

FINAL SUBMITTAL

SURRY EXAM 50-280/2000-301

SEPTEMBER 14 - 21, 2000

FINAL RO WRITTEN EXAMINATION
AND ANSWER KEY
SEPTEMBER 14, 2000

98
Total Points: (100.0) 1-11

NRC RO EXAM ANSWER KEY

SURRY POWER STATION

RO/SRO LICENSE CLASS 99-1

SRO UPGRADE CLASS 99-2

NRC LICENSING EXAM

September 14, 2000

NRC RO EXAM ANSWER KEY

1. <u> B </u>	31. <u> C </u>	61. <u> C </u>	91. <u> D </u>
2. <u> A </u>	32. <u> D </u>	62. <u> C </u>	92. <u> A </u>
3. <u> C </u>	33. <u> B </u>	63. <u> A </u>	93. <u> A </u>
4. <u> C </u>	34. <u> B </u>	64. <u> B </u>	94. <u> C </u>
5. <u> B </u>	35. <u> A </u>	65. <u> D </u>	95. <u> A </u>
6. <u> B </u>	36. <u> C </u>	66. <u> A </u>	96. <u> D </u>
7. <u> C </u>	37. <u> A </u>	67. <u> B </u>	97. <u> C </u>
8. <u> B </u>	38. <u> C </u>	68. <u> B </u>	98. <u> A </u>
9. <u> D </u>	39. <u> A </u>	69. <u> A </u>	99. <u> A </u>
10. <u> D </u>	40. <u> B </u>	70. <u> C </u>	100. <u> B </u>
11. <u> C </u>	41. <u> C </u>	71. <u> D </u>	
12. <u> A </u>	42. <u> A </u>	72. <u> B </u>	
13. <u> A </u>	43. <u> D </u>	73. <u> B </u>	
14. <u> C </u>	44. <u> B </u>	74. <u> D </u> <i>deleted</i>	
15. <u> B </u>	45. <u> C </u>	75. <u> D </u>	
16. <u> C </u>	46. <u> B </u>	76. <u> D </u>	
17. <u> B </u>	47. <u> A </u>	77. <u> B </u>	
18. <u> D </u>	48. <u> D </u>	78. <u> D </u>	
19. <u> A </u>	49. <u> C </u>	79. <u> D </u>	
20. <u> D </u>	50. <u> B </u>	80. <u> C </u>	
21. <u> B </u>	51. <u> C </u>	81. <u> D </u>	
22. <u> C </u>	52. <u> B </u>	82. <u> B </u>	
23. <u> B </u>	53. <u> D </u>	83. <u> C </u>	
24. <u> A </u>	54. <u> A </u>	84. <u> B </u>	
25. <u> A </u>	55. <u> D </u>	85. <u> D </u>	
26. <u> C </u>	56. <u> A </u>	86. <u> B </u> <i>deleted</i>	
27. <u> B </u>	57. <u> B </u>	87. <u> A </u> <i>B</i>	
28. <u> C </u>	58. <u> A </u>	88. <u> B </u>	
29. <u> C </u>	59. <u> C </u>	89. <u> C </u>	
30. <u> B </u> <u> A </u> <i>for</i>	60. <u> C </u>	90. <u> D </u>	

SURRY POWER STATION

RO/SRO LICENSE CLASS 99-1

NRC RO LICENSING EXAM

September 14, 2000

(TOTAL POINTS: 100.0)

QUESTION 1: (1.0)

Given the following plant conditions:

- RCS is at 320°F/400 psig.
- Charging flow control in manual.
- The "A" RHR heat exchanger develops a 10 gpm tube leak.
- Heat exchanger bypass flow controller FCV-1605 is in Automatic.

Which ONE of the following is correct concerning the indications you would expect for this condition?

- a. CC Head tank level decreases.
- b. PRZR level decreases.
- c. Indicated RHR flow increases.
- d. RHR pump amps decrease.

QUESTION 2: (1.0)

Given the following plant conditions:

- Unit 1 core off-load is in progress.
- The Fuel Building supervisor informs the control room that an irradiated fuel assembly has become separated from the top nozzle and fallen on top of the fuel racks.
- Fuel building radiation monitors are in alarm.

In accordance with 0-AP-22.00, Fuel Handling Abnormal Conditions, the control room team should immediately_____.

- a. actuate dumping of control room bottled air.
- b. align fuel building exhaust through the iodine filters.
- c. evacuate the fuel building only if radiation levels exceed 1 Rem/hour.
- d. retrieve the fuel transfer cart and close the fuel transfer tube gate valve.

QUESTION 3: (1.0)

Given the following plant conditions:

- Reactor power is 20%, increasing to 100%.
- Annunciator G-B5, COMPU PRINTOUT ROD CONT SYS, is inoperable.
- Rod height is initially 140 steps on "D" bank.
- As rods are withdrawn, a blown fuse results in one immovable rod—F-6 in "D" bank (located near N-43).

If power ascension continues, quadrant power tilt ratio will _____ as indicated by _____ as rods are fully withdrawn.

- a. decrease; N-43 Delta Flux meter
- b. increase; N-43 Delta Flux meter
- c. increase; annunciator G-C4, UPPER ION CHAMBER OR AUTO DEFEAT < 50% remaining lit as power exceeds 50%
- d. decrease; annunciator G-D4, LOWER ION CHAMBER OR AUTO DEFEAT < 50% clearing as power exceeds 50%

QUESTION 4: (1.0)

Given the following plant conditions:

- Refueling is complete and RCS loops have been filled.
- The team has started "A" reactor coolant pump (RCP).
- Immediately after pump start, annunciator C-H4, RCP FRAME DANGER alarms.

In response, the team should _____.

- a. stop the RCP and request engineering to perform a structural integrity inspection
- b. re-scale the vibration monitor and determine if readings are accurate
- c. determine if vibrations are high; if so then stop the RCP
- d. request predictive analysis to take readings using hand-held instrumentation

QUESTION 5: (1.0)

RCS cooldown is in progress per 1-ES-0.2, Natural Circulation Cooldown.

During RCS depressurization, the team notes that subcooling has suddenly decreased from 45°F to 5°F. Per the ES-0.2 continuous action page, the team should _____.

- a. initiate safety injection and transition to 1-ES-0.0, Re-diagnosis
- b. initiate safety injection and transition to 1-E-0, Reactor Trip or Safety Injection
- c. stop RCS depressurization and continue cooldown to restore subcooling
- d. continue RCS depressurization and increase the cooldown rate to restore subcooling

QUESTION 6: (1.0)

A reactor trip occurred and the team noted that all IRPIs indicated zero except the following:

- L-5 – 22 steps
- K-10 – 16 steps
- E-14 – 9 steps
- B-6 – 11 steps
- D-10 – 20 steps
- C-7 – 17 steps
- H-2 – 13 steps
- J-3 – 19 steps
- B-8 – 6 steps

Emergency boration via 1-CH-MOV-1350 commenced with “A” BAST level initially at 89% AND 8.1 % Boric Acid. Current RCS Concentration of Boron is 892 ppm.

Using the references provided, determine which ONE of the following is correct concerning the level in “A” BAST at which the team should stop emergency boration.

- a. 28%
- b. 52%
- c. 58%
- d. 73%

NUMBER	PROCEDURE TITLE	REVISION
1-ES-0.1	REACTOR TRIP RESPONSE	24
		PAGE 8 of 14

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10.	<p>__VERIFY ALL IRPIs - 10 STEPS OR LESS</p>	<p><u>IF</u> two or more IRPIs indicate greater than 10 Steps, <u>THEN</u> do the following:</p> <ul style="list-style-type: none"> a) Verify or raise CHG flow - GREATER THAN 75 GPM b) Align boration path: <ul style="list-style-type: none"> 1) Put BATP in FAST. 2) Open 1-CH-MOV-1350. 3) Verify emergency borate flow. c) <u>IF</u> emergency borate flow path <u>NOT</u> available, <u>THEN</u> align alternate boration path: <ul style="list-style-type: none"> • Borate using the Blender. <p style="text-align: center;"><u>OR</u></p> <ul style="list-style-type: none"> • Manually align CHG pump suction to the RWST. d) Record start time of emergency boration. <ul style="list-style-type: none"> • _____ e) Record in-service BAST level. <ul style="list-style-type: none"> • _____ f) Direct STA to initiate Attachment 1. g) Initiate Shutdown Margin IAW 1-OP-RX-002. SHUTDOWN MARGIN (CALCULATED AT-ZERO POWER).

NUMBER 1-KS-0.1	ATTACHMENT TITLE GALLONS OF BORIC ACID NEEDED TO INCREASE RCS BORON BY 200 PPM	REVISION 24
ATTACHMENT 1		PAGE 1 of 2

NOTE: The amount of boration listed in the table in Step 4c is only an estimate of the actual boration required. The actual value is determined by calculations performed in 1-OP-RX-002. The amount of boration should be adjusted based on the SDM calculation.

- ___ 1. Using IRPI indication, determine the number of control rods greater than 10 Steps and complete the following table.

Actual RPI Indication	Record RPI IDs for RPIs indicating NOT fully inserted	Equivalent Stuck Rods (EQSR)	Record EQSR Subtotals:
Any Rod > 20 steps		1 rod = 1 EQSR	
Rods indicating 11 - 20 (inclusive) steps withdrawn		1 to 6 rods = 1 EQSR 7 to 12 rods = 2 EQSR 13 to 31 rods = 3 EQSR 32 or more = 4 EQSR	
		Total Equivalent Stuck Rods:	

- ___ 2. IF only one Total Equivalent Stuck Rod was indicated in the above table, THEN stop emergency boration.
- ___ 3. IF two or more Equivalent Stuck Rods were indicated in the above table, THEN continue with emergency boration IAW Step 4.
- ___ 4. Use the table below to borate 200 ppm for each equivalent stuck rod as determined in Step 1.
- ___ a. Check current RCS boron concentration. Use the range within which the current ppm reading falls.

NUMBER 1-ES-0.1	ATTACHMENT TITLE GALLONS OF BORIC ACID NEEDED TO INCREASE RCS BORON BY 200 PPM	REVISION 24
ATTACHMENT 1		PAGE 2 of 2

- ___ b. Check the BAST boron concentration for the in-service tank.
Use the range within which the current concentration falls.
- ___ c. Multiply the value listed (gallons) by the number of equivalent
stuck rods determined in Step 1 and borate that amount.

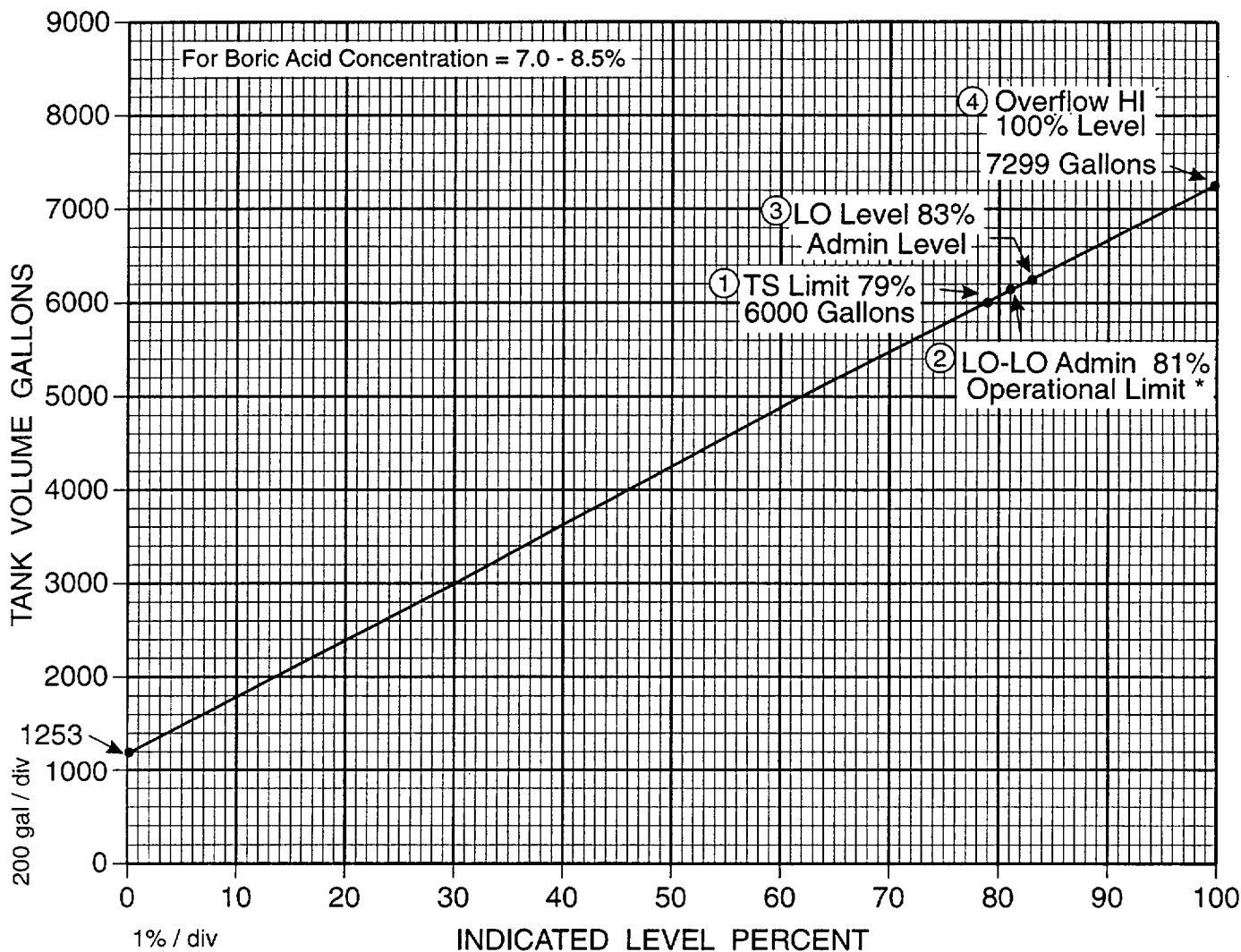
CURRENT RCS BORON (PPM)	BAST 7.0-7.24	BAST 7.25-7.49	BAST 7.50-7.74	BAST 7.75-7.99	BAST 8.0-8.24	BAST 8.25-8.5
0-100	1198	1156	1117	1080	1046	1014
101-200	1208	1165	1126	1088	1054	1021
201-300	1218	1175	1134	1097	1061	1028
301-400	1229	1184	1143	1105	1069	1036
401-500	1239	1194	1153	1114	1077	1043
501-600	1250	1204	1162	1122	1085	1051
601-700	1261	1214	1171	1131	1094	1059
701-800	1272	1225	1181	1140	1102	1066
801-900	1283	1235	1191	1149	1110	1074
901-1000	1295	1246	1201	1158	1119	1082
1001-1100	1307	1257	1211	1168	1128	1091
1101-1200	1318	1268	1221	1177	1137	1099
1201-1300	1331	1279	1231	1187	1146	1108
1301-1400	1343	1290	1242	1197	1155	1116
1401-1500	1356	1302	1253	1207	1164	1125

