurizer heaters are off

1. Which one of the following failures would account for all these indications?
2. What procedure will be used to address the results of this failure?

A. 1. Selected Pressurizer Level (SPL-1) "PZR LVL LOW" output signal is present
   2. AP/1/A/5500/012 (Loss of Charging or Letdown)

B. 1. Channel 1 pressurizer level/pressure common reference leg is leaking
   2. AP/1/A/5500/012 (Loss of Charging or Letdown)

C. 1. Selected Pressurizer Level (SPL-2) "PZR LVL LOW" output signal is present
   2. AP/1/A/5500/011 (Pressurizer Pressure Anomalies)

D. 1. Channel 1 pressurizer level/pressure common reference leg is leaking
   2. AP/1/A/5500/011 (Pressurizer Pressure Anomalies)

Question: 59
(1 point)

Unit 1 is operating at 100% power. Assuming intermediate range N-35 channel compensation voltage is lost and a reactor trip occurs:

1. How will N-35 indication compare to N-36 when actual reactor power has decreased into the source range?
2. What is the minimum number of intermediate range instruments required to be below the P6 setpoint to automatically re-energize the source range instruments N-31 and N-32?

A. 1. N-35 will read higher than N-36
   2. One

B. 1. N-35 will read higher than N-36
   2. Two

C. 1. N-35 will read lower than N-36
   2. One

D. 1. N-35 will read lower than N-36
   2. Two

Question: 60
(1 point)

Unit 1 is operating at 100% power. Given the following:

- Containment Pressure Channel I failed high
- The failed channel is bypassed

Which of the following lists the logic for a Containment Spray actuation based on the conditions above?

A. 1/3

B. 2/3

C. 1/2

D. 2/2

Question: 61
(1 point)

Regarding hydrogen production during a design basis large break LOCA:

1. Which one of the following is a larger contributor to post LOCA hydrogen buildup in containment?
2. Per OP/1/A/6450/010 (Containment Hydrogen Control Systems), what minimum containment hydrogen concentration requires Technical Support Center (TSC) approval prior to placing the Hydrogen Recombiners in service?

A. 1. Zirc-Water reaction in core region
   2. 4%

B. 1. Zirc-Water reaction in core region
   2. 6%

C. 1. Dissolved hydrogen in the NC System
   2. 4%

D. 1. Dissolved hydrogen in the NC System
   2. 6%

Question: 62
(1 point)

Given the following:

- A transfer of control to the Standby Shutdown Facility (SSF) has been completed
- Natural circulation is being verified per OP/0/B/6100/013 (Standby Shutdown Facility Operations)
- NC system pressure is 1700 psig
- In-core thermocouple readings are:
  - 582°F
  - 610°F
  - 588°F
  - 600°F
  - 585°F

1. Per OP/0/B/6100/013, what NC system pressure indication is used for the purpose of determining the status of natural circulation?
2. For the given conditions, does natural circulation currently exist?

Reference provided

A. 1. Pressurizer pressure
   2. Yes

B. 1. Pressurizer pressure
   2. No

C. 1. NC Loop B WR pressure
   2. Yes

D. 1. NC Loop B WR pressure
   2. No

Question: 63
(1 point)

Unit 1 was operating at 100% power.

Initial Conditions
- Both CF pumps tripped
- No CA pumps could be started
- WR level in all S/Gs is 0%
- The crew established bleed and feed per EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink)

Current Conditions
- CA is available
- Core exit thermocouple temperatures are decreasing

Based on the current conditions, how does EP/1/A/5000/FR-H.1 initially direct CA flow to be established?

A. Feed 1 S/G at greater than 450 gpm

B. Feed 4 S/Gs at a total flow of greater than 450 gpm

C. Feed 1 S/G at less than or equal to 100 gpm

D. Feed 4 S/Gs at less than or equal to 100 gpm each

Question: 64
(1 point)

Unit 1 is at 14% power synchronizing the turbine to the grid.

1. What is the normal position of the "STEAM DUMP SELECT" switch for current conditions?
2. How will steam dump demand respond to a turbine trip under current conditions?

A. 1. "PRESS"
   2. decrease

B. 1. "PRESS"
   2. increase

C. 1. "T-AVG"
   2. decrease

D. 1. "T-AVG"
   2. increase

Question: 65
(1 point)

Unit 1 was operating at 80% power when the turbine tripped due to an inadvertent generator over frequency signal.

Which of the following lists automatic actions that will all occur as a result of this turbine trip?

1. Steam dumps actuate in Plant Trip mode
2. Zone 1A and Zone 1B Lockouts occur
3. C-Heater Drain Pumps trip
4. Feedwater heater extraction steam check valves close

A. 1, 2 and 3

B. 1, 3 and 4

C. 2, 3 and 4

D. 1, 2 and 4

Question: 66
(1 point)

Per NSD 512 (Maintenance of RO/SRO Licenses), which of the following lists two requirements to maintain an Active RO License?

A. 1. Serve in the RO or BOP position for 5 complete 12 hour shifts per quarter
   2. Complete a plant tour in the areas listed in NSD 512 once per quarter

B. 1. Serve in the RO or BOP position for 5 complete 12 hour shifts per quarter
   2. Maintain respirator qualifications current

C. 1. Serve in the RO or BOP position for 40 hours per quarter including shift turnovers
   2. Complete a plant tour in the areas listed in NSD 512 once per quarter.

D. 1. Serve in the RO or BOP position for 40 hours per quarter including shift turnovers
   2. Maintain respirator qualifications current

Question: 67
(1 point)

Per OMP 2-31 (Control Room Instrumentation Status):

1. Where is a list of active Increased Surveillances required to be maintained?
2. Who (by title) determines the monitoring frequency of an Increased Surveillance?

A. 1. OPS Shift Routine Logbook
   2. OSM

B. 1. OPS Shift Routine Logbook
   2. Unit Supervisor

C. 1. AUTOLOG
   2. OSM

D. 1. AUTOLOG
   2. Unit Supervisor

Question: 68
(1 point)

The crane operator has determined that a fuel handling interlock must be bypassed that is not addressed by a procedure.

Assume approval has been obtained to bypass the interlock.

In accordance with OP/1/A/6550/007 (Reactor Building Manipulator Crane Operation) which of the following, by title, must be notified when any "Interlock Bypass" is placed into and removed from bypass when handling new fuel assemblies?

A. WCC SRO

B. Control Room Supervisor

C. Reactor Systems Engineer

D. Fuel Handling Equipment Engineer

Question: 69
(1 point)

Which one of the following completes the statement:

At _____ power and increasing, the flow restricting orifice on the _____ S/Gs will begin forcing flow through the CA nozzle.

A. 15%; Unit 1

B. 40%; Unit 1

C. 15%; Unit 2

D. 40%; Unit 2

Question: 70
(1 point)

Unit 1 NC system conditions are 248°F and 600 psig.

1. For the stated plant conditions, is the FWST required to be operable per Technical Specification 3.5.4 (Refueling Water Storage Tank)?
2. When the FWST is required to be operable, and the FWST is below the borated water volume required by SR 3.5.4.2, what is the required action?

A. 1. No
   2. Immediately take action to restore the FWST to operable status

B. 1. No
   2. Restore the FWST to operable status within 1 hour

C. 1. Yes
   2. Immediately take action to restore the FWST to operable status

D. 1. Yes
   2. Restore the FWST to operable status within 1 hour

Question: 71
(1 point)

The NV system is being aligned for startup. The procedure being used calls for independent verification of a single valve located in a room with a general dose rate of 130mR/hr.

Given the following conditions:

- Estimated time to independently verify the valve's position is 10 minutes
- There are no known hot spots in the area
- There is no airborne activity in this room
- The room has no surface contamination areas
- Assume any necessary approvals are obtained

Per NSD 700 (Verification Techniques), can independent verification of the valve above be waived and why or why not?

A. Yes, because the general area dose rate is greater than 100mR/hr

B. No, because the general area dose rate is less than 1 R/hr

C. Yes, because the radiation exposure for a single verification would exceed the allowable limit

D. No, because radiation exposure for a single verification is within the allowable limit

---

Question: 72
(1 point)

Unit 1 is operating at 75% power. An engineer needs to enter the Reactor Building pipechase area to perform some scoping work for a future modification.

Per Site Directive 3.1.2 (Access to Reactor Building and Areas Having High Pressure Steam Relief Devices):

1. For current plant conditions, whose permission is required to allow entry into this area?
2. What operational modes require use of the "buddy system" for entry into the Reactor Building?

A. 1. Radiation Protection and the WCC SRO
   2. Modes 1 and 2 only

B. 1. Radiation Protection and the WCC SRO
   2. Modes 1, 2, 3 and 4

C. 1. Radiation Protection only
   2. Modes 1 and 2 only

D. 1. Radiation Protection only
   2. Modes 1, 2, 3 and 4

Question: 73
(1 point)

An RWP that you are preparing to work under states that the highest dose rate in a particular area (at 30 cm) is 325 mR/hr. When you arrive at the work site, a flashing yellow light is noted in the entry path to the area.

1. How would an area with the dose rate specified in the RWP be designated?
2. What is the significance of the flashing yellow light?

A. 1. Radiation Area
   2. Radiography is in progress

B. 1. High Radiation Area
   2. Radiography is in progress

C. 1. Radiation Area
   2. The area has been designated as a "Locked" High Radiation Area

D. 1. High Radiation Area
   2. The area has been designated as a "Locked" High Radiation Area

---

Question: 74
(1 point)

Unit 1 was operating at 100% power when a complete loss of offsite power occurred. A LOCA occurred as a result of the transient. Given the following conditions:

- 1A D/G did not start and manual start attempts have failed
- Containment pressure is 3.4 psig
- NC subcooling is -8°F
- Core exit thermocouples are 642°F
- RVLIS level is 37%
- S/G NR levels are all 13%
- CA has not been reset
- CA flow is 470 gpm
- I/R SUR is 0 DPM
- S/R SUR is 0.3 DPM

Which one of the following is the highest priority Critical Safety Function for the given plant conditions?

A. SUBCRITICALITY

B. CORE COOLING

C. CONTAINMENT

D. HEAT SINK

Question: 75
(1 point)

During an emergency event, which one of the following identifies:

1. The on-site emergency facility that assumes responsibility for communications with offsite agencies including the NRC once it is activated?
2. What minimum level of emergency classification always requires an evacuation of all non-essential personnel?

A. 1. Technical Support Center (TSC)
   2. Site Area Emergency

B. 1. Technical Support Center (TSC)
   2. General Emergency

C. 1. Operations Support Center (OSC)
   2. Site Area Emergency

D. 1. Operations Support Center (OSC)
   2. General Emergency

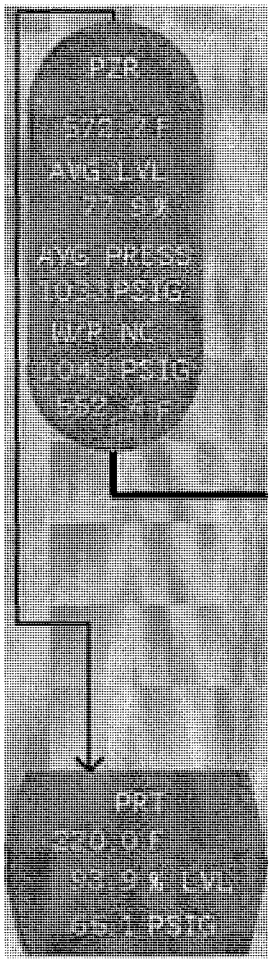
CATAWBA NUCLEAR STATION

2009 SRO NRC Examination

Question: 76
(1 point)

Unit 1 was operating at 100%. Given the following conditions:

- A pressurizer safety valve opened and did <u>not</u> fully reclose
- Current Conditions per the OAC are shown to the right:



1. Based on the current conditions what is the temperature downstream of the partially open pressurizer safety valve?
2. Which NC overpressure transient establishes the <u>required</u> relief capacity of the pressurizer safety valves per the Technical Specification Bases?

<u>Reference provided</u>

A. 1. 550°F
   2. NCP locked rotor

B. 1. 550°F
   2. Main turbine trip

C. 1. 320°F
   2. NCP locked rotor

D. 1. 320°F
   2. Main turbine trip

Question: 77
(1 point)

Unit 1 was heating up after a refueling outage. Given the following conditions and sequence of events:

- NC temperature is 225°F and stable
- 1A NV pump was in service
- An oil leak resulted in damage to the pump rotating element and work is currently in progress to replace the damaged rotating element

1. Which one of the following Selected Licensee Commitments (SLCs) applies based on current conditions?
2. What post maintenance requirement(s) must be completed prior to restoring 1A NV pump to OPERABLE status per the SLCs?

A. 1. SLC 16.9-9 (Boration Systems Charging Pump-Shutdown)
   2. Post maintenance work order functional only

B. 1. SLC 16.9-9 (Boration Systems Charging Pump-Shutdown)
   2. Post maintenance work order functional and in-service testing

C. 1. SLC 16.9-10 (Boration Systems Charging Pump-Operating)
   2. Post maintenance work order functional only

D. 1. SLC 16.9-10 (Boration Systems Charging Pump-Operating)
   2. Post maintenance work order functional and in-service testing

---

Question: 78
(1 point)

Unit 1 was operating at 100% power. Given the following conditions and sequence of events:

- Manual reactor trip and safety injection occurred due to a tube rupture on 1A S/G
- A complete loss of offsite power occurs
- All S/G pressures have been maintained stable by automatic operation of the S/G PORVs
- The crew is in EP/1/A/5000/E-3 (Steam Generator Tube Rupture) cooling down the NC system to the required core exit temperature based on 1A S/G pressure
- Current NC loop Tcolds are as follows and decreasing:
  - A Loop – 245°F
  - B Loop – 530°F
  - C Loop – 526°F
  - D Loop – 528°F

1. What is the basis for the required core exit temperature selection?
2. What is the correct procedure flowpath for this situation?

A.
1. To ensure intact S/G pressures will remain above the main steam isolation setpoint during the NC system cooldown and depressurization
2. Transition to EP/1/A/5000/FR-P.1 (Response to Imminent Pressurized Thermal Shock Condition)

B.
1. To ensure intact S/G pressures will remain above the main steam isolation setpoint during the NC system cooldown and depressurization
2. Continue in EP/1/A/5000/E-3 (Steam Generator Tube Rupture)

C.
1. To establish and maintain subcooling for the NC system cooldown and depressurization
2. Transition to EP/1/A/5000/FR-P.1 (Response to Imminent Pressurized Thermal Shock Condition)

D.
1. To establish and maintain subcooling for the NC system cooldown and depressurization
2. Continue in EP/1/A/5000/E-3 (Steam Generator Tube Rupture)

Question: 79
(1 point)

Unit 1 was operating at 100% power and Unit 2 was in No Mode. Given the following events and conditions:

- Terrorist attack resulted in a total loss of switchyard
- 1A D/G failed to start
- The OSM orders an evacuation of the control room due to the ongoing security threat per AP/1/A/5500/017 (Loss of Control Room)

1. Which Unit 1 CA pump(s) is/are currently available <u>and</u> <u>can</u> <u>be</u> <u>controlled</u> from the location to which the crew is evacuated?
2. How is secondary side pressure control maintained automatically from the location to which the crew is evacuated?

A. 1. CAPT #1 only
   2. By the steam line code safety valves

B. 1. CAPT #1 only
   2. By the S/G PORVs

C. 1. CAPT #1 and 1B motor driven CA Pump
   2. By the steam line code safety valves

D. 1. CAPT #1 and 1B motor driven CA Pump
   2. By the S/G PORVs

Question: 80
(1 point)

Unit 1 was operating at 100% power and Unit 2 was in No Mode. Given the following:

- 1100 The TCC reported that RTCA (Real Time Contingency Analysis) indicates CNS switchyard voltage would not be adequate if Unit 1 should trip
- 1102 The crew entered AP/1/A/5500/037 (Generator Voltage and Electric Grid Disturbances), Case I (Abnormal Generator or Grid Voltage)
- 1300 The crew notified SPOC to install jumpers per AM/1/A/5100/008 (4Kv Essential Power (EPC) System Degraded Voltage Logic)

1. Which one of the following describes the operability of the VC/YC system per Technical Specifications at 1100?
2. What is the basis for installing these jumpers under the current conditions?

A. 1. VC/YC is operable
   2. To bypass the 8 second time delay for load shed/sequencer actuation on a blackout signal

B. 1. VC/YC is operable
   2. To prevent the D/G sequencer from double sequencing if a LOCA occurs

C. 1. VC/YC is not operable
   2. To bypass the 8 second time delay for load shed/sequencer actuation on a blackout signal

D. 1. VC/YC is not operable
   2. To prevent the D/G sequencer from double sequencing if a LOCA occurs

---

Question: 81
(1 point)

Unit 1 was operating at 50% power. Given the following:

Initial Conditions
- 1A CA pump red tagged for PMs
- UST level is 104%
- During a board walkdown, 1CA-6 (CA Pmps Suct From CA CST) was noted to be closed

Current Conditions
- The reactor was manually tripped due to a main steam equalization header break
- All power is lost to 1ETB
- 1SM-5 (S/G 1B SM Isol) failed to close
- 1SM-3 (S/G 1C SM Isol) failed to close
- 1A S/G conditions - NR level is 10% ; pressure is 650 psig and stable
- 1B S/G conditions - NR level is 0% ; pressure is 5 psig and stable
- 1C S/G conditions - NR level is 0% ; pressure is 7 psig and stable
- 1D S/G conditions - NR level is 8% ; pressure is 675 psig and stable

1. Based on the Initial Conditions, which CA pump(s) was/were required to be declared inoperable per Technical Specifications?
2. Based on the Current Conditions, what procedure will the crew transition to upon exit of EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)?