- ___ d. Adjust boration amount based on the value calculated in
1-OP-RX-002.

ATTACHMENT 58

(Page 1 of 1)

BORIC ACID STORAGE TANKS



- | | |
|---------------------------------|------|
| ① TS Limit (6000 gallons) | 79% |
| ② LO-LO Admin Operational Limit | 81% |
| ③ LO Level Admin Limit | 83% |
| ④ Overflow High Level | 100% |

Graphics No: KM1130

* 81% ~ TS Limit with Gauge
Inaccuracy Minimum Operational Limit

BORIC ACID STORAGE TANKS
1-CH-TK-1A, B, C

QUESTION 7: (1.0)

Given the following plant conditions:

- Reactor startup is in progress.
- Shutdown banks have been withdrawn.
- Control bank "D" is at 150 steps.
- The reactor is at 5% power controlling on the steam dumps.
- Multiple failures result in RCS pressure increasing to 2750 psig.

What is the required team response required by Technical Specifications?

- a. Be in hot shutdown within 6 hours.
- b. Be in cold shutdown in 30 hours.
- c. Be in hot shutdown within 1 hour.
- d. Suspend the startup until the pressure is below 2235 psig.

QUESTION 8: (1.0)

Given the following plant conditions:

- A main steam break occurred with the unit at 100% power.
- Safety injection actuated and all equipment functioned correctly.
- The RO noted that control rod H-14 IRPI indicates 226 and all other rod bottom lights are illuminated.

Which ONE of the following identifies the required team response?

- a. Initiate Emergency boration.
- b. No additional actions are required.
- c. Rack out both rod drive MG set supply breakers.
- d. Attempt to manually insert the rod.

QUESTION 9: (1.0)

Given the following plant conditions:

- The unit has been placed on line.
- The turbine is at 15% power.
- Annunciator F-B6, TURB LO VAC, alarmed ten minutes ago.
- The reactor operator observes main condenser vacuum at 24.8" Hg and degrading.

In accordance with 1-AP-14.00, Loss of Main Condenser Vacuum, if vacuum can not be recovered the team should _____.

- a. reduce turbine load until vacuum is stable
- b. initiate 1-AP-23.00, Rapid Load Reduction
- c. trip the turbine while continuing with 1-AP-14.00
- d. trip the reactor and go to 1-E-0 while continuing with 1-AP-14.00

QUESTION 10: (1.0)

Given the following plant conditions:

- A complete loss of vital bus 1-III occurred with the unit at 100% power.
- Repairs will require at least one hour before the bus can be re-energized.
- CC flow to the "A" RCP could not be restored and the team tripped the unit.
- Five minutes after the trip, RCS average temperature decreased to 538°F in the idle RCS loop.

Which ONE of the following actuations will occur, if any?

- a. No actuation will occur.
- b. High steam flow SI only will occur.
- c. Steam line isolation only will occur.
- d. High steam flow SI and steam line isolation will both occur.

QUESTION 11: (1.0)

While responding to a Hi Hi CLS actuation on Unit 2 the Reactor Operator receives annunciator 2B-H2, BCHX OUTLET Hi Temp. Unit 1 is shutdown with RCP's running.

Which ONE of the following events caused the annunciator to alarm?

- a. Phase III Containment Isolation.
- b. Load Shed.
- c. "E" and "F" transfer bus undervoltage.
- d. Load Sequencing.

QUESTION 12: (1.0)

Given the following plant conditions:

- Unit 1 was at 100% power when noxious fumes forced evacuation of the control room.
- 1-AP-20.00, Main Control Room Inaccessibility, was entered.

Which ONE of the following identifies the control manipulation required to transfer charging flow control to the ASDP?

- a. Place the switch for half station 1-CH-FCV-1122 to "LOCAL".
- b. Place the "H" Group Transfer Switch to "LOCAL".
- c. Place the "J" Group Transfer Switch to "LOCAL".
- d. Place the switch for Manual/Auto controller FCV-FC-1122 to "LOCAL".

QUESTION 13: (1.0)

Which ONE of the following conditions describes a loss of containment integrity?

- a. The seals on the Personnel airlock (inner and outer) are tested 18 days after use while at power.
- b. The inner containment airlock door is left open while performing maintenance on the outer door O-rings at Cold Shutdown.
- c. One containment airlock door is opened for maintenance at Intermediate Shutdown.
- d. A containment penetration exceeds Tech Spec leakage rate limits while at Cold Shutdown.

QUESTION 14: (1.0)

A letdown radiation monitor alarm prompts the team to verify a mixed bed IX is in service.

Which ONE of the following identifies the basis for this action?

- a. A mixed bed IX must be in service because the letdown radiation monitor is located in series with the IX.
- b. A mixed bed IX will remove excess Lithium that could potentially damage the fuel.
- c. A mixed bed IX will help reduce radioactive activity in the RCS by trapping the radioactive particles.
- d. A mixed bed IX will raise primary pH which will minimize fuel element damage.

QUESTION 15: (1.0)

Given the following plant conditions:

- Unit 1 is stable at 50% power.
- Rod control is in AUTOMATIC with "D" bank at 190 steps.
- T_{ave} and T_{ref} are initially matched at 560°F.
- A failure in the median/high select T_{ave} control unit results in T_{ave} indicating 556°F.

As a result, control rods will _____.

- a. insert at 40 steps per minute
- b. withdraw at 40 steps per minute
- c. insert at 32 steps per minute
- d. withdraw at 32 steps per minute

QUESTION 16: (1.0)

Which ONE of the following will directly result in a Unit 1 Reactor Trip from 100% power?

- a. With MG 1-1 tagged out for maintenance, "C" RSST locks out.
- b. Loss of the 1C1-2 transformer supplying Rod control.
- c. With MG 1-2 tagged out for maintenance, breaker 15A7, 480 supply breaker, trips open.
- d. Loss of semi-vital bus power to the IRPI cabinets.

QUESTION 17: (1.0)

The following conditions exist:

- Unit 1 tripped from 30% power due to a loss of the "A" RSST.
- The Unit 1 Terry Turbine tripped on overspeed.
- The #3 EDG failed to auto start.
- The Outside Service Building Operator has isolated the "J" train of AFW.

Which ONE of the following system relationships exists?

- a. "B" Motor Driven AFW pump recirculation line is isolated.
- b. With Unit 1 AFW cross-tie established from Unit 2, Unit 1 "J" AFW will be re-established.
- c. If Unit 1 "J" bus is restored, Unit 1 "J" header AFW flow will initiate unmitigated.
- d. The Unit 1 "J" train must be un-isolated to initiate Unit 2 AFW cross-tie.

QUESTION 18: (1.0)

You are monitoring 100% power operation using the SPDS in the TSC. During this monitoring the following Top Level Display Functions are shown:

1-Reactivity Control	Green
2-Core Heat Removal	Red
3-Secondary Heat Removal	Green
4-RCS Integrity	Red
5-Radioactivity Control	Red
6-Containment Conditions	Red

Which ONE of the following identifies the accident in progress?

- a. Steam Generator Tube Rupture.
- b. Steam Line Break Inside Containment.
- c. Steam Line Break Outside Containment
- d. Small Break LOCA.

QUESTION 19: (1.0)

The following conditions exist:

- The Unit Reactor Operator noticed pressurizer level decreasing rapidly and performed AP-16.00, Excessive RCS leakage.
- The team initiated a manual SI based on excessive RCS leakage.
- A Health Physics technician reported steam from the Safeguards valve pit area.
- With RCS pressure at 1650 psig, the Unit Reactor Operator reported LHSI flow at 4500 gpm per pump.
- The team has entered ECA-1.2, LOCA outside Containment.
- Immediately after closing 1-SI-MOV-1890C, all LHSI flow reduced to zero.

Which ONE of the following identifies the status of the leak (assuming there is only one leak location)?

- a. RCS leak is still active.
- b. RWST leak is still active.
- c. The leak is isolated.
- d. The leak is NOT on the LHSI piping.

QUESTION 20: (1.0)

All running RCP's must be stopped after Hi Hi CLS actuation.

Which ONE of the following is the reason for the RCP's being stopped?

- a. to reduce RCS inventory loss via the break.
- b. to prevent a deeper core uncover due to two phase flow within the RCS.
- c. to minimize electrical load on the Reserve Station Service busses during Hi Hi CLS.
- d. to prevent damage to the RCP motor from a loss of Component Cooling.

QUESTION 21: (1.0)

The Operating team has just swapped charging pumps and the following conditions exist:

Charging flow control is in automatic.

Charging flow indicates 40 gpm.

“B” Charging pump indicates 82 amps (12 amps above normal).

Program Pressurizer level indicates 53.7%.

Actual Pressurizer level indicates 49%.

1-CH-FCV-1122 indicates full demand.

Which ONE of the following has initiated this response?

- a. 1-CH-FCV-1122 air supply line severed.
- b. “A” charging pump discharge check valve failed.
- c. 1-CH-HCV-1311, Auxiliary Spray valve failed open.
- d. Regenerative heat exchanger tube leak.

QUESTION 22: (1.0)

The following conditions exist:

- The RCS is at 256°F, 300 psig.
- The RCS is solid.
- RHR is in-service, with 1-CH-PCV-1145 controlling RCS pressure.
- Outside air is valved into Containment.
- A loss of ALL instrument air occurs.

Assuming all systems respond as expected, which ONE of the following identifies the effect on the RCS?

- a. Temperature will decrease.
- b. Pressure will increase to a maximum of 2235 psig.
- c. Pressure will increase to a maximum of 365 psig.
- d. Inventory will decrease.

QUESTION 23: (1.0)

During the performance of 1-FR-P.1, Response to Imminent Pressurized Thermal Shock Condition, the team is directed to stop both low-head safety injection (LHSI) pumps and all but one charging pump.

Which ONE of the following describes the potential consequences of failure to perform these actions?

- a. Containment failure.
- b. Brittle failure of the reactor vessel.
- c. Loss of suction to containment spray pumps.
- d. Loss of suction to LHSI and charging pumps.

QUESTION 24: (1.0)

During performance of FR-S.1, Response to Nuclear Power Generation/ATWS, manual alignment of the Charging pump suction to the RWST is performed if emergency boration is unavailable.

Which ONE of the following identifies why manual SI initiation is NOT performed?

- a. Trips the running Main Feed Pumps.
- b. Excessive RCS pressure spike due to an auto turbine trip.
- c. Phase I Containment Isolation.
- d. Initiates electrical transient due to a Main Generator Trip.

QUESTION 25: (1.0)

20 minutes after a reactor trip from 66% power, the following NI indications exist:

- N-35 indicates 4.0×10^{-9} amps, SUR indicates 0 DPM.
- N-36 indicates 2.1×10^{-11} amps, SUR indicates -0.1 DPM.
- Source range detectors N-31 and N-32 are de-energized.

Which ONE of the following describes the abnormality in the above condition?

- a. N-35 is undercompensated.
- b. N-36 is undercompensated.
- c. N-35 is overcompensated.
- d. N-36 is overcompensated.

QUESTION 26: (1.0)

Which ONE of the following Steam Generator primary to secondary leakage conditions would permit continued power operation in accordance with Tech Specs?

- a. "A" leakage at 1.2 gpm.
- b. "A" leakage at .812 gpm and "C" SG at .25 gpm.
- c. "A" leakage at .345 gpm, "B" leakage at .25 gpm, and "C" leakage at .3 gpm.
- d. "A" leakage at .33 gpm, "B" leakage at .34 gpm, and "C" leakage at .335 gpm.

QUESTION 27: (1.0)

The following conditions exist during a Spent Fuel Cask load in the Fuel Building:

- Annunciator RM-C-3, Fuel Pit Bridge ALERT/FAILURE alarmed.
- Radiation Monitor indicates 7.32 mr/hr.
- High alarm test indicates 1.00E1 mr/hr.
- Alert alarm test indicates 5.00E0 mr/hr.
- Local reports from the Fuel Building indicate cloudiness in the water.

Which ONE of the following immediate actions is required for this situation?

- a. Direct HP to establish alternate radiation monitoring.
- b. Evacuate the fuel building.
- c. Manually dump both banks of bottled air.
- d. Immediately start one emergency MCR supply fan.

QUESTION 28: (1.0)

Which ONE of the following is performed in accordance with FR-Z.3, Response to Containment High Radiation?

- a. Isolate SW to 2/4 inservice RSHXs.
- b. If containment pressure has not increased to 23 psia, initiate CS flow to add NaOH.
- c. Verify that non-essential containment penetrations are isolated.
- d. Establish Containment Purge and Exhaust.

QUESTION 29: (1.0)

Given the following plant conditions:

- Unit 1 tripped from 100% power due to a loss of all main and auxiliary feedwater.
- All efforts to restore S/G feedwater flow have failed.
- RCS bleed and feed has now been initiated.

In all cases, RCS bleed and feed will _____.

- a. prevent core uncover
- b. prevent an inadequate core cooling condition
- c. provide temporary core cooling until a secondary heat sink can be restored
- d. depressurize the RCS sufficiently to enable the team to place RHR in service

QUESTION 30: (1.0)

Unit 2 is at Hot Shutdown with the steam dump system in Tave Mode. Steam Dump Controller offset has allowed Tave to increase up to 554°F. The Unit 2 semi-vital bus lost power 5 minutes ago.

Which ONE of the following identifies the status of the Unit 2 PORV's?

- a. All open and being automatically controlled in Local/Auto.
- b. All open and being automatically controlled in Remote/Auto.
- c. All shut and being manually controlled in Local/Auto.
- d. All shut and being manually controlled in Remote/Auto.

QUESTION 31: (1.0)

With unit 1 at 100% power, the RO takes the following data from the power range NIs.

	<u>N-41</u>	<u>N-42</u>	<u>N-43</u>	<u>N-44</u>
Upper Detector Current	159.7	139.5	157.0	141.7
100% Upper Detector Current	266.6	234.5	262.9	237.4
Lower Detector Current	166.0	145.1	160.7	144.4
100% Lower Detector Current	278.6	236.7	270.0	240.2

Using the references provided, determine which ONE of the following is correct.

- a. QPTR is 1.0253.
- b. QPTR is 1.0158.
- c. QPTR is 1.0195.
- d. QPTR is 1.0209.

Radial Tilt Calculation Worksheet

Unit _____

Upper Flux Channels

Time	Data	NI-41	NI-42	NI-43	NI-44	Average NI $\frac{41+42+43+44}{4}$	Peak NI-__	Radial Tilt PEAK AVERAGE
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							

Lower Flux Channels

Time	Data	NI-41	NI-42	NI-43	NI-44	Average NI $\frac{41+42+43+44}{4}$	Peak NI-__	Radial Tilt PEAK AVERAGE
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							

Approved by: _____

Supt. Operations

Approved By: _____

SNSOC

Completed By: _____

Date: 6/10/98

Date: 6/10/98

Date: _____

QUESTION 32: (1.0)

Given the following plant conditions:

- Unit 1 is at 28% power.
- Annunciator 1C-C4, RCP 1C SEAL LKOFF HI FLOW, has just alarmed.
- "C" RCP no. 1 seal leak-off flow is indicating >8 gpm.

What actions are required?

- a.
 - 1) Stop "C" RCP.
 - 2) Verify "C" loop flow decreases to zero.
 - 3) Close "C" RCP seal leak-off valve.
- b.
 - 1) Go to 1-E-0, Reactor trip or Safety Injection, while continuing with AP-9.00.
 - 2) When the reactor is tripped, then close "C" RCP seal leak-off valve.
 - 3) Stop "C" RCP and verify ≤ 5 minutes have passed since seal failure occurred.
- c.
 - 1) Monitor RCP pump radial temperature and seal water return temperature.
 - 2) Initiate unit shutdown to allow stopping "C" RCP within 1 hour.
 - 3) When the unit is in HSD, then stop "C" RCP.
 - 4) Close "C" RCP seal leak-off valve.
- d.
 - 1) Go to 1-E-0, Reactor Trip or Safety Injection, while continuing with AP-9.00.
 - 2) When the reactor is tripped, then stop "C" RCP.
 - 3) Verify "C" loop flow decreases to zero.
 - 4) Close "C" RCP seal leak-off valve.

QUESTION 33: (1.0)

Unit 1 was tripped from 100% power due to a Main Steam Trip valve spurious closure. Unit 2 remains at 100% power. During electrical swapover, breaker 15E1 tripped on fault.

Which ONE of the following describes the Unit 1 and Unit 2 Reactor Coolant Pump (RCP) status?

- a. All RCPs running.
- b. All RCPs running except 1B.
- c. All RCPs running except 1B and 2B.
- d. All RCPs running except 2B.

QUESTION 34: (1.0)

The following conditions exist:

- RCS pressure is 300 psig.
- RCS temperature is 251°F.
- The RCS is solid.
- Flow through 1-RH-HCV-1142 is 50 gpm.

If a spurious SI occurs, which ONE of the following identifies RCS pressure response?

- a. increases due to three running charging pumps.
- b. increases due to letdown isolation.
- c. decreases due to the running RHR pump tripping.
- d. decreases due to administrative isolation of containment I/A.

QUESTION 35: (1.0)

With Unit 1 at 100% power, a partial phase "1" containment isolation signal results in closure of letdown isolation valve 1-CH-TV-1204A. No other valves or components are affected by the signal.

Which ONE of the following is correct concerning the affect of this transient on letdown flow?

- a. Indicated Letdown flow goes to zero; actual Letdown flow continues to the PRT.
- b. Indicated Letdown flow goes to zero; actual Letdown flow continues to the PDT.
- c. Indicated Letdown flow fluctuates as the relief valve lifts; actual Letdown flow continues to the PRT.
- d. Indicated Letdown flow fluctuates as the relief valve lifts; actual Letdown flow continues to the PDTT.

QUESTION 36: (1.0)

Following a LOCA with core damage, the following conditions were determined to have existed:

- Maximum clad temperature reached 2175°F.
- Cladding oxidation was 15% of original cladding thickness.
- Hydrogen generation from Zirc-water reaction was 3%.
- One train of ESF equipment failed to operate.

Which ONE of the above conditions exceeded (violated) 10CFR50.46, ECCS acceptance criteria?

- a. Clad temperature.
- b. Clad oxidation.
- c. Hydrogen generation.
- d. ESF equipment availability.

QUESTION 37: (1.0)

Which ONE of the following evolutions is prohibited?

- a. Entry into the Incore Sump Room with the flux thimbles retracted.
- b. Access into an RCP Motor Cubicles during reduced inventory conditions.
- c. Entry into an airborne radioactivity area without a SCBA.
- d. A ten minute entry into 15 Rem/Hr area to protect property during a Site Area Emergency.

QUESTION 38: (1.0)

The following parameters are indicated on the ICCM:

- Wide range pressure – 1988 psig.
- Highest quadrant CETC – 606°F.
- Lowest quadrant CETC – 600°F.
- Average of the 5 highest CETC – 603 °F.
- “A” loop Th – 596 °F.
- “B” loop Th – 594 °F.

Which ONE of the following identifies the expected displayed subcooling margin?

- a. 40 °F
- b. 36 °F
- c. 33 °F
- d. 30 °F

QUESTION 39: (1.0)

With Unit 2 at 100% power, a spurious Hi Hi CLS occurs.

Which ONE of the following identifies the effect on indicated partial pressure?

- a. The indication is inaccurate, indicated pressure will be lower than pre-event values.
- b. The indication is inaccurate, indicated pressure will be higher than pre-event values.
- c. The indication is accurate, indicated pressure will be lower than pre-event values.
- d. The indication is accurate, indicated pressure will be higher than pre-event values.

QUESTION 40: (1.0)

Unit One is operating at 100% when the Reactor Operator notices that Main Feed Pump suction pressure suddenly decreased and stabilized at the lower pressure.

Which ONE of the following initiated the sudden pressure decrease in Main Feed Pump suction pressure?

- a. Another Polishing Building ion exchanger bed was put into service.
- b. FCV-CN-107 failed open.
- c. AOV-CN-122 failed open.
- d. The HP Heater Drain Pump Normal Level Control valve failed open.

QUESTION 41: (1.0)

The following conditions exist:

- Unit 2 is at 100% power.
- All Main Feed Regulation Valve Controllers are in automatic.
- Rod Control is Manual.
- The turbine is in Operator Auto and IMP-OUT.
- Steam Flow, Feed Flow, and Pimp are selected for Channel IV.

Which ONE of the following identifies S/G level response if pressure transmitter 1-MS-PT-1447 fails low?

- a. Steam Generator levels will decrease to the SF/FF mismatch with S/G low level Rx Trip setpoint.
- b. Steam Generator levels will decrease to the S/G low low level Rx Trip setpoint.
- c. Steam Generator levels will decrease to 33%.
- d. Steam Generator levels are not affected.

QUESTION 42: (1.0)

With the Unit One Steam Driven Auxiliary Feed pump tagged out for maintenance, what is the Unit 1 source of auxiliary feedwater if both Units are in emergency procedure ECA-0.0?

- a. Fire Protection and Domestic Water Tanks (1-FP-TK-1A/B).
- b. Emergency Condensate Makeup Tank (1-CN-TK-3).
- c. Distillate Water Storage Tank (1-WT-TK-101).
- d. Emergency Condensate Storage Tank (1-CN-TK-1A).

QUESTION 43: (1.0)

Unit One is performing a normal startup and is currently at 2% power when a safety injection occurs. The reactor operator notices that both motor driven auxiliary feed pumps are running after the safety injection.

Which ONE of the following identifies the time after the safety injection that the motor driven auxiliary feed pumps started?

- a. 0 seconds.
- b. 10 seconds.
- c. 27 seconds.
- d. 50 seconds.

QUESTION 44: (1.0)

During release of the "A" WGD, which ONE of the following will cause an automatic termination of the release?

- a. FI-GW-101, WGD effluent flow meter, fails high.
- b. 1-GW-RI-101, Process Vent Radiation Monitor, is inadvertently de-energized.
- c. 1-GW-AR-150A, Waste gas analyzer oxygen, fails high.
- d. VG-RI-131-1, Vent Stack #2 effluent monitor, fails high.

QUESTION 45: (1.0)

A High alarm on the _____ Radiation monitor will automatically close the Unit 1 Containment purge isolation MOVs.

- a. Unit 1 Containment, 1-RM-RMS-163
- b. Unit 1 Containment High Range, 1-RM-RMS-161
- c. Unit 1 Containment Manipulator crane, 1-RM-RMS-162
- d. Unit 1 Containment High Range (CHRRMS), 1-RM-RMS-127

QUESTION 46: (1.0)

The Unit 1 charging pumps are in the following configuration:

- 1-CH-P-1A – auto-off
- 1-CH-P-1B – auto-off
- 1-CH-P-1C – running on the “H” bus (15H6)

The Load Tap changer on ‘C’ RSS transformer fails and immediately lowers transformer voltage to 3037 volts AC. Which charging pumps will be running on Unit 1, 65 seconds after the transient?