A. 1. 1A CA Pump only
   2. EP/1/A/5000/E-2 (Faulted Steam Generator Isolation)

B. 1. All three CA pumps
   2. EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink)

C. 1. 1A CA Pump only
   2. EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink)

D. 1. All three CA pumps
   2. EP/1/A/5000/E-2 (Faulted Steam Generator Isolation)

CATAWBA NUCLEAR STATION

2009 SRO NRC Examination

Question: 82
(1 point)

Unit 1 is operating at 98% power. A surveillance test per PT/1/A/4600/001 (RCCA Movement Test) is in progress. As Control Bank D was being moved, one control rod in Control Bank D slipped to 120 steps withdrawn and stopped. This is an incore thermocouple map one minute later.

	R	P	N	M	L	K	J	H	G	F	E	D	C	B	A
1						576		572		576					
2			546		599		611		603		605				
3				605				624				BAD		569	
4			597		602				609				617		
5		602				625				616				614	
6	563		611				611				626		623		568
7		602		606				617				620			
8	561				612		634		572				626		
9		619				611				613				614	
10	548		610				606				613				574
11				627				BAD				610		614	
12			612		599				608				622		
13				620		619				576		626		562	
14			540		628		613		608		614				
15						BAD		622		580					

1. Which single rod has slipped into the core to 120 steps withdrawn?
2. In addition to reducing power to less than 75% and verifying SDM, what other surveillances (if any) are <u>required</u> per Technical Specification 3.1.4 (Rod Group Alignment Limits) to allow continued power operation in Mode 1?

A. Rod D-12; no additional surveillances are required

B. Rod M-4; no additional surveillances are required

C. Rod D-12; $F^N_{\Delta H}(X,Y)$ and $F_Q(X,Y,Z)$

D. Rod M-4; $F^N_{\Delta H}(X,Y)$ and $F_Q(X,Y,Z)$

Question: 83
(1 point)

Unit 1 was in Mode 6 performing core alterations. Given the following conditions and sequence of events:

- N-31 was removed from service 3 days ago
- N-32 indicates 1.1 $x10^2$ cps
- 1AD-2, E/2 (TRAIN A SHUTDOWN MARGIN ALARM) actuates
- BDMS Train A indicates "E1"
- BDMS Train B indicates 1.4 $x10^2$ cps

1. What procedure is entered to address the stated conditions?
2. Are core alterations <u>required</u> to be stopped based on the above conditions?

A. 1. AP/1/A/5500/013 (Boron Dilution)
   2. No

B. 1. AP/1/A/5500/013 (Boron Dilution)
   2. Yes

C. 1. AP/1/A/5500/016 (Malfunction of Nuclear Instrumentation System)
   2. No

D. 1. AP/1/A/5500/016 (Malfunction of Nuclear Instrumentation System)
   2. Yes

Question: 84
(1 point)

Unit 1 was at 3% power performing a startup. Given the following:

Initial conditions

- Intermediate Range channel N-35 failed low
- The crew removed N-35 from service per the applicable abnormal procedure

Current conditions

- IAE returned the channel to service and reported that the SUR circuitry for N-35 had to be disabled as part of the channel repair
- Engineering has evaluated the repair and determined that all other functions will operate as designed with the SUR circuitry disabled

1. When the crew removed N-35 from service per the abnormal procedure, which fuses (if any) were removed?
2. For the conditions above, is N-35 operable?

A. 1. The control power fuses
   2. No

B. 1. The control power fuses
   2. Yes

C. 1. No fuses were removed
   2. No

D. 1. No fuses were removed
   2. Yes

Question: 85
(1 point)

Unit 1 was in Mode 3 and Unit 2 was operating at 100% power when a fire occurred on site. Given the following:

- A large amount of smoke entered the Auxiliary Building Ventilation (VA) system ductwork
- 1A main transformer was de-energized due to the fire

Based on the above conditions:

1. How will the VA system respond?
2. What is the status of the "A" train VA system per Technical Specifications?

A. 1. VA Supply fans (ABSU) will trip and then the Unfiltered Exhaust Fans will trip
   2. Only 1A train is <u>not</u> operable

B. 1. VA Supply fans (ABSU) will trip and then the Unfiltered Exhaust Fans will trip
   2. Both 1A and 2A trains are <u>not</u> operable

C. 1. VA Supply fans (ABSU) will trip and then the ABSU inlet dampers will close
   2. Only 1A train is <u>not</u> operable

D. 1. VA Supply fans (ABSU) will trip and then the ABSU inlet dampers will close
   2. Both 1A and 2A trains are <u>not</u> operable

Question: 86
(1 point)

Unit 1 is at 3% power and increasing. Given the following has just occurred:

- 1AD-7 C/1 NCP #1 "SEAL LEAKOFF HI FLOW" actuates
- 1B NCP seal leakoff is 6.5 gpm and stable
- 1B NCP Seal Outlet temperature is 165°F and stable
- 1B NCP Lower Bearing temperature is 140°F and stable
- The crew enters AP/1/A/5500/008 (Malfunction of Reactor Coolant Pump)

Per AP/1/A/5500/008, what is the maximum time 1B NCP can remain in service and what procedure will the crew be directed to enter <u>when</u> the pump is tripped?

A. 5 minutes; EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)

B. 5 minutes; AP/1/A/5500/004 (Loss of Reactor Coolant Pump)

C. 8 hours; OP/1/A/6100/002 (Controlling Procedure For Unit Shutdown)

D. 8 hours; AP/1/A/5500/004 (Loss of Reactor Coolant Pump)

Question: 87
(1 point)

Unit 1 is at 450°F and 1860 psig heating up with shutdown banks withdrawn following a refueling outage. Given the following conditions and sequence of events:

Initial Conditions
- YD has been manually aligned to provide cooling to 1A NV pump per AP/1/A/5500/021 (Loss of Component Cooling)

Current Conditions
- KC has not been restored
- The crew trips the reactor and all reactor coolant pumps
- A 100 gpm NC system leak occurs on an NC loop crossover pipe

1. If a safety injection becomes necessary, what guidance does AP/1/A/5500/021 provide for maintaining Unit 1 NC pump seal injection?
2. What procedure will AP/1/A/5500/021 direct the crew to implement next?

A. 1. Maintain YD aligned to 1A NV pump and continuously monitor motor parameters
   2. AP/1/A/5500/005 (Reactor Trip or Inadvertent S/I Below P-11)

B. 1. Maintain YD aligned to 1A NV pump and continuously monitor motor parameters
   2. AP/1/A/5500/027 (Shutdown LOCA)

C. 1. Realign KC to the 1A NV pump and start the Standby Makeup Pump
   2. AP/1/A/5500/005 (Reactor Trip or Inadvertent S/I Below P-11)

D. 1. Realign KC to the 1A NV pump and start the Standby Makeup Pump
   2. AP/1/A/5500/027 (Shutdown LOCA)

Question: 88
(1 point)

Given the following conditions on Unit 1:

Initial Conditions
- Reactor power was 100% and stable
- Turbine impulse pressure was 693 psig and stable

Final Conditions
- Security has reported significant steam escaping from the interior doghouse
- The crew is performing actions in AP/1/A/5500/028 (Secondary Steam Leak)
- Reactor power is 99.9% and stable
- Turbine impulse pressure is 657 psig and stable

1. What single steam relief valve passing full flow produced the conditions noted?
2. What actions will be directed by AP/1/A/5500/028 based on the final conditions?

A.
1. A steam line safety
2. Trip the reactor and go to EP/1/A/5000/E-0 (Reactor Trip or Safety Injection

B.
1. A steam line safety
2. Initiate a unit shutdown per AP/1/A/5500/009 (Rapid Downpower)

C.
1. A S/G PORV
2. Trip the reactor and go to EP/1/A/5000/E-0 (Reactor Trip or Safety Injection

D.
1. A S/G PORV
2. Initiate a unit shutdown per AP/1/A/5500/009 (Rapid Downpower)

CATAWBA NUCLEAR STATION

2009 SRO NRC Examination

Question: 89
(1 point)

Unit 1 is operating at 100% power. Given the following timeline:

12/15/09	1500	During the review of completed procedures it was noted that 12/07/09 at 0300 was the last time the 7 day surveillance was performed on the 1A D/G battery cells.
12/15/09	1800	IAE completed the 1A D/G battery cell surveillance and noted one bad battery cell.

Based on the above conditions and in accordance with Technical Specification 3.8.4 (DC Sources - Operating):

BASED ON CONDITIONS AT 1500:

1. What is the latest time that this surveillance ~~can be~~ COULD HAVE BEEN completed before the LCO for Technical Specification 3.8.4 ~~will not be met?~~ WOULD NOT HAVE BEEN MET?
2. When is the cascade to Technical Specification 3.8.1 (AC Sources – Operating) required to be made based on the bad battery cell?

A. 1. 12/15/09 at 2100
   2. Immediately

B. 1. 12/15/09 at 2100
   2. Within 1 hour

C. 1. 12/22/09 at 1500
   2. Immediately

D. 1. 12/22/09 at 1500
   2. Within 1 hour

Question: 90
(1 point)

Unit 1 and 2 are operating at 100% power with 2A RN pump in service. Given the following conditions and sequence of events:

- 1A D/G is tagged for PMs
- The following annunciators actuate:
  - 1AD-12, A/2 – "RN Essential Hdr A Pressure – Lo"
  - 2AD-12, A/2 – "RN Essential Hdr A Pressure – Lo"
  - 1AD-12, A/5 – "RN Essential Hdr B Pressure – Lo"
  - 2AD-12, A/5 – "RN Essential Hdr B Pressure – Lo"
- The 2A RN pump trips
- The 1A RN pump is started and the alarms listed above clear

1. Is the 2A D/G operable per Technical Specifications for the conditions stated above?
2. What actions are <u>required</u> per OP/0/A/6400/006C (Nuclear Service Water System)?

A. 1. No
   2. Ensure the RN essential header supply crossover valves are open

B. 1. No
   2. Rackout and tag the "A" VC Compressor breaker

C. 1. Yes
   2. Ensure the RN essential header supply crossover valves are open

D. 1. Yes
   2. Rackout and tag the "A" VC Compressor breaker

Question: 91
(1 point)

Given the following:

- Unit 1 is performing a power decrease required by Technical Specifications
- At 45% power, 1SMPS5219 (Turbine Impulse Pressure / ATWS/ AMSAC Related) stopped decreasing
- The power supply to 1SMPS5218 (Turbine Impulse Pressure / ATWS/ AMSAC Related) has failed
- IAE has been notified to repair failed channels
- Current reactor power is 28.5%

1. What guidance does OP/1/A/6100/003 (Controlling Procedure for Unit Operation) provide for the AMSAC system for this situation?
2. Per the Selected Licensee Commitment (SLC), the basis for AMSAC, is to provide independent means of initiating a turbine trip signal and a _____ under ATWS conditions.

A. 1. Continue the power decrease
   2. reactor trip signal

B. 1. Continue the power decrease
   2. CA autostart signal

C. 1. Stop the power decrease
   2. reactor trip signal

D. 1. Stop the power decrease
   2. CA autostart signal

Question: 92
(1 point)

Unit 1 entered Mode 6 three days ago. Given the following conditions and sequence of events:

- The head crew is currently lifting the reactor vessel upper internals
- The B train Containment Purge Exhaust System (VP) duct heaters lose power
- The B train VP system fan status/ system flow is unchanged

1. For the conditions above, is the VP system required to be operable per Technical Specification 3.9.3 (Containment Penetrations)?
2. Is proper functioning of the VP duct heaters required for operability of the VP system per the bases of Technical Specification 3.9.3?

A. 1. Yes
   2. Yes

B. 1. No
   2. Yes

C. 1. Yes
   2. No

D. 1. No
   2. No

Question: 93
(1 point)

Unit 1 is in Mode 6 with core unload in progress. Given the following:

- An RP technician in the Spent Fuel Pool (SFP) building calls the control room and reports that level in the SFP is decreasing
- The fuel assembly most recently removed from the core is currently in the reactor building manipulator crane

1. Based on current conditions, what procedure will direct movement of the fuel assembly being handled to a safe location?
2. Where is the fuel assembly in the reactor building manipulator crane <u>required</u> to be placed?

A. 1. AP/1/A/5500/026 (Loss of Refueling Canal Level)
   2. Into the upender and lowered to the fully down position

B. 1. AP/1/A/5500/026 (Loss of Refueling Canal Level)
   2. Fully down in the core or the deep end of the canal

C. 1. AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level)
   2. Into the upender and lowered to the fully down position

D. 1. AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level)
   2. Fully down in the core or the deep end of the canal

Question: 94
(1 point)

Unit 1 entered a forced outage 3 days ago to replace an NC pump motor.

- 2 work crews are involved in replacing the NC pump motor, an NC pump crew and an IAE crew. The tagout boundary is being shared by both crews
- The NC pump crew has the new motor in place and has outstanding Work Order Task Assignments (WOTAs) for wiring completion
- The IAE crew has asked the Unit 1 SRO for clearance of their WOTA to allow electrical testing of the new motor which requires connecting an outside power source

Per NSD 500 (Red Tags/Configuration Control Tags), in addition to ensuring the work can be performed safely, what other condition is required to be met by the Unit 1 SRO prior to granting clearance to the IAE crew WOTA?

A. The Unit 1 SRO must obtain OSM concurrence

B. The Unit 1 SRO must ensure the two crews have established constant communication

C. The Unit 1 SRO must ensure all affected crews have been informed of the intent to apply an outside power source

D. The Unit 1 SRO must ensure a Safety Group representative has walked down the area where the outside power source will be applied

---

Question: 95
(1 point)

Unit 1 was operating at 100% power. Given the following:

- 1ND-64 (1B ND Train Cold Leg Injection Return Safety Relief) lifted and did not reseat
- The crew used the closest valves in the piping available to isolate the leak
- Due to parts availability it will be 4-5 days before repairs can be completed
- The crew began a Technical Specification shutdown

1. Which trains of ND, if any, are operable?
2. When shutting down, what is the next operational mode in which Technical Specification 3.5.2 (ECCS – Operating) will no longer apply?

Reference provided

A. 1. No trains of ND are operable
   2. Mode 4

B. 1. No trains of ND are operable
   2. Mode 5

C. 1. 1A Train of ND only
   2. Mode 4

D. 1. 1A Train of ND only
   2. Mode 5

Question: 96
(1 point)

Unit 1 is in Mode 3. Given the following:

- An operator is bleeding off nitrogen pressure from the 1A NW surge tank
- At the completion of venting, the crew notes NW surge tank pressure is 21 psig

Per Technical Specification 3.6.17 (Containment Valve Injection Water System):

1. What are the modes of applicability for this Technical Specification?
2. What is the current status of 1A Train of NW?

A. 1. Modes 1, 2 and 3 only
   2. Operable

B. 1. Modes 1, 2 and 3 only
   2. Not operable

C. 1. Modes 1, 2, 3 and 4
   2. Operable

D. 1. Modes 1, 2, 3 and 4
   2. Not operable

Question: 97
(1 point)

Given the following:

- A LOCA has occurred in Unit 1
- The TSC has been fully staffed and activated
- An individual is needed for lifesaving activities during which 27 Rem of TEDE exposure is expected to be received

1. Is the individual required to be a volunteer?
2. Who is required to approve the exposure for this lifesaving activity?

A. 1. Yes
   2. The TSC Emergency Coordinator

B. 1. Yes
   2. The Operations Shift Manager

C. 1. No
   2. The TSC Emergency Coordinator

D. 1. No
   2. The Operations Shift Manager

Question: 98
(1 point)

An individual with a current year Total Effective Dose Equivalent (TEDE) of 1500 mR is preparing to perform a job in the RCA. The RWP states that the dose rate in the area is 200 mR/hr.

Per NSD 507 (Radiation Protection):

1. What is the maximum time he can work in this area until he accumulates enough dose to require an extension prior to the next entry into the RCA?
2. What is the minimum level RP position that could provide the approval of a dose extension if needed?

A. 1. 0.5 hours
   2. An RP Supervisor

B. 1. 0.5 hours
   2. The RP Manager

C. 1. 1.5 hours
   2. An RP Supervisor

D. 1. 1.5 hours
   2. The RP Manager

Question: 99
(1 point)

Unit 1 was at 25% and increasing following a refueling outage. Given the following conditions and sequence of events:

- Unit 1 experiences a large break LOCA
- Containment sump level is 5.2 ft and increasing
- During the swap to cold leg recirculation, 1NI-136B (ND Supply To NI Pump 1B) could <u>not</u> be opened
- The crew verified S/I flow per EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation)
- The crew is preparing to transition out of EP/1/A/5000/ES-1.3 when all running ECCS pumps begin showing signs of cavitation

1. What action, if any, was required per EP/1/A/5000/ES-1.3 when 1NI-136B would <u>not</u> open?
2. What procedure will EP/1/A/5000/ES-1.3 direct the crew to enter to address cavitation of the ECCS pumps?

A. 1. 1B NI pump was secured
   2. EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation)

B. 1. 1B NI pump was secured
   2. EP/1/A/5000/ECA-1.3 (Containment Sump Blockage)

C. 1. No action required
   2. EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation)

D. 1. No action required
   2. EP/1/A/5000/ECA-1.3 (Containment Sump Blockage)

Question: 100
(1 point)

Given the following two events:

- Earthquake
  - Seismic instrumentation indicates .04 g vertical acceleration and .05 g horizontal acceleration
  - 1AD-4, B/8 "OBE Exceeded" is <u>not</u> actuated

- High Auxiliary Building radiation
  - 1RAD-1, B/3 "EMF41 Aux Bldg Vent Hi Rad" is actuated
  - EMF41 is reading 1.2×10^6 counts per minute and slowly increasing

Which one of the above events requires activation of the site assembly alarm per RP/0/A/5000/010 (Conducting a Site Assembly or Preparing the Site for an Evacuation) and from what location(s) is this alarm activated?