- a. 1-CH-P-1A, 1-CH-P-1B, 1-CH-P-1C
- b. 1-CH-P-1B, 1-CH-P-1C only
- c. 1-CH-P-1A, 1-CH-P-1B only
- d. 1-CH-P-1C only

QUESTION 47: (1.0)

Given the following plant conditions:

- A spurious safety injection occurred with Unit 1 at 100% power.
- SI has been terminated, and charging and letdown are in service.
- RCS pressure is stable at 2235 psig, solid plant pressure control.
- PRZR water temperature is 590°F.

Using the steam tables provided, determine the pressure at which the RCS would stabilize if a PRZR bubble were drawn at the current plant conditions.

- a. 1417 psig.
- b. 1432 psig.
- c. 1438 psig.
- d. 1453 psig.

QUESTION 48: (1.0)

During the initial RCP start following RCS fill and vent, you are assigned to operate reverse acting, letdown pressure controller, 1-CH-PCV-1145 in manual.

After the RCP is started, you notice RCS pressure decreasing. To restore pressure, you will _____.

- a. decrease the demand on the controller to close CH-PCV-1145
- b. increase the demand on the controller to open CH-PCV-1145
- c. decrease the demand on the controller to open CH-PCV-1145
- d. increase the demand on the controller to close CH-PCV-1145

QUESTION 49: (1.0)

With Unit 1 at 5% power, a loss of "A" DC Bus occurs.

Without operator intervention, which ONE of the following states how the Reactor Protection System will respond?

- a. Both reactor trip breakers remain closed.
- b. "A" reactor trip breaker remains closed, "B" reactor trip breaker opens.
- c. "B" reactor trip breaker remains closed, "A" reactor trip breaker opens.
- d. Both reactor trip breakers open.

QUESTION 50: (1.0)

The following conditions exist:

- A Small Break LOCA has occurred.
- ES-1.2, Post LOCA Cooldown and Depressurization is in progress.

Which ONE of the following conditions prevents RHR from being placed in service?

- a. All RCS hot leg temperatures are 337°F.
- b. RCS pressure is 475 psig.
- c. 1-RC-PT-1403 is failed low.
- d. Pressurizer level less than 22%.

QUESTION 51: (1.0)

Given the following plant conditions:

- Unit 1 is at 100% power.
- All plant equipment is operable.
- An I&C tech inadvertently isolates and vents "A" condenser pressure transmitter 1-CN-PT-101A.

Which ONE of the following is correct concerning the affects of this?

- a. Trip signal to main turbine, no affect on condenser steam dumps or "A" condenser pressure indication.
- b. Trip signal to main turbine and loss of "A" condenser pressure indication, no affect on condenser steam dump capability.
- c. Loss of condenser steam dump capability and loss of "A" condenser pressure indication, no affect on main turbine.
- d. Loss of condenser steam dump capability, trip signal to main turbine, and loss of "A" condenser pressure indication.

QUESTION 52: (1.0)

Unit 1 is at 100% power with no equipment out of service and all three containment air recirculation fans (CARFs) running.

If a spurious Hi Hi CLS occurs, which ONE of the following identifies the immediate affects on the CARFs?

- a. All three CARFs trip.
- b. "A" and "B" trip, "C" continues to run.
- c. "B" trips, "A" and "C" continue to run.
- d. "B" and "C" trip, "A" continues to run.

QUESTION 53: (1.0)

Given the following plant conditions:

- Unit is on-line at 100% power.
- All control systems are in AUTOMATIC.
- "C" S/G level channel III fails low.

Assuming no operator action, which ONE of the following is correct?

- a. Feed Flow < Steam Flow Reactor Trip occurs.
- b. No affect on "C" S/G Level control.
- c. "C" FRV valve closes and "C" S/G level decreases.
- d. "C" FRV opens and "C" S/G level increases.

QUESTION 54: (1.0)

Given the following plant conditions:

- Unit 1 generator output breaker has just been closed following a reactor startup.
- All control systems are in AUTOMATIC and aligned per startup procedures.
- Steam Dump Valve 1-MS-TCV-105A is de-energized and tagged out for repair.

If main steam header pressure transmitter PT-464 fails high, which ONE of the following is correct?

- a. All steam dump valves will remain in their present position.
- b. All steam dumps (except 1-MS-TCV-105) fully open and RCS cooldown stops at 543°F.
- c. All steam dumps (except 1-MS-TCV-105) fully open and uncontrolled RCS cooldown condition continues until MSTVs are manually closed.
- d. All steam dumps (except 1-MS-TCV-105) fully open and safety injection occurs when RCS T_{ave} decreases to <543°F.

QUESTION 55: (1.0)

Given the following plant conditions:

- #1 EDG is carrying 1H emergency bus.
- The team is about to transfer 1H bus back to its normal source.
- The diesel operator places the 15H8 synchronizing switch to ON.
- The synchroscope begins rotating very fast in the slow direction (counterclockwise).

The diesel operator will have to _____ #1 EDG speed until the synchroscope is rotating slowly in the _____ direction.

- a. decrease; slow
- b. decrease; fast
- c. increase; slow
- d. increase; fast

QUESTION 56: (1.0)

Station battery 1-A capacity is 1800 amp-hours at a given rate of discharge.

If the discharge rate _____, the battery capacity _____.

- a. increases; decreases
- b. increases; increases
- c. increases; remains constant
- d. decreases; remains constant

QUESTION 57: (1.0)

Given the following plant conditions:

- #1 and #3 EDG's are loaded to 2750 KW each.
- The total amount of fuel in the underground fuel oil storage tanks is at the minimum required by Technical Specifications.
- Due to equipment failures, the aboveground fuel oil storage tank is not available.

#1 and #3 EDG's will run out of fuel oil in approximately _____.

- a. one hour
- b. 3.5 days
- c. four hours
- d. 7 days

QUESTION 58: (1.0)

The Reactor was tripped from 100% power in response to increased steam generator tube leakage.

The post trip indication of primary-to-secondary leakage on the NRC radiation monitors will tend to be _____.

- a. lower than at power indication
- b. approximately equal to at power indication
- c. higher than at power indication
- d. so inaccurate as to be unusable

QUESTION 59: (1.0)

With both units operation at 100% power the 2G transformer trips due to internal fault.

Which ONE of the following identifies the impact on unit operation?

- a. 2G transformer must be restored or Unit 2 must be shutdown.
- b. 2G bus automatically re-energizes and running CW pumps remain running, allowing continued dual unit operation.
- c. 2G bus automatically re-energizes and Unit 2 CW pumps must be manually restarted to allow continued dual unit operation.
- d. 2G bus must be manually crosstied and Unit 2 CW pumps restarted to allow continued dual unit operation.

QUESTION 60: (1.0)

Unit 1 is in Refueling Shutdown with the temporary jumper to the CC heat exchangers in service. The Unit 1 "B" & "D" high level intake structures are stop logged and drained. Unit 2 has sustained minor flooding on the "2C" Circulating Water Line.

What adverse effects will result if stop logs are placed at the Unit 2 "C" high level intake structure.

- a. Loss of Component Cooling Service Water.
- b. Loss of charging pump cooling water.
- c. Unit 2 Turbine Trip on low intake canal level.
- d. Loss of #5 MER chiller cooling water.

QUESTION 61: (1.0)

A rupture in the instrument air (IA) piping causes IA header pressure to decrease to 92 psig. Turbine building IA header pressure remains above 90 psig.

Which ONE of the following correctly states all of the actuations that occur to restore IA pressure?

- a. Running IA compressor loads, standby IA compressor starts and loads.
- b. Standby IA compressor starts and loads.
- c. Running SA compressor loads, standby SA compressor starts and loads.
- d. Standby SA compressor starts and loads.

QUESTION 62: (1.0)

A fire has been reported in the ESGR. There are flames issuing from the UPS 1A2.

Which ONE of the following actions should you direct the Fire Team to take?

- a. Actuate the HP CO₂ System.
- b. Actuate the LP CO₂ System.
- c. Actuate the Halon System.
- d. Rig fire hoses to the panel.

QUESTION 63: (1.0)

A licensed RO is about to swap charging pump service water pumps, which is designated as a "Skill-of-the-Craft" task. The RO has performed the task several times this shift.

Per OPAP-0002, Operations Department Procedures, which ONE of the following is correct concerning the procedure adherence requirements?

- a. The RO can perform the task without a procedure in hand, but must perform the task in accordance with the procedure.
- b. The RO can perform the task without a procedure in hand, since the task is not covered by an approved procedure.
- c. The RO must have the procedure in hand when performing the task, but is not required to sign-off procedure steps.
- d. The RO can perform the task without procedure in hand only if he requests a peer check for each equipment manipulation.

QUESTION 64: (1.0)

Which ONE of the following consequences does a spurious SI present (assuming all systems function as designed)?

- a. Pressurized Thermal Shock due to RWST water injection.
- b. Degraded containment conditions due to PRT rupture.
- c. Degraded heat sink due to Main Feed Pump trip.
- d. Overload of the Station Service Electrical Distribution.

QUESTION 65: (1.0)

Following a refueling shutdown, the RCS is in the process of being heated up and pressurized. The RO notes the CC surge tank level has been increasing for the past hour.

Isolation of which ONE of the following would potentially stop this increase?

- a. RCP seal water return heat exchanger.
- b. Neutron Shield Tank heat exchanger.
- c. Primary Drains Tank cooler.
- d. RHR pumps seal cooler.

QUESTION 66: (1.0)

Which ONE of the following prevents fuel assembly movement with cavity water level less than 23 feet?

- a. Administrative requirements only.
- b. Fuel mast interlock.
- c. Fuel elevator interlock.
- d. Manipulator crane interlock.

QUESTION 67: (1.0)

During performance of turbine valve freedom testing, the test engineer erroneously directs a local turbine trip.

Which ONE of the following components initiates the reactor trip signal?

- a. 74/AST.
- b. 63-AST-4/5/6.
- c. 4/4 Governor valves closed.
- d. 20/ET.

QUESTION 68: (1.0)

During a spurious Hi Hi CLS, the team is unable to reset the Hi Hi CLS signal.

The team must locally secure the _____ pumps to ensure Containment pressure does not drop below ____ psia which would potentially damage the _____.

- a. Containment Spray, 9, Containment Dome Liner
- b. Containment Spray, 8, Containment Basemat
- c. Inside Recirc Spray, 9, Containment Dome Liner
- d. Inside Recirc Spray, 8, Containment Basemat

QUESTION 69: (1.0)

Which ONE of the following identifies the maximum steady state power level that does not exceed the maximum steady state power level allowed by the facility license?

- a. 100%
- b. 107%
- c. 109%
- d. 118%

QUESTION 70: (1.0)

Which ONE of the following manipulations is prohibited during a Reactor Startup?

- a. Withdrawing the shutdown banks and performing a Normal Boration.
- b. Withdrawing the shutdown banks and raising RCS temperature.
- c. Withdrawing the shutdown banks and performing an Alternate Dilution.
- d. Withdrawing the shutdown banks 14 hours after a Reactor Trip from 100% power.

QUESTION 71: (1.0)

Maintenance would like to remove the danger tags from a 4160-volt breaker so they can cycle it in the TEST position. The tag-outs cannot be cleared.

Which ONE of the following correctly describes the operator actions required to facilitate this request?

- a. Remove the danger tags in accordance with an approved partial clearance, rack the breaker to TEST, then return the danger tags to the Operations Annex.
- b. Remove the danger tags in accordance with an approved partial clearance, rack the breaker to TEST, then destroy the danger tags and return the tagging records to the Operations Annex.
- c. Remove the danger tags in accordance with an approved temporary release, rack the breaker to TEST, then place a special order blue tag on the breaker racking device and return the danger tags to the Operations Annex.
- d. Remove the danger tags in accordance with an approved temporary release, rack the breaker to TEST, then place in tags in a temporary release envelope and attach the envelope to the breaker racking device.

QUESTION 72: (1.0)

Given the following Unit 1 conditions:

- All control rods are fully withdrawn.
- A failure in the rod control system causes "D" bank rods to step outward.
- The RO notes the failure and places rod control in MANUAL.
- Group step counters for "D" bank indicate 243 steps.
- IRPIs for "D" bank rods indicate (on the average) 230 steps.

Which ONE of the following is correct concerning the disparity between the group step counters and the IRPIs?

- a. This is expected; the IRPIs should eventually drift up to indicate approximately 243 steps.
- b. This is expected; the IRPIs should continue to indicate approximately 230 steps.
- c. This is not expected; the IRPIs should have tracked with the group step counters; they are still operable per TS-3.12.C.
- d. This is not expected; the IRPIs should have tracked with the group step counters; they are inoperable per TS-3.12.C.

QUESTION 73: (1.0)

An accident at SPS results in a radioactive plume passing over the high level intake structure. An operator at the high level intake structure receives a whole body dose of 1 rem per hour and he is exposed for 8 hours.

This operator is in the _____ zone and _____ exceeded the legal limit of 10CFR100.