A. Earthquake Event; Control Room only

B. Earthquake Event; Control Room and Secondary Alarm Station (SAS)

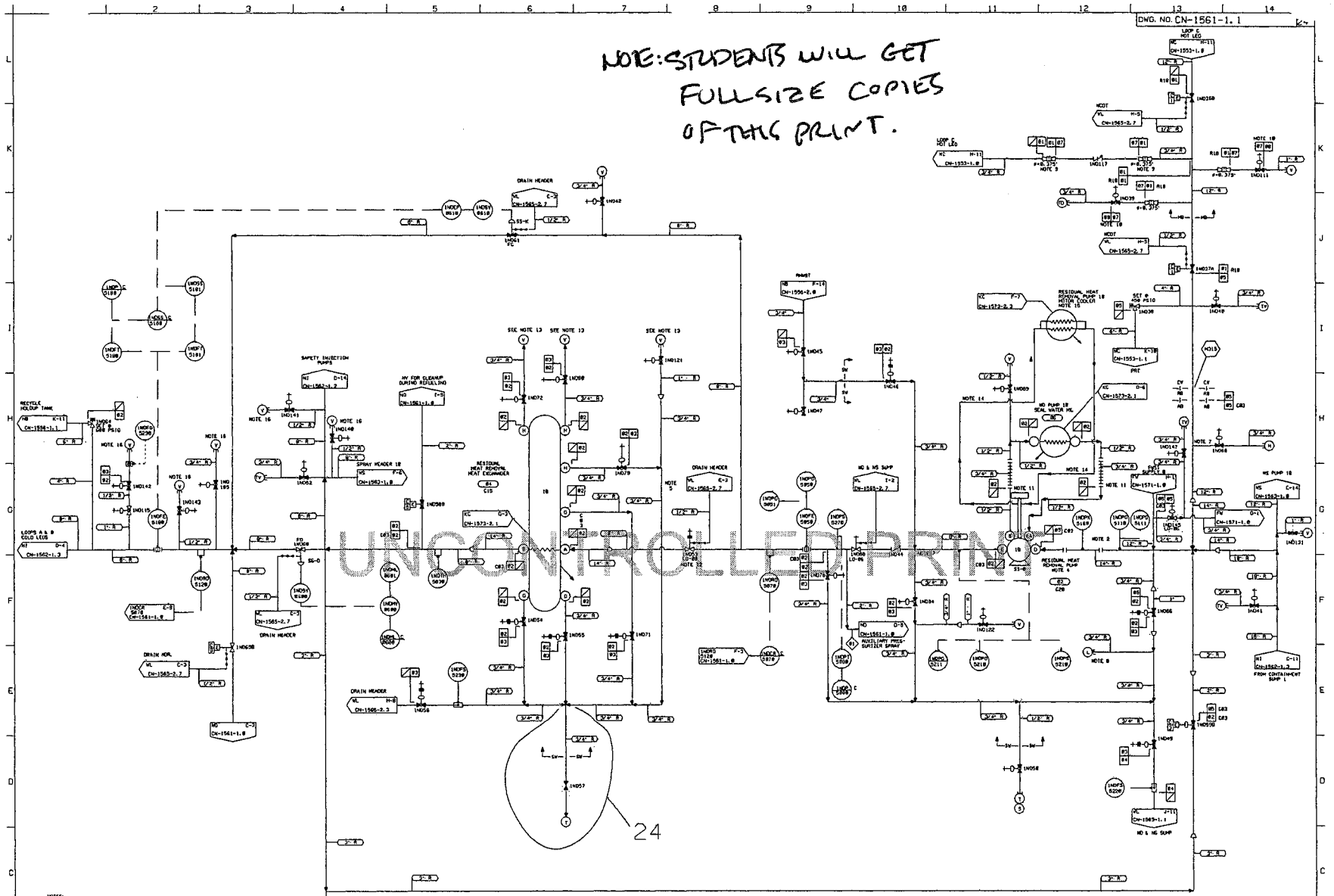
C. High Auxiliary Building radiation; Control Room only

D. High Auxiliary Building radiation; Control Room and Secondary Alarm Station (SAS)

Reference List for: 2009 SRO NRC Exam

CN-1561-1.1
CN-1562-1.3
Databook Figure 14B
Databook Figure 15B
Databook Figure 57
EP/1/A/5000/ECA-1.1 Enclosure 5
Steam Tables

NOTE: STUDENTS WILL GET FULLSIZE COPIES OF THIS PRINT.



NOTES:

1. REFER TO EQUIPMENT LISTING CN-1561 FOR EQUIPMENT DATA.
2. IDENTIFIED STRAINER IS PLACED IN THE SPOOL PIECE DURING INITIAL FLUSHING OPERATIONS. STRAINER MUST BE REMOVED BEFORE PLANT START UP. CAPPED LINE IS CONNECTED TO PRESSURE GAUGE DURING INITIAL FLUSHING.
3. SAMPLE LINE SHOULD BRANCH OFF NEAR PUMP DISCHARGE.
4. SEE CN-1573-1.1 FOR ADDITIONAL CONNECTIONS ON PUMPS.
5. VENT STANDPIPES TO EXTEND AT LEAST ONE FOOT ABOVE TOP OF HEAT EXCHANGER. VENT OVERFLOW TO BRANCH OFF AT SAME LEVEL AS TOP OF EXCHANGER ON OUTLET SIDE VENT.
6. LOW POINT DRAIN.
7. HIGH POINT OF PIPING AT TOP OF PIPE.
8. PORTABLE PUMP HOOKUP TO TRANSFER WATER BACK TO RWST FOR LINE MAINTENANCE. THIS LINE MUST NOT BE USED AFTER LOCA.
9. FLOW RESTRICTOR DETAIL PROVIDED ON DRAWING CN-1536-4.
10. REF. DESIGN ENGR., POWER PIPING SECTION, E.M. NO. PPS-M-24.
11. 3/4" LAPPED JOINT FLANGES.
12. IND853 HAS AN 1/8" HOLE DRILLED IN THE UPSTREAM DISC FACE FOR BONNET OVERPRESSURE RELIEF. VALVE HAS UNIDIRECTIONAL SEALING.
13. TO FACILITATE VENTING OR DRAINING EVOLUTIONS, FLEXIBLE TUBING OR HOSE WILL BE TEMPORARILY CONNECTED TO THE VENT PIPING FOR VALVES IND870 AND IND878 AND INDMR. FOR THE LINE CONTAINING IND870 THE DISCHARGE WILL BE AT VALVE IND852. PIPE CAPS SHOWN ON THIS DRAWING MUST BE REINSTALLED WHEN THE FLEXIBLE TUBING OR HOSE IS REMOVED.
14. VENDOR SUPPLIED PIPING. PROCESS FLUID HOT IN THESE LINES.
15. COOLER SHOWN FOR INFORMATION ONLY. REFERENCE KC SYSTEM FLOW DIAGRAM FOR SPECIFIC INFORMATION.
16. TO FACILITATE VENTING OR DRAINING EVOLUTIONS, A VENTING DEVICE AS DESCRIBED ON CNDN-1223.11-00-0805 CAN REMAIN CONNECTED TO VENT PIPING FOR VALVES IND870, IND148, IND141, IND142, AND IND143. THE PIPE CAP(S) ARE TO BE RE-INSTALLED WHEN VENTING DEVICE IS REMOVED.

DESIGN PARAMETERS

NO	PIPE SPEC.	PRESSURE	TEMPERATURE	CLASS	MATERIAL
B1	2501.1	2500 PSIA	650°F	A	SS
B2	601.2	615 PSIA	400°F	B	SS
B3	601.4	615 PSIA	400°F	C	SS
B4	151.4	45 PSIA	200°F	E	SS
B5	601.2	548 PSIA	400°F	B	SS
B6	601.4	548 PSIA	400°F	C	SS
B7	2501.1	2500 PSIA	650°F	E	SS
B8	2501.4	2500 PSIA	650°F	D	SS

DESIGN FLOW

NO	FLOW
B1	85 GPM

NO.	REVISIONS	DRN	DATE	CHKD	DATE	APPR	DATE
24	REV PER CN-10003/08	VOC	8-16	NEC	8-19	RDW	8-19
23	REV PER CD100607 IMP. DATE 7-26-87	VOC	8-20	TLC	8-20	PFB	8-20
22	REV PER PIP C-85-0548; EXCMPT. CODE C-21	VOC	8-15	CGA	8-20	PFB	8-20
0-10	ORIGINAL DRAWING RETIRED	VOC	8-21				

QA CONDITION 2

QA CONDITION 1

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION UNIT 1

FLOW DIAGRAM OF
RESIDUAL HEAT REMOVAL
SYSTEM (ND)

DESIGNED BY CARMONA	DATE 9-3-76	INSP. WATKIN	DATE
DRAWN B CASKEY	DATE 9-8-76	INSP. TC MCKENZIE	DATE 9-10-76
CHECKED BY SHEV	DATE 9-8-76	APPR. JE KISE	DATE 9-16-76

CIVIL ELEC MECH
INSPECTED

SCALE

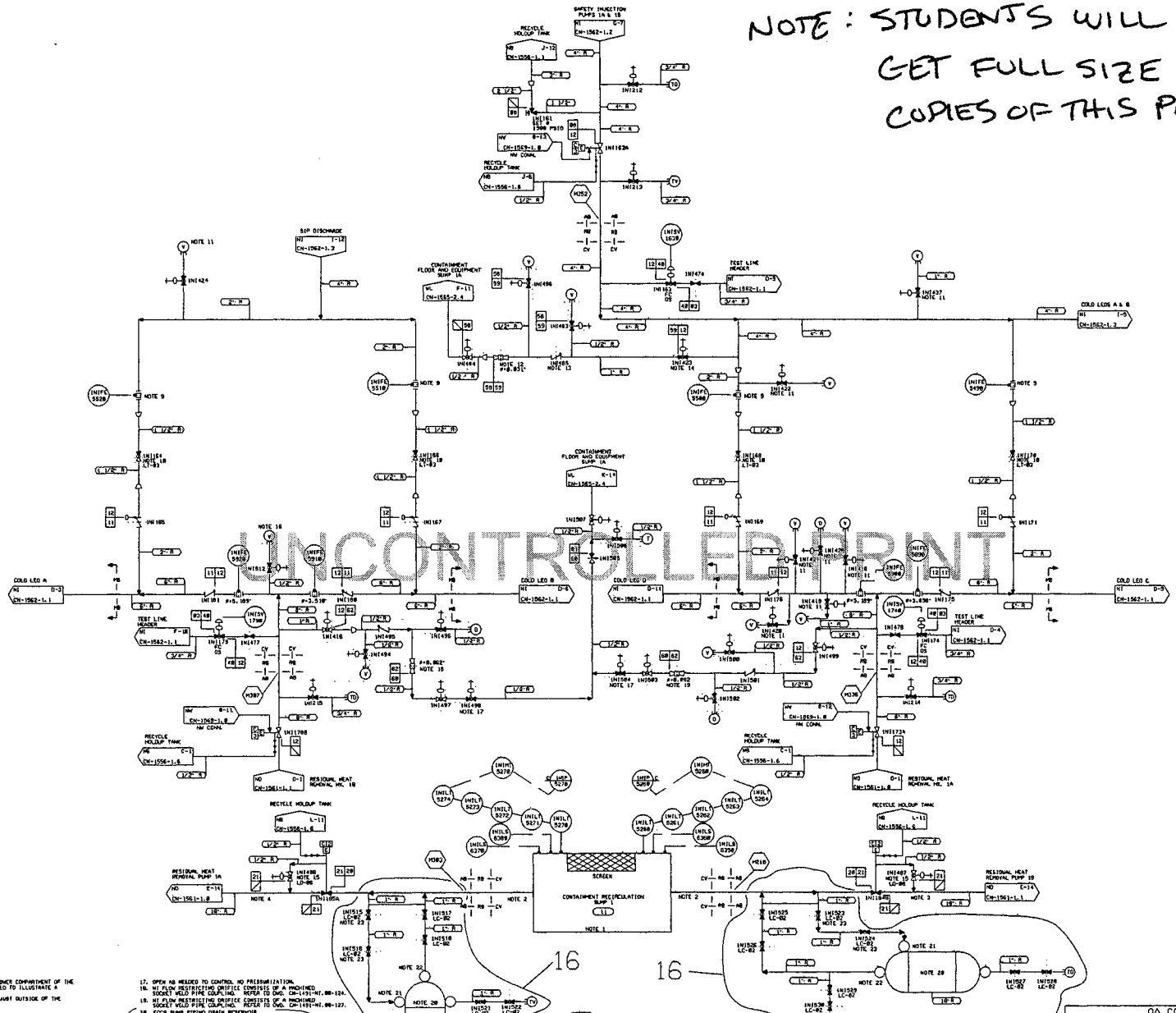
DWG. NO. CN-1561-1.1

24

ERN: CN000HLV

DWG. NO. CN-1562-1.3

NOTE: STUDENTS WILL GET FULL SIZE COPIES OF THIS PRINT.



UNCONTROLLED PRINT

NOTES:

1. THE SUMP REPRESENTATION, LOWER COMPARTMENT OF THE CONTAINMENT, IS NOT INTENDED TO ILLUSTRATE A STRUCTURAL DESIGN.
2. GUARDED PIPE FROM SUMP TO JUST OUTSIDE OF THE CONTAINMENT BUILDING WALL.
3. TRAIN A
4. TRAIN B
5. NO INSULATION REQUIRED.
8. FLOW METERING ORIFICE TO VERIFY FLOW DURING PRE-OPERATIONAL TESTING.
10. ADJUST VALVES IN FIELD TO LIMIT PUMP RUNOUT. THEN LOCK WITH POSITION LOCKING DEVICE.
11. CONSTRUCTION VENTS AND DRAINS. PIPE SIZE IS ONE INCH.
12. NI FLOW RESTRICTING ORIFICE CONSISTS OF A MACHINED SOCKET WELD PIPE COUPLING. REFER TO DWG. CN-1451-NI.00-1007.
13. VALVE INI485 IS A SOFT SEATED VALVE.
14. VALVE INI493 MAY BE OPENED BY PROCEDURE TO RELIEVE INCREASING NI DISCHARGE HEADER PRESSURE TO PREVENT LIFTING RELIEF VALVES. REFER TO BPV/V/4208/BG.
15. VALVE BONNET PRESSURE EQUALIZATION LINE.
16. TO FACILITATE VENTING OR DRAINING EVOLUTIONS, A VENTING RIG, AS DESCRIBED ON CNDS-1323.11-00-0026 CAN REMAIN CONNECTED TO VENT PIPING FOR VALVE INI512. THE PIPE CAP IS TO BE RE-INSTALLED WHEN VENTING RIG IS REMOVED.
17. OPEN AS NEEDED TO CONTROL NO PRESSURIZATION.
18. NI FLOW RESTRICTING ORIFICE CONSISTS OF A MACHINED SOCKET WELD PIPE COUPLING. REFER TO DWG. CN-1451-NI.00-124.
19. NI FLOW RESTRICTING ORIFICE CONSISTS OF A MACHINED SOCKET WELD PIPE COUPLING. REFER TO DWG. CN-1451-NI.00-127.
20. ECCS SUMP PIPING DRAIN RESERVOIR.
21. ECCS SUMP PIPING DRAIN PATH TO RESERVOIR.
22. ECCS SUMP PIPING VENT FROM RESERVOIR.
23. VALVE INSTALLED OPPOSITE TO DIRECTION OF FLOW.

DESIGN PARAMETERS

LINE LISTING	PIPE SPEC.	PRESSURE	TEMPERATURE	CLASS	MATERIAL
03	2501.4	2750 PSIA	300°F	E	53
08	1501.2	1915 PSIA	200°F	B	55
11	2501.1	2500 PSIA	650°F	A	55
12	2501.2	2500 PSIA	650°F	A	55
20	151.2	65 PSIA	110°F	B	55
21	601.2	540 PSIA	400°F	B	55
40	2501.2	2750 PSIA	650°F	B	55
56	2501.2	2500 PSIA	300°F	B	55
59	2501.2	2500 PSIA	300°F	B	55
60	2781.4	2500 PSIA	500°F	E	51
61	2781.4	2500 PSIA	300°F	E	51
62	2501.2	2500 PSIA	500°F	E	53

NO.	REVISIONS	DRN	DATE	CHKD	DATE	APPR	DATE
16	REV PER CD1010388	VOC	02-18	RSF	02-18	ROW	02-18
15	REV PER CD1080631 IMP. DATE 12-25-86	VOC	12-29	TLC	12-29	PFB	12-29
14	REV PER CN-1160/RR IMP. DATE 6-13-85	VOC	6-24	CLT	6-24	ROW	6-25
13	REV PER CE-6210G IMP. DATE 11-29-83	VOC	12-2	CLT	12-3	ROW	12-4
12	REV PER CE-8924 (11-3-87)	VOC	11-11	BJL	11-12	ROW	11-20
—	REV PER CE-9146 (11-4-87)	—	—	—	—	—	—
11	REV PER CE-7698 (9-21-86)	RPF	10-15	EDS	10-15	KWA	10-15
10	REV. PER CE-6818I	DLM	10-18	AEC	10-24	KLE	10-30
9	REV PER CE-6083G (9-15-84)	EDS	9-24	AEC	9-24	KLE	10-3
ORIG	APPROVED AND RELEASED	—	—	RHW	—	CLS	7-3

INSPECTED	DATE
CIVIL	
ELEC.	
MECH.	