- a. exclusion, has
- b. exclusion, has not
- c. low population, has
- d. low population, has not

QUESTION 74: (1.0)

Vital Bus II was de-energized in Unit 1 while at hot shutdown. The RO is performing the actions of ES-0.1.

Which ONE of the following identifies which RCP must be stopped and how much time is allowed to complete this action (assume all RCP bearing temperatures remain below 200°F)?

- a. RCP 1A, 5 minutes.
- b. RCP 1A, 2 minutes.
- c. RCP 1B, 5 minutes.
- d. RCP 1B, 2 minutes.

Deleted RSH
10/2/00

QUESTION 75: (1.0)

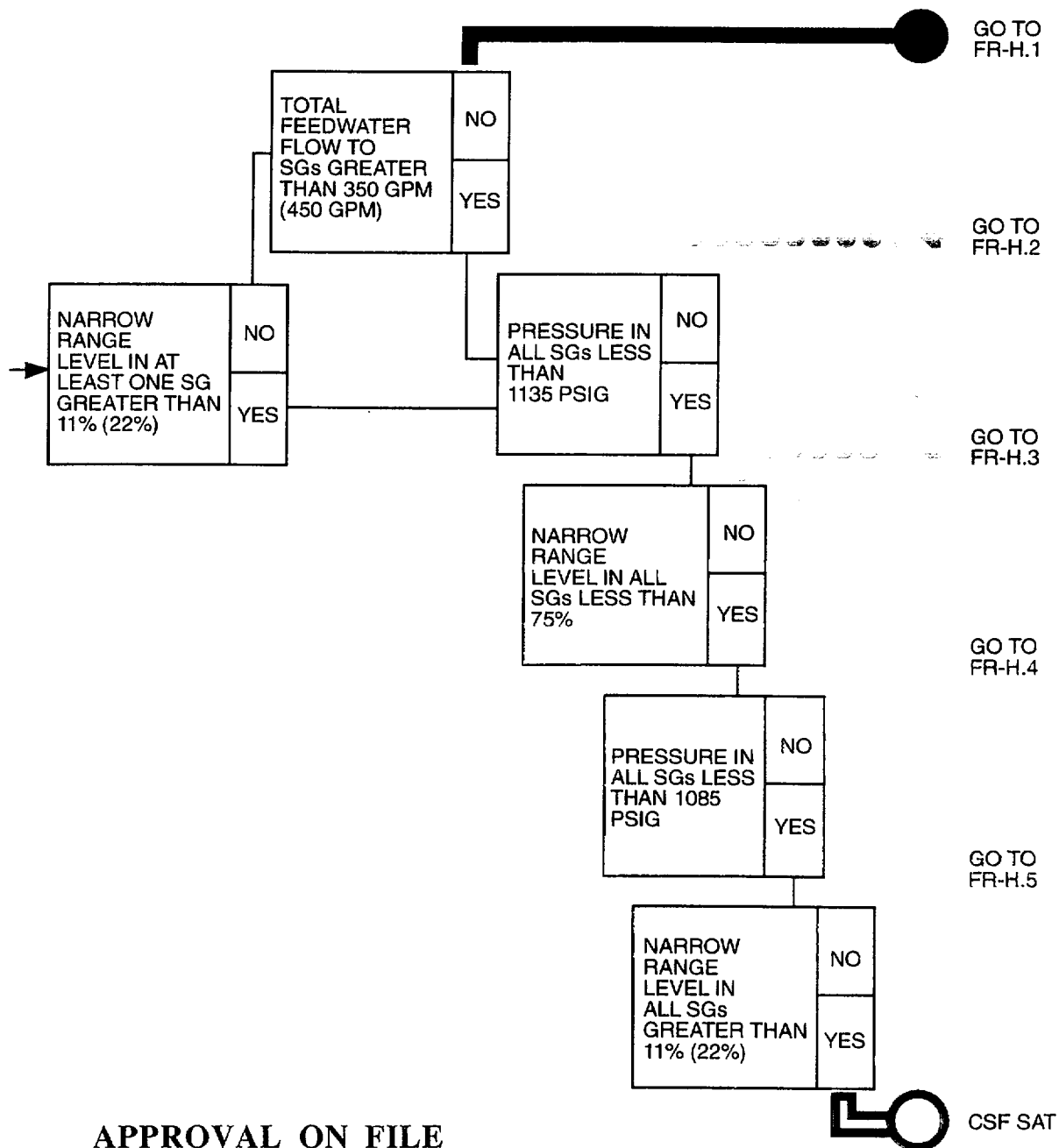
The plant has experienced a large-break LOCA twenty minutes ago from 100% power. The crew has transitioned from 1-E-0, Reactor Trip or Safety Injection, to 1-E-1, Loss of Reactor or Secondary Coolant. The following conditions exist:

- "A" S/G N/R level is 20%, AFW flow is 140 gpm.
- "B" S/G N/R level is 10%, AFW flow is 135 gpm.
- "C" S/G N/R level is 10%, AFW flow is 145 gpm.
- S/G pressure in all S/Gs is 1035 psig.
- RCS pressure is 100 psig and decreasing.
- No RCPs are running.
- Core Exit T/Cs are 705°F.
- All cold-leg temperatures are 280°F.
- RVLIS full-range level is 53%.
- Containment pressure is 37 psia.

Using the attached procedure, which ONE of the following identifies the required procedure to be implemented immediately?

- a. 1-FR-C.2
- b. 1-FR-P.1
- c. 1-FR-Z.1
- d. 1-FR-H.1

Number: F-3	Title: HEAT SINK	Revision: 4
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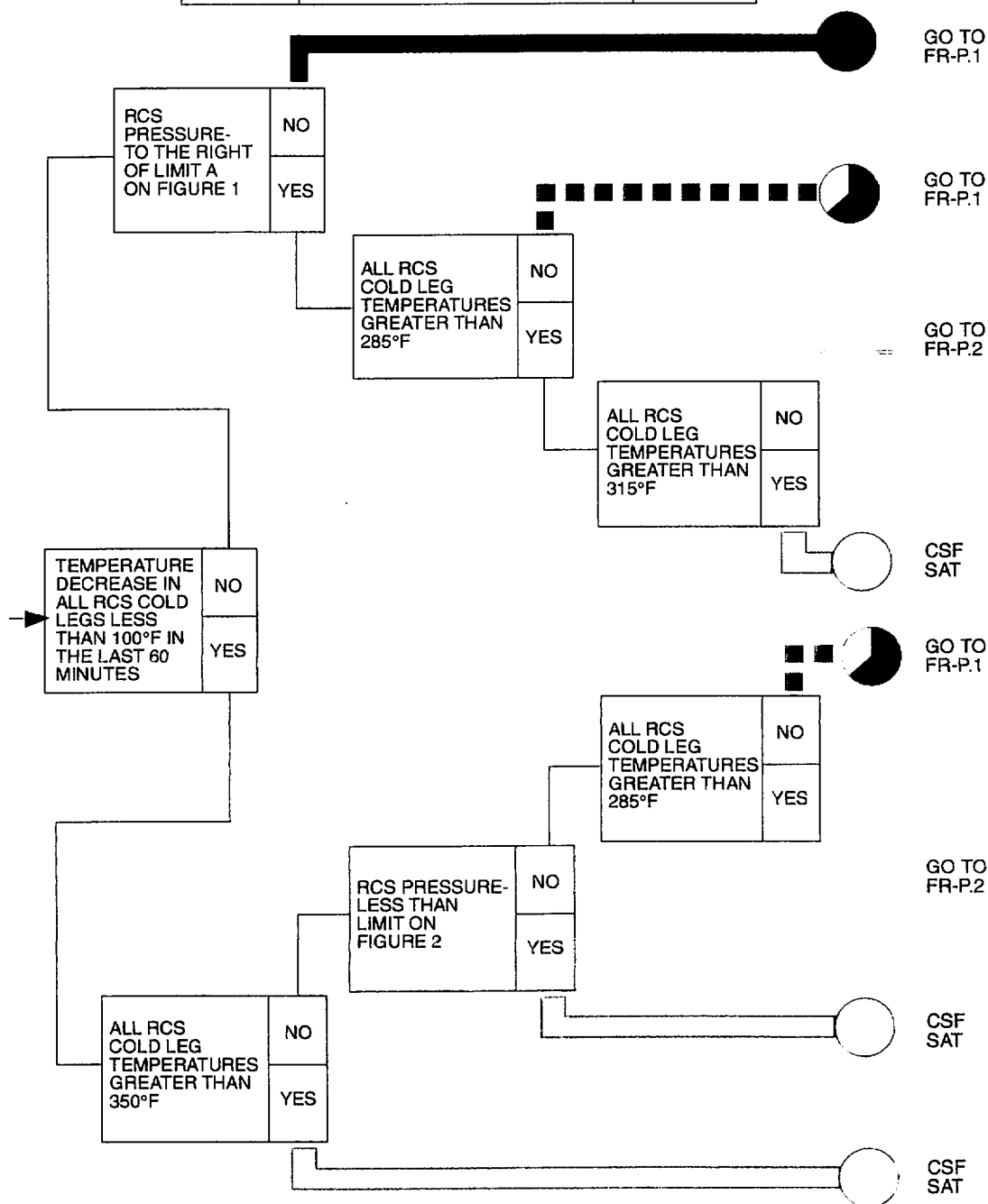
APPROVAL ON FILE

SNSOC CHAIRMAN

DATE

Graphics No. CB381

Number: F-4	Title: INTEGRITY	Revision: 2
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APPROVAL ON FILE

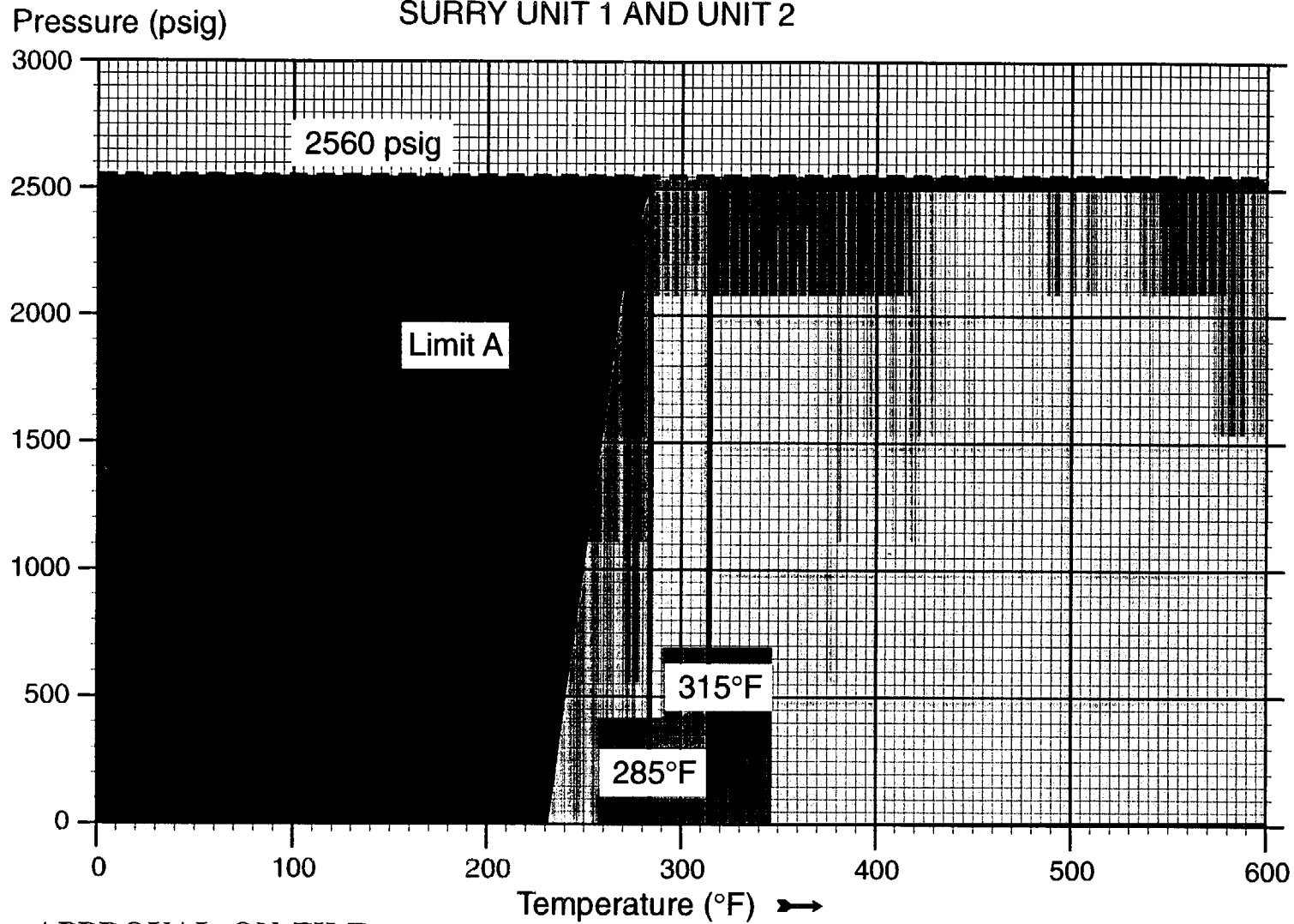
SNSOC CHAIRMAN

DATE

Graphics No. CB383

Number: F-4	Title: INTEGRITY	Revision: 2
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**FIGURE 1 - OPERATIONAL LIMITS CURVE
SURRY UNIT 1 AND UNIT 2**