QA CONDITION 2
QA CONDITION 1

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION UNIT 1

FLOW DIAGRAM OF
SAFETY INJECTION SYSTEM
(NI)

DESIGNER INE WEBSTER DATE 7-3-74 | INSP. WALKER DATE
DRAWN TOM JONES DATE 6-28-74 | INSP. JR HALL DATE 7-3-74
CHECKED BY WALKER DATE 7-3-74 | APPR. JF VOKE DATE 7-3-74

SCALE | DWG. NO. CN-1562-1.3 | REV. 16

ERN:CN000HM0

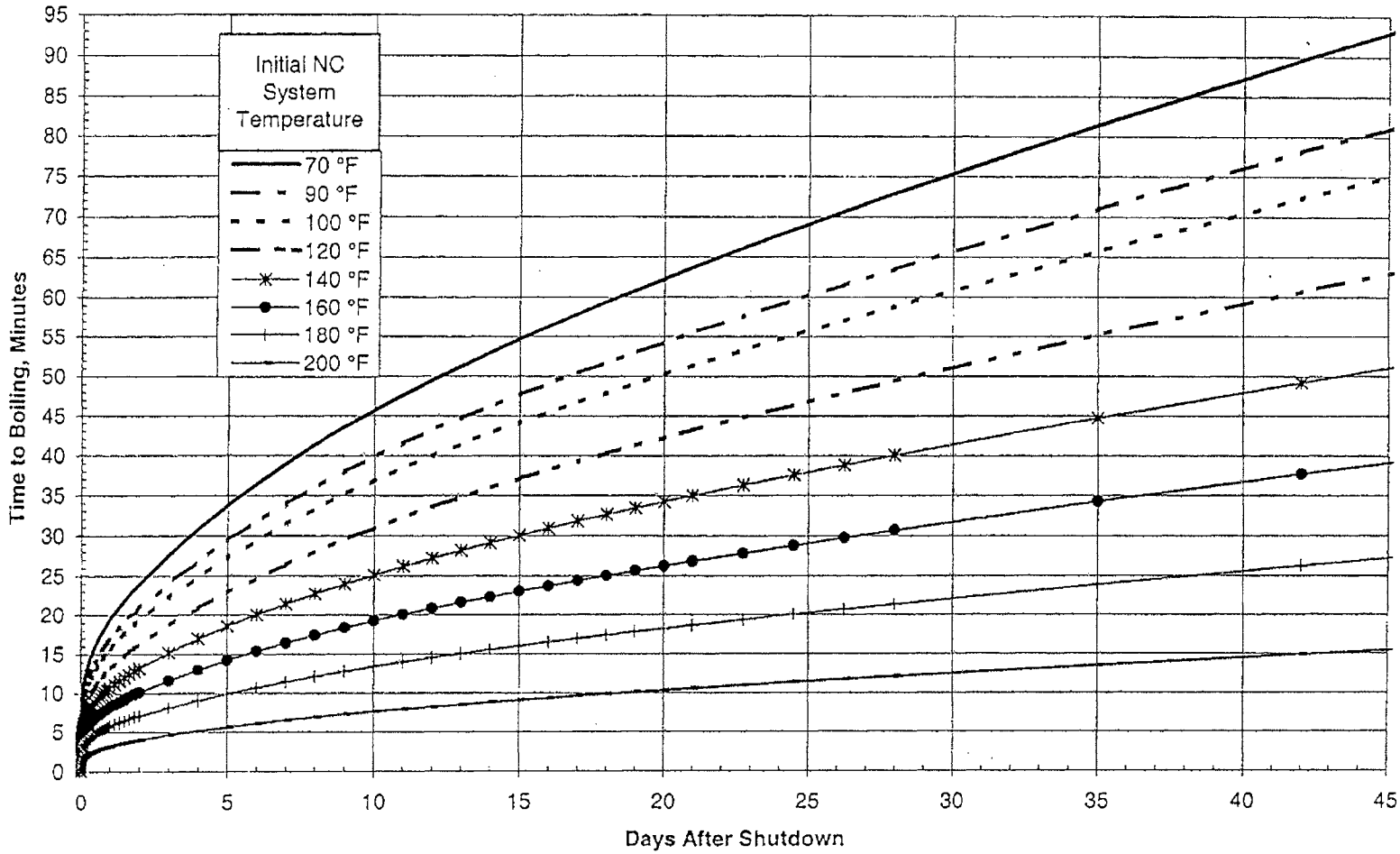


Figure 14B - Loss of Decay Heat Removal, 18% NC Level, High Decay Heat

Source: DPC-1552.08-00-0014, Rev. 8
Figure 16-8

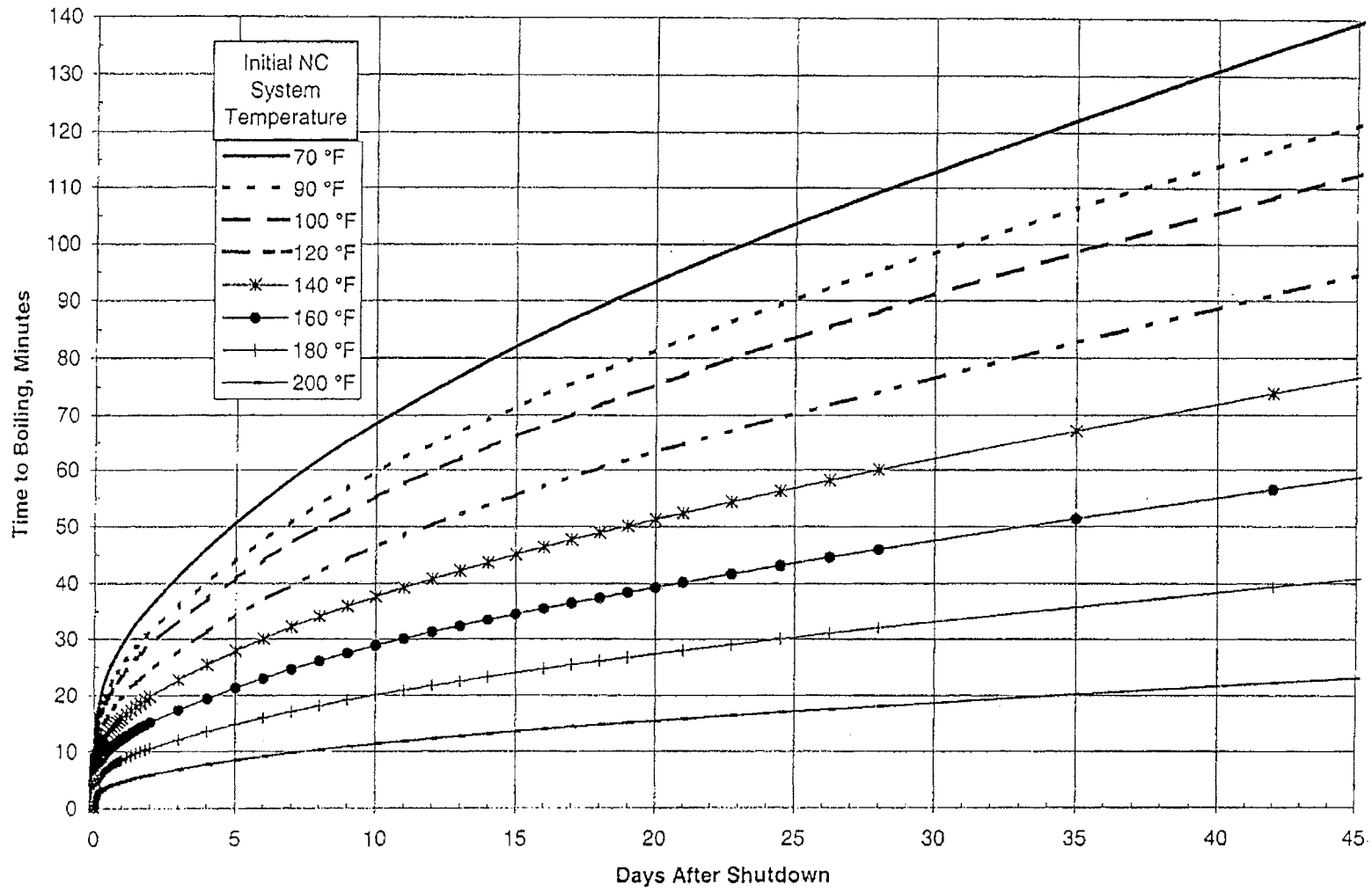


Figure 15B - Loss of Decay Heat Removal, 18% NC Level, Low Decay Heat

Source: OAC Reactor Coolant Saturation Calculations

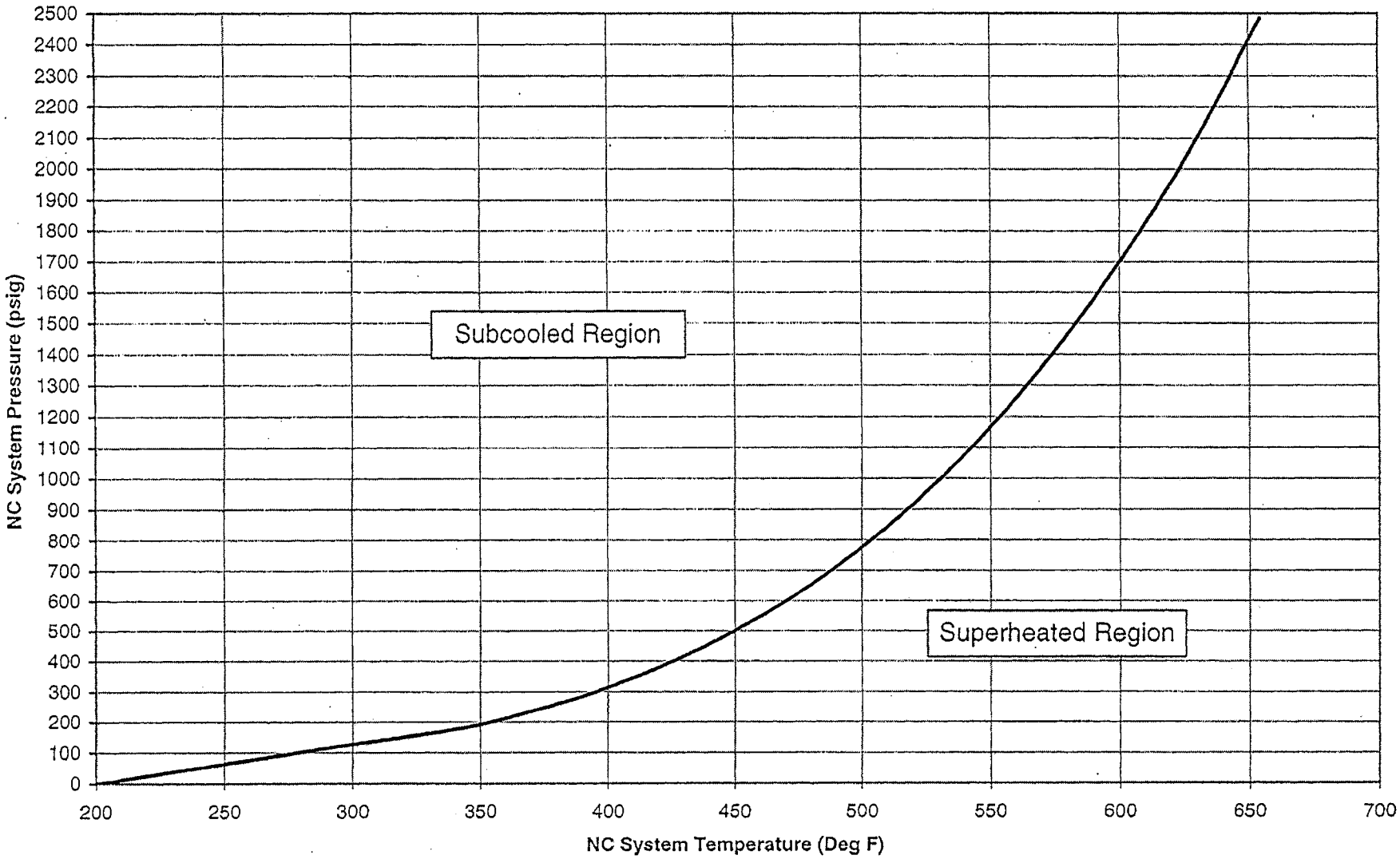
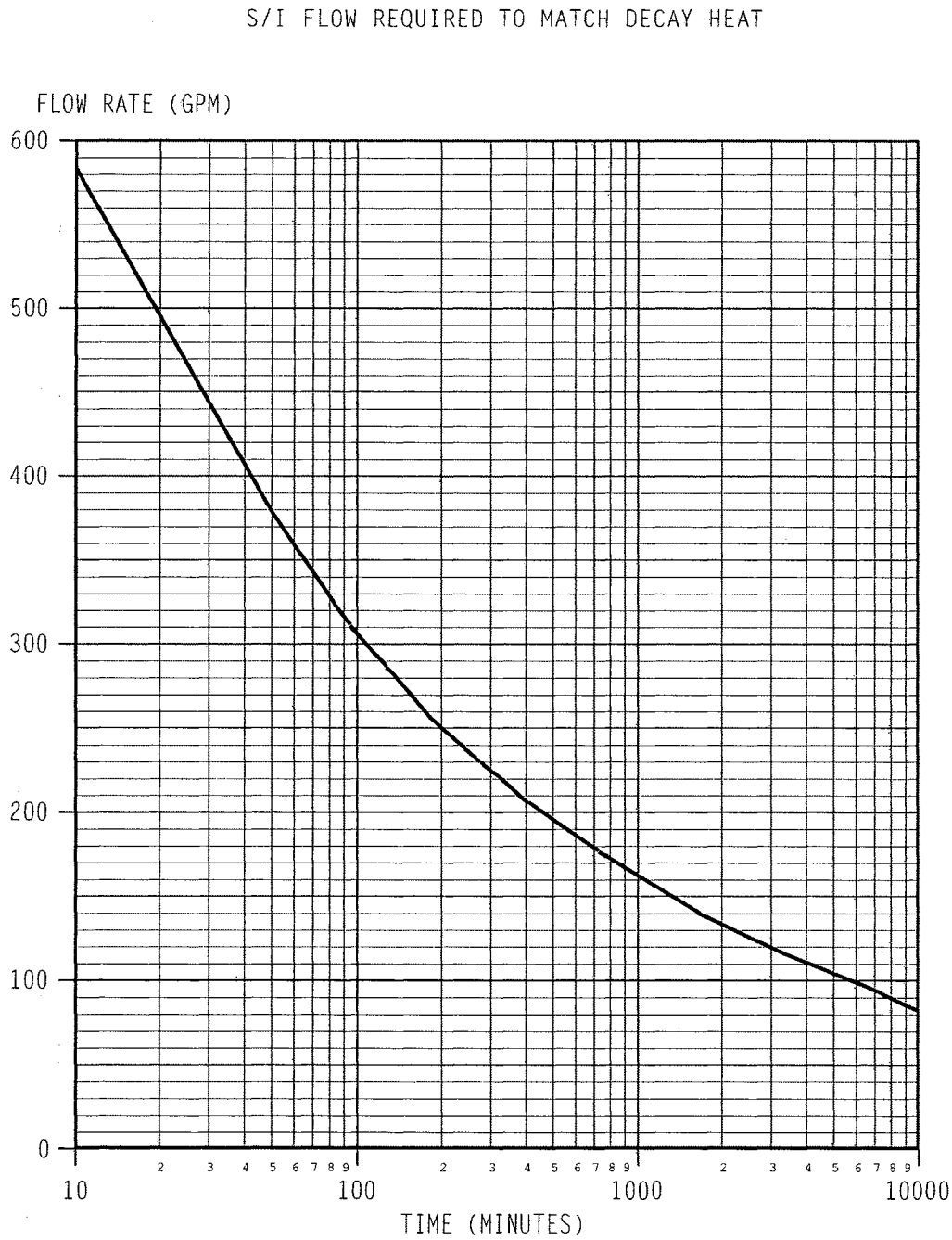


Figure 57 - Reactor Coolant Satur Curve


S/I FLOW REQUIRED TO MATCH DECAY HEAT
FLOW RATE (GPM)