APPROVAL ON FILE

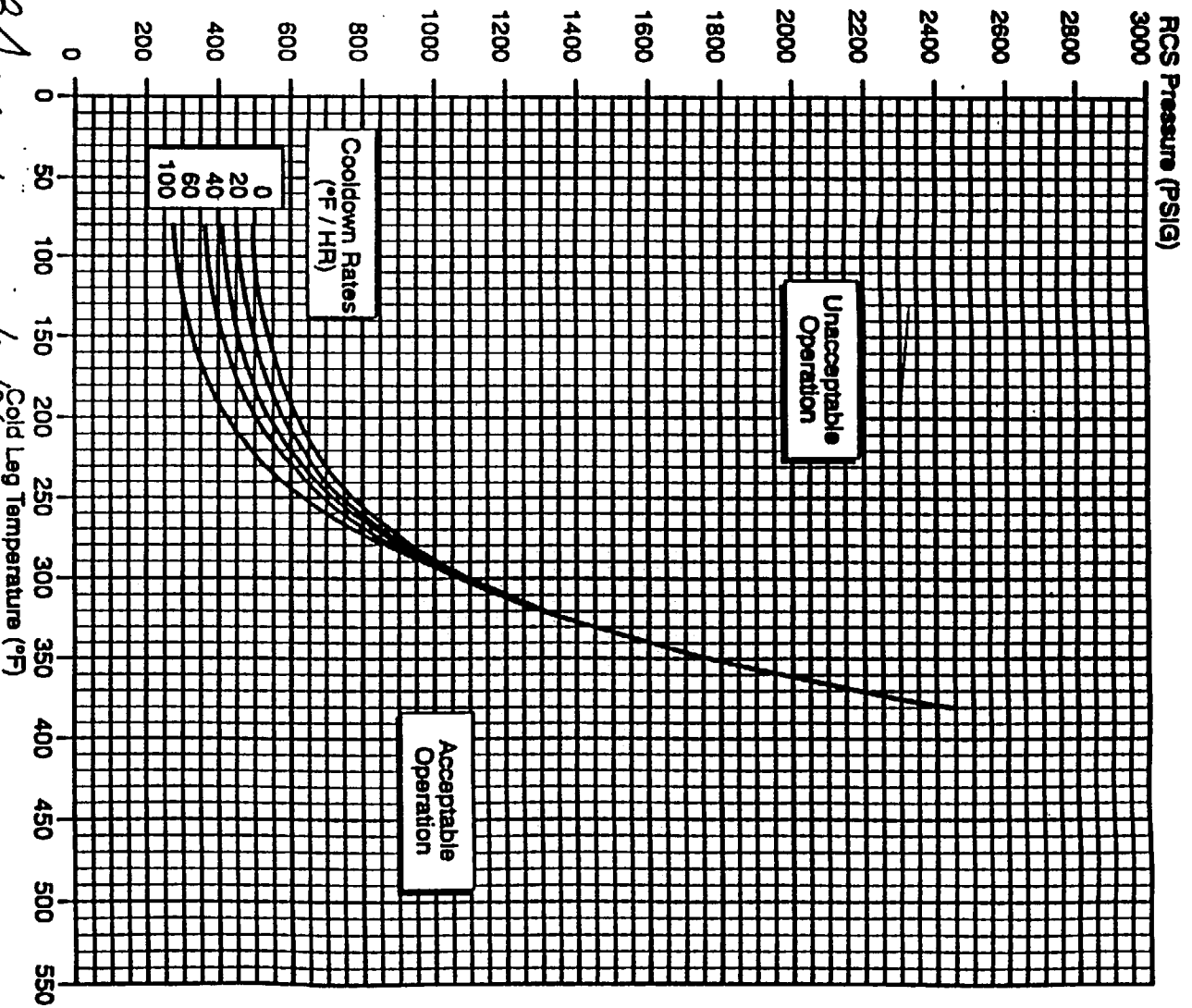
SNSOC Chairman

Date _____

Drawing No: WT316

Number:	Title:	Revision:
F-4	INTEGRITY	2

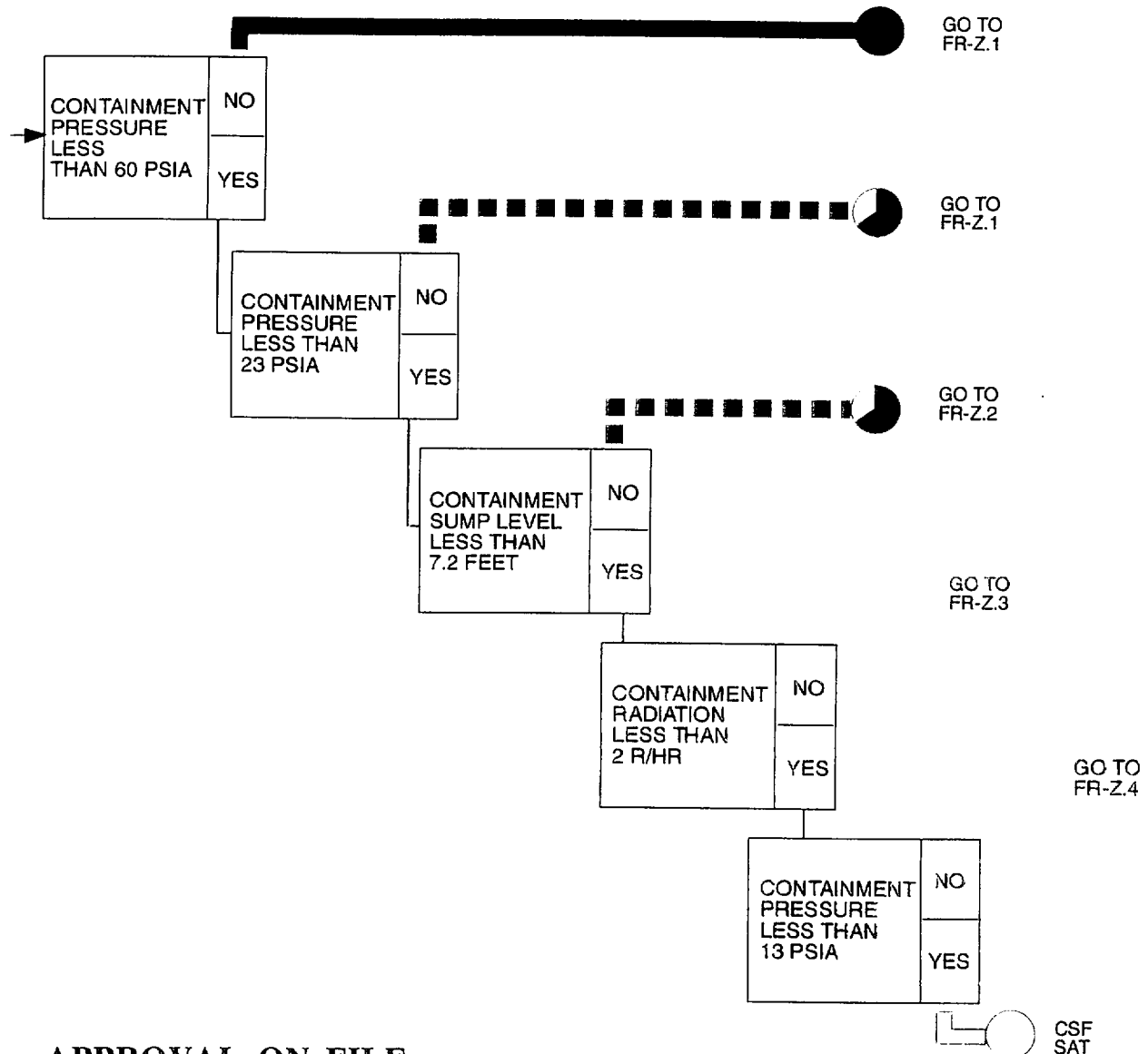
Figure 2
RCS COOLDOWN RESTRICTIONS



J. B. Blevins
SNSOC Chairman

1/25/96
Date Cold Leg Temperature (°F)

Number: F-5	Title: CONTAINMENT	Revision: Rev-1A
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APPROVAL ON FILE

SNSOC CHAIRMAN

DATE

Drawing No. CB382

QUESTION 76: (1.0)

Given the following plant conditions:

- The team is responding to a loss of both emergency busses.
- Neither bus could be re-energized and all required equipment is in Pull-to-Lock.
- S/G depressurization resulted in automatic actuation of safety injection.

The team is directed to reset the SI signal to _____.

- a. enable securing equipment that automatically started
- b. enable securing equipment that was manually started
- c. prevent equipment from automatically starting when an emergency bus is restored
- d. prevent equipment from automatically starting when it is returned to Auto

QUESTION 77: (1.0)

With 1-RC-LT-1461 aligned to the upper channel of Pressurizer Level Control, the transmitter develops a 0.5 gpm reference leg leak while at power with all control systems in Automatic.

Assuming no operator action, which ONE of the following identifies system response?

- a. Pressurizer level continually increases to a water solid condition.
- b. Pressurizer level decreases until letdown isolates, then increases.
- c. Pressurizer level continually decreases to the Low Pressurizer Pressure reactor trip setpoint.
- d. Pressurizer level continually increases to the High Pressurizer Level reactor trip setpoint.

QUESTION 78: (1.0)

Which ONE of the following explains why a negative number may be displayed on the ICCM subcooled margin monitor during a large-break LOCA?

- a. The ICCM is not qualified for adverse containment conditions.
- b. The core exit thermocouples are invalid in a steam environment.
- c. The calculated value is outside its normal range of indication.
- d. This is the indicated degree of superheating.

QUESTION 79: (1.0)

An unisolable RCS leak exists in the Auxiliary Building Basement.

Which ONE of the following describes the expected procedure transitions from E-0, Reactor Trip or Safety Injection?

- a. E-1, Loss of Reactor or Secondary Coolant, to ECA-1.2, LOCA outside Containment, to ECA-1.1, Loss of Emergency Coolant Recirculation.
- b. E-1, Loss of Reactor or Secondary Coolant, to ECA-1.1, Loss of Emergency Coolant Recirculation.
- c. E-1, Loss of Reactor or Secondary Coolant, to ECA-1.2, LOCA outside Containment to ES-1.2, Post LOCA cooldown and depressurization.
- d. ECA-1.2, LOCA outside Containment, to ECA-1.1, Loss of Emergency Coolant Recirculation.

QUESTION 80: (1.0)

During the rapid RCS cooldown directed by E-3, Steam Generator Tube Rupture, steam flow is limited to 1.0×10^6 lbm/hr.

Which ONE of the following identifies the basis for this caution?

- a. Prevent entry into FR-P.1.
- b. Prevent restart of high head SI pumps.
- c. Prevent Main Steam Isolation.
- d. Prevent Condenser Air ejector discharge isolation.

QUESTION 81: (1.0)

Given the following plant conditions:

- Unit 1 is at 100% power with stable T_{ave} .
- Charging flow is increasing.
- Annunciator 1D-E5, CHG PP TO REGEN HX HI-LO FLOW, has just alarmed.
- VCT level is decreasing and PRZR level is increasing.
- All other plant parameters are normal.

The conditions described are most likely due to _____ and the team should respond by _____.

- a. increasing RCS leakage; entering 1-AP-16.00, Excessive RCS Leakage
- b. increasing RCS leakage; isolating letdown and maximizing charging flow
- c. failure of charging flow control; isolating instrument air to FCV-1122
- d. failure of charging flow control; taking manual control of charging

QUESTION 82: (1.0)

The Unit 1 Discharge tunnel Radiation monitor is currently reading 1.2E1.

What radiation units are being monitored?

- a. mr/hr.
- b. CPM.
- c. DPM.
- d. R/hr.

QUESTION 83: (1.0)

Which ONE of the following containment pressures is the maximum that will allow manual reset of the Hi-Hi CLS System once actuated?

- a. < 23.0 psia.
- b. < 17.7 psia.
- c. < 14.2 psia.
- d. < 10.3 psia.

QUESTION 84: (1.0)

Unit 1 is operating at 100% power with "D" bank rods at 218 steps when an electrical failure deenergizes vital bus I-III. You have noticed that the rods cannot be withdrawn.

Which ONE of the following is preventing rod motion?

- a. Intermediate range high flux rod stop.
- b. Power range high flux rod stop.
- c. Overtemperature delta-T rod stop.
- d. Overpower delta-T rod stop.

QUESTION 85: (1.0)

During a LOCA the pressure of isolated SI Accumulators is monitored as RCS pressure decreases below Accumulator pressure.

What is the reason for this monitoring of SI Accumulator pressure?

- a. Verifies the injection phase of safety injection has occurred.
- b. Ensures that Technical Specification capacities are maintained.
- c. Used to determine if accumulator check valve failure has taken place.
- d. SI Accumulator isolation MOV limit switches are not environmentally qualified.

QUESTION 86: (1.0)

The following Unit conditions exist:

- Unit One is shutdown.
- The Unit One A Main Feed pump is feeding all three S/Gs at a rate of 800 gpm each.
- The Unit One reactor operator is holding depressed the Train "A" and "B" feedwater isolation reset buttons in order to completely fill the steam generators for wet layup.

Which ONE of the following events would trip the Unit One "A" Main Feed Pump?

- a. High Water Level in the Steam Generators.
- b. 'B' Main Feed Pump Recirc Valve fails closed.
- c. Safety Injection Initiation Train B.
- d. Load Shed Actuation on all Station Service Busses.

Deleted RSK 10/2/00

QUESTION 87: (1.0)

A male radiation worker's total effective dose equivalent for the current quarter is 1837 mrem and for the current year is 3823 mrem.

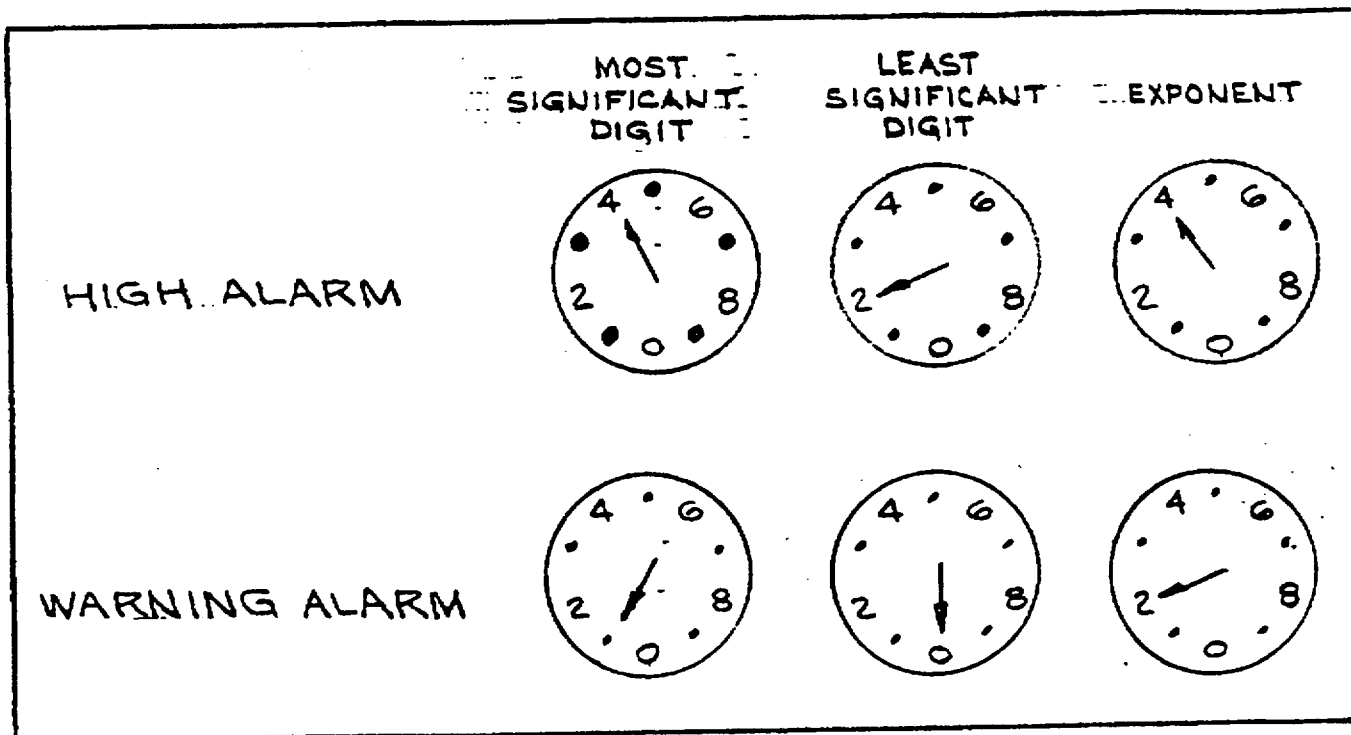
The worker _____ be authorized access to the RCA _____.

- a. can; if a dose extension request is prepared and authorized
- b. can; with no additional authorization other than an RWP
- c. cannot; because his quarterly dose has exceeded the administrative limit
- d. cannot; because his quarterly and annual dose have both exceeded the administrative limit

QUESTION 88: (1.0)

Using the references provided, determine which ONE of the following represents the current High Alarm setpoint for the NRC radiation monitor?

- a. 4200.00 Rem/hr.
- b. 4200.00 mrem/hr.
- c. 42000.00 Rem/hr.
- d. 420000.0 mrem/hr.



QUESTION 89: (1.0)

The power to area radiation monitor 1-RM-RMS-157, MCR Area Monitor, has been lost.

Which ONE of the following indications will alert the operator that this detector has failed?

- a. Digital Ratemeter "RANGE" light on.
- b. Digital Ratemeter "FAIL" light on.
- c. "Alert/Failure" annunciator illuminated.
- d. Local detector "HIGH" light flashing.

QUESTION 90: (1.0)

Given the following plant conditions:

- Unit 1 is stable at 20% power with turbine control in IMP-IN.
- Rod Control is in MANUAL with Tave and Tref matched.
- "B" RCP trips.
- The reactor does not trip automatically.
- No operator actions are taken.
- The transient continues until the plant stabilizes.

Which ONE of the following is correct?

- a. The indicated final steady-state values for "A" and "C" loop delta-T will be lower than their pre-event values.
- b. The indicated final steady-state value for Tref will be higher than its pre-event value.
- c. The actual final steady-state value for "B" loop delta-T will be higher than its pre-event value.
- d. The actual final steady-state core delta-T will be higher than its prevent value.

QUESTION 91: (1.0)

Fire water is initiated to extinguish a fuel pit bridge fire.

With this continued dilution in progress, at what Boron concentration will the Technical Specification minimum $\leq 0.95 K_{eff}$ limit be violated?

- a. 2250 ppm.
- b. 2300 ppm.
- c. 2500 ppm.
- d. A fully diluted spent fuel pool will not violate the limit.

QUESTION 92: (1.0)

Given the following plant conditions:

- The "A" waterbox is being removed from service for leak repairs.
- The operator inadvertently closes 1-VP-4 (air ejector suction from "B" waterbox) instead of 1-VP-3 (air ejector suction from "A" waterbox).
- CW flow through "A" waterbox is isolated per procedure.

As a result, the _____ air ejector(s) will become steam-bound and _____.

- a. "A"; condenser vacuum will degrade
- b. "B"; condenser vacuum will degrade
- c. "A" and "B"; condenser vacuum will degrade
- d. "A"; condenser vacuum will be maintained by "B" air ejector via the suction cross-tie

QUESTION 93: (1.0)

Which ONE of the following identifies the power supply to the Unit 1 "A" Electric Hydrogen Recombiner Unit?

- a. 1H1-2 MCC.
- b. 2H1-2 MCC.
- c. 1J1-2 MCC.
- d. 2J1-2 MCC.

QUESTION 94: (1.0)

A Unit 1 Instrument Air line rupture has caused a complete loss of air pressure with both Units at power. Subsequently, the reactor operator notices that Containment Instrument Air pressure is currently 60 psig and decreasing.

Which ONE of the following caused the decrease in Containment Instrument Air?

- a. The normal cross-tied with the Station Instrument Air System.
- b. 1-IA-TV-100 (Normal Discharge) trips closed due to low Containment Instrument Air pressure interlock.
- c. 1-IA-TV-100 (Normal Discharge) fails closed due to loss of dome supply air.
- d. 1-IA-TV-101A (Normal Suction) fails closed due loss of dome supply air.

QUESTION 95: (1.0)

Which ONE of the following would prevent making a mode change to Refueling Shutdown?

- a. RCS temperature 143°F.
- b. Reactor head detensioned but still installed.
- c. RCS is subcritical by 5125 pcm.
- d. 4 incore flux thimbles not retracted.

QUESTION 96: (1.0)

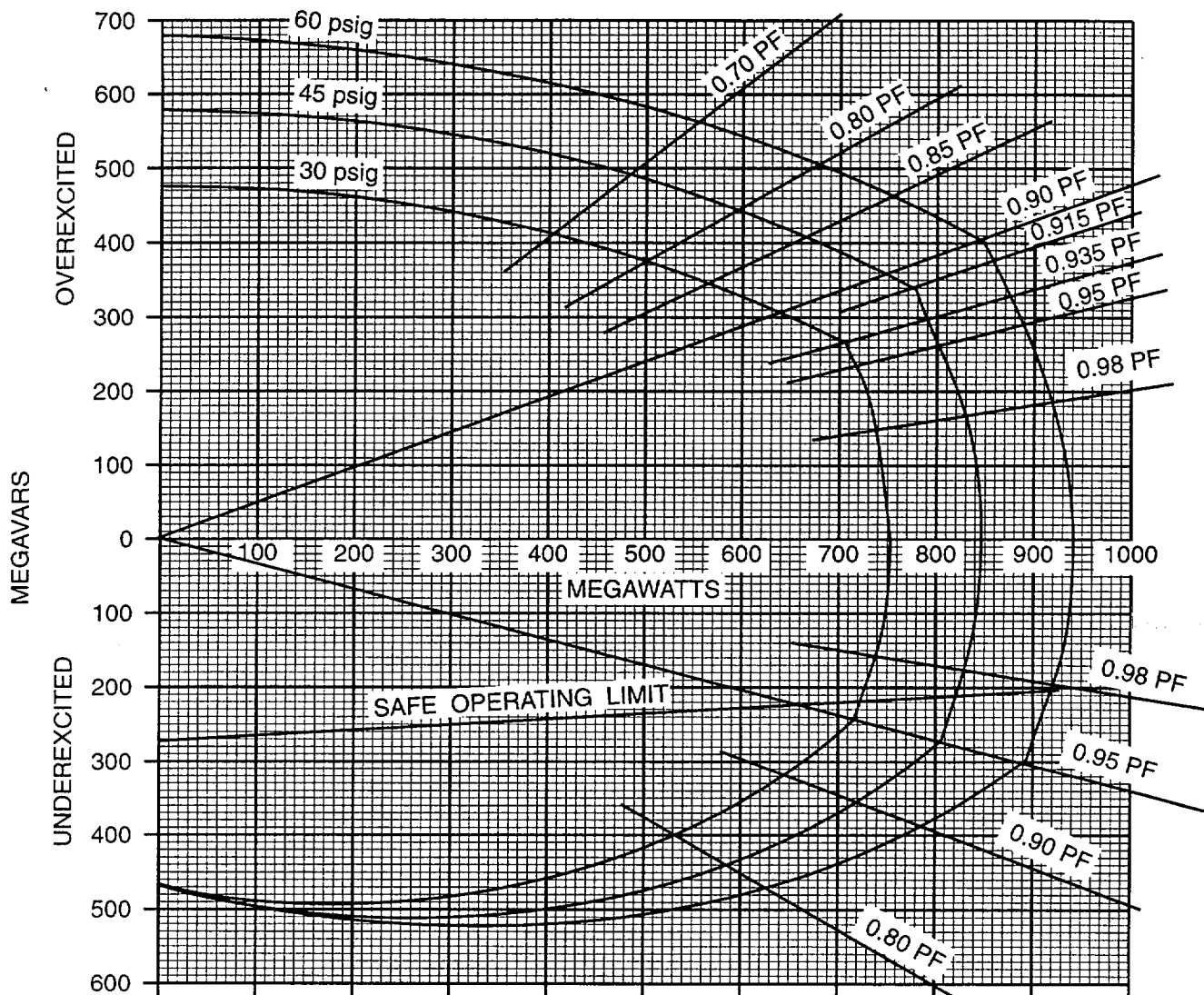
The System Operator has requested that you operate the main generator in a VARS IN condition. The following conditions exist:

- Maximum attainable Hydrogen pressure is 45 psig.
- Main Generator output is 800 Megawatts.