600
500
400
300
200
100
0
10
100
1000
10000
TIME (MINUTES)

CLEAN COPY OF STEAM TABLES

Examination KEY for: 2009 SRO NRC Examination

Question Number	*Answer*
1	B
2	D
3	A
4	A
5	A
6	A
7	D
8	C
9	A
10	C
11	B
12	D
13	D
14	A
15	D
16	D
17	A
18	A
19	D
20	A
21	B
22	A
23	C
24	A
25	D

Examination KEY for: 2009 SRO NRC Examination

Question Number	*Answer*
26	D
27	A
28	D
29	D
30	B
31	A
32	A
33	D
34	B
35	B
36	A
37	B
38	B
39	A
40	D
41	C
42	D
43	A
44	B
45	C
46	D
47	D
48	A
49	B
50	B

Examination KEY for: 2009 SRO NRC Examination

Question Number	*Answer*
51	D
52	A
53	A
54	D
55	C
56	B
57	C
58	A
59	B
60	B
61	B
62	D
63	C
64	B
65	B
66	B
67	B
68	B
69	D
70	D
71	C
72	B
73	D
74	B
75	B

Examination KEY for: 2009 SRO NRC Examination

Question Number	*Answer*
76	C
77	D
78	D
79	A
80	D
81	C
82	D
83	A
84	D
85	D
86	D
87	C
88	A
89	A
90	A
91	B
92	D
93	B
94	C
95	A
96	D
97	A
98	D
99	D
100	C