Using the supplied reference, which ONE of the following identifies the maximum VARS IN that can be carried by Surry Unit 1?

- a. 280 MVAR's.
- b. 270 MVAR's.
- c. 260 MVAR's.
- d. 210 MVAR's.

ATTACHMENT 48
(Page 1 of 2)
CAPABILITY CURVES



HYDROGEN INNER-COOLED TURBINE GENERATOR
CALCULATED CAPABILITY CURVES
941, 700 KVA, 0.90 PF, 0.58 SCR, 60 PSIG, 3 PH
60 CYCLES, 1800 RPM

Graphics No: KM1117

QUESTION 97: (1.0)

The Turbine Building operator reports that the air side seal oil pump has tripped on thermal overload.

Which ONE of the following identifies the actions required to coordinate restoration of power to the seal oil pump?

- a. Electricians must be contacted to reset the thermal overload device.
- b. The Turbine Building operator has the authority to reset the thermal overload device once to determine the cause of the trip.
- c. After determining the cause, the SRO may approve one reset of the thermal overload device.
- d. The pump must be tagged out, bridged, and meggered prior to reset of the thermal overload device.

QUESTION 98: (1.0)

Unit 2 is in a refueling outage with core on-load in progress. The Refueling SRO requests that the running RHR pump be secured to increase water clarity. The RO checks the logs and determines that the running RHR pump has been in service for 15 hours.

Which ONE of the following times correctly states how long the running RHR pump may be secured?

- a. 1 hour.
- b. 2 hours.
- c. 4 hours.
- d. 8 hours.

QUESTION 99: (1.0)

The Reactor Operator is in the process of performing a normal shutdown when she observes that letdown flow has decreased.

Which ONE of the following conditions would cause this decrease in letdown flow?

- a. Decreasing RCS pressure.
- b. Decreasing VCT pressure.
- c. A decrease in the auto setpoint for PCV-1145.
- d. Channeling of the mixed bed.

QUESTION 100: (1.0)

Given the following plant conditions:

- The team is responding to an ATWS in accordance with 1-FR-S.1, Response to Nuclear Power Generation/ATWS.
- The RO is performing the immediate actions without assistance from the third licensed RO.
- Manual trip was attempted but the reactor would not trip.
- Control rods are in manual due to continuous rod insertion caused by instrument failure.

In response to this, the RO should _____.

- a. trip the turbine, then manually insert control rods
- b. Place rods in auto, then trip the turbine
- c. trip the turbine, then place rods in automatic
- d. manually insert control rods until all control rods are at zero steps, then trip the turbine

FINAL SUBMITTAL

SURRY EXAM 50-280/2000-301

SEPTEMBER 14 - 21, 2000

FINAL SRO WRITTEN EXAMINATION
AND ANSWER KEY

SEPTEMBER 14, 2000

97
Total Points: ⁹⁷(100.0) *100*

NRC SRO EXAM ANSWER KEY

SURRY POWER STATION

RO/SRO LICENSE CLASS 99-1

SRO UPGRADE CLASS 99-2

NRC LICENSING EXAM

September 14, 2000

NRC SRO EXAM ANSWER KEY

- | | | | |
|---------------------------|------------------|--|-------------------|
| 1. <u> B </u> | 31. <u> C </u> | 61. <u> C </u> | 91. <u> B </u> |
| 2. <u> A </u> | 32. <u> D </u> | 62. <u> C </u> | 92. <u> A </u> |
| 3. <u> C </u> | 33. <u> B </u> | 63. <u> A </u> | 93. <u> B </u> |
| 4. <u> C </u> | 34. <u> B </u> | 64. <u> B </u> | 94. <u> C </u> |
| 5. <u> B </u> | 35. <u> A </u> | 65. <u> D </u> | 95. <u> B </u> |
| 6. <u> B </u> | 36. <u> C </u> | 66. <u> A </u> | 96. <u> A </u> |
| 7. <u> C </u> | 37. <u> A </u> | 67. <u> B </u> | 97. <u> A </u> |
| 8. <u> B </u> | 38. <u> C </u> | 68. <u> B </u> | 98. <u> D </u> |
| 9. <u> D </u> | 39. <u> A </u> | 69. <u> A </u> | 99. <u> C </u> |
| 10. <u> D </u> | 40. <u> B </u> | 70. <u> C </u> | 100. <u> A </u> |
| 11. <u> C </u> | 41. <u> C </u> | 71. <u> D </u> | |
| 12. <u> A </u> | 42. <u> A </u> | 72. <u> B </u> | |
| 13. <u> A </u> | 43. <u> D </u> | 73. <u> B </u> | |
| 14. <u> C </u> | 44. <u> B </u> | 74. <u> D </u> <i>Deleted</i> | |
| 15. <u> B </u> | 45. <u> C </u> | 75. <u> D </u> | |
| 16. <u> C </u> | 46. <u> B </u> | 76. <u> B </u> | |
| 17. <u> B </u> | 47. <u> A </u> | 77. <u> D </u> | |
| 18. <u> D </u> | 48. <u> D </u> | 78. <u> C </u> | |
| 19. <u> A </u> | 49. <u> C </u> | 79. <u> D </u> | |
| 20. <u> D </u> | 50. <u> B </u> | 80. <u> A </u> | |
| 21. <u> B </u> | 51. <u> C </u> | 81. <u> C </u> | |
| 22. <u> C </u> | 52. <u> B </u> | 82. <u> C </u> | |
| 23. <u> B </u> | 53. <u> D </u> | 83. <u> B </u> | |
| 24. <u> A </u> | 54. <u> A </u> | 84. <u> D </u> | |
| 25. <u> A </u> | 55. <u> D </u> | 85. <u> D </u> | |
| 26. <u> C </u> | 56. <u> A </u> | 86. <u> B </u> | |
| 27. <u> B </u> | 57. <u> B </u> | 87. <u> A </u> | |
| 28. <u> C </u> | 58. <u> A </u> | 88. <u> D </u> | |
| 29. <u> C </u> | 59. <u> C </u> | 89. <u> B </u> | |
| 30. <u> B </u> <i>A</i> | 60. <u> C </u> | 90. <u> D </u> | |

SURRY POWER STATION

RO/SRO LICENSE CLASS 99-1

SRO UPGRADE CLASS 99-2

NRC SRO LICENSING EXAM

September 14, 2000

(TOTAL POINTS: 100.0)

QUESTION 1: (1.0)

Given the following plant conditions:

- RCS is at 320°F/400 psig.
- Charging flow control in manual.
- The "A" RHR heat exchanger develops a 10 gpm tube leak.
- Heat exchanger bypass flow controller FCV-1605 is in Automatic.

Which ONE of the following is correct concerning the indications you would expect for this condition?

- a. CC Head tank level decreases.
- b. PRZR level decreases.
- c. Indicated RHR flow increases.
- d. RHR pump amps decrease.

QUESTION 2: (1.0)

Given the following plant conditions:

- Unit 1 core off-load is in progress.
- The Fuel Building supervisor informs the control room that an irradiated fuel assembly has become separated from the top nozzle and fallen on top of the fuel racks.
- Fuel building radiation monitors are in alarm.

In accordance with 0-AP-22.00, Fuel Handling Abnormal Conditions, the control room team should immediately_____.

- a. actuate dumping of control room bottled air.
- b. align fuel building exhaust through the iodine filters.
- c. evacuate the fuel building only if radiation levels exceed 1 Rem/hour.
- d. retrieve the fuel transfer cart and close the fuel transfer tube gate valve.

QUESTION 3: (1.0)

Given the following plant conditions:

- Reactor power is 20%, increasing to 100%.
- Annunciator G-B5, COMPU PRINTOUT ROD CONT SYS, is inoperable.
- Rod height is initially 140 steps on "D" bank.
- As rods are withdrawn, a blown fuse results in one immovable rod—F-6 in "D" bank (located near N-43).

If power ascension continues, quadrant power tilt ratio will _____ as indicated by _____ as rods are fully withdrawn.

- a. decrease; N-43 Delta Flux meter
- b. increase; N-43 Delta Flux meter
- c. increase; annunciator G-C4, UPPER ION CHAMBER OR AUTO DEFEAT < 50% remaining lit as power exceeds 50%
- d. decrease; annunciator G-D4, LOWER ION CHAMBER OR AUTO DEFEAT < 50% clearing as power exceeds 50%

QUESTION 4: (1.0)

Given the following plant conditions:

- Refueling is complete and RCS loops have been filled.
- The team has started "A" reactor coolant pump (RCP).
- Immediately after pump start, annunciator C-H4, RCP FRAME DANGER alarms.

In response, the team should _____.

- a. stop the RCP and request engineering to perform a structural integrity inspection
- b. re-scale the vibration monitor and determine if readings are accurate
- c. determine if vibrations are high; if so then stop the RCP
- d. request predictive analysis to take readings using hand-held instrumentation

QUESTION 5: (1.0)

RCS cooldown is in progress per 1-ES-0.2, Natural Circulation Cooldown.

During RCS depressurization, the team notes that subcooling has suddenly decreased from 45°F to 5°F. Per the ES-0.2 continuous action page, the team should _____.

- a. initiate safety injection and transition to 1-ES-0.0, Re-diagnosis
- b. initiate safety injection and transition to 1-E-0, Reactor Trip or Safety Injection
- c. stop RCS depressurization and continue cooldown to restore subcooling
- d. continue RCS depressurization and increase the cooldown rate to restore subcooling

QUESTION 6: (1.0)

A reactor trip occurred and the team noted that all IRPIs indicated zero except the following:

- L-5 – 22 steps
- K-10 – 16 steps
- E-14 – 9 steps
- B-6 – 11 steps
- D-10 – 20 steps
- C-7 – 17 steps
- H-2 – 13 steps
- J-3 – 19 steps
- B-8 – 6 steps

Emergency boration via 1-CH-MOV-1350 commenced with "A" BAST level initially at 89% AND 8.1 % Boric Acid. Current RCS Concentration of Boron is 892 ppm.

Using the references provided, determine which ONE of the following is correct concerning the level in "A" BAST at which the team should stop emergency boration.

- a. 28%
- b. 52%
- c. 58%
- d. 73%

NUMBER	PROCEDURE TITLE	REVISION
1-ES-0.1	REACTOR TRIP RESPONSE	24
		PAGE 8 of 14

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10.	<p>__VERIFY ALL IRPIs - 10 STEPS OR LESS</p>	<p><u>IF</u> two or more IRPIs indicate greater than 10 Steps, <u>THEN</u> do the following:</p> <ul style="list-style-type: none"> a) Verify or raise CHG flow - GREATER THAN 75 GPM b) Align boration path: <ul style="list-style-type: none"> 1) Put BATP in FAST. 2) Open 1-CH-MOV-1350. 3) Verify emergency borate flow. c) <u>IF</u> emergency borate flow path <u>NOT</u> available, <u>THEN</u> align alternate boration path: <ul style="list-style-type: none"> • Borate using the Blender. <p style="text-align: center;"><u>OR</u></p> <ul style="list-style-type: none"> • Manually align CHG pump suction to the RWST. d) Record start time of emergency boration. <ul style="list-style-type: none"> • _____ e) Record in-service BAST level. <ul style="list-style-type: none"> • _____ f) Direct STA to initiate Attachment 1. g) Initiate Shutdown Margin IAW 1-OP-RX-002, SHUTDOWN MARGIN (CALCULATED AT-ZERO POWER).

NUMBER 1-ES-0.1	ATTACHMENT TITLE GALLONS OF BORIC ACID NEEDED TO INCREASE RCS BORON BY 200 PPM	REVISION 24
ATTACHMENT 1		PAGE 1 of 2

NOTE: The amount of boration listed in the table in Step 4c is only an estimate of the actual boration required. The actual value is determined by calculations performed in 1-OP-RX-002. The amount of boration should be adjusted based on the SDM calculation.

1. Using IRPI indication, determine the number of control rods greater than 10 Steps and complete the following table.

Actual RPI Indication	Record RPI IDs for RPIs indicating NOT fully inserted	Equivalent Stuck Rods (EQSR)	Record EQSR Subtotals:
Any Rod > 20 steps		1 rod = 1 EQSR	
Rods indicating 11 - 20 (inclusive) steps withdrawn		1 to 6 rods = 1 EQSR 7 to 12 rods = 2 EQSR 13 to 31 rods = 3 EQSR 32 or more = 4 EQSR	
		Total Equivalent Stuck Rods:	

2. IF only one Total Equivalent Stuck Rod was indicated in the above table, THEN stop emergency boration.
3. IF two or more Equivalent Stuck Rods were indicated in the above table, THEN continue with emergency boration IAW Step 4.
4. Use the table below to borate 200 ppm for each equivalent stuck rod as determined in Step 1.
- a. Check current RCS boron concentration. Use the range within which the current ppm reading falls.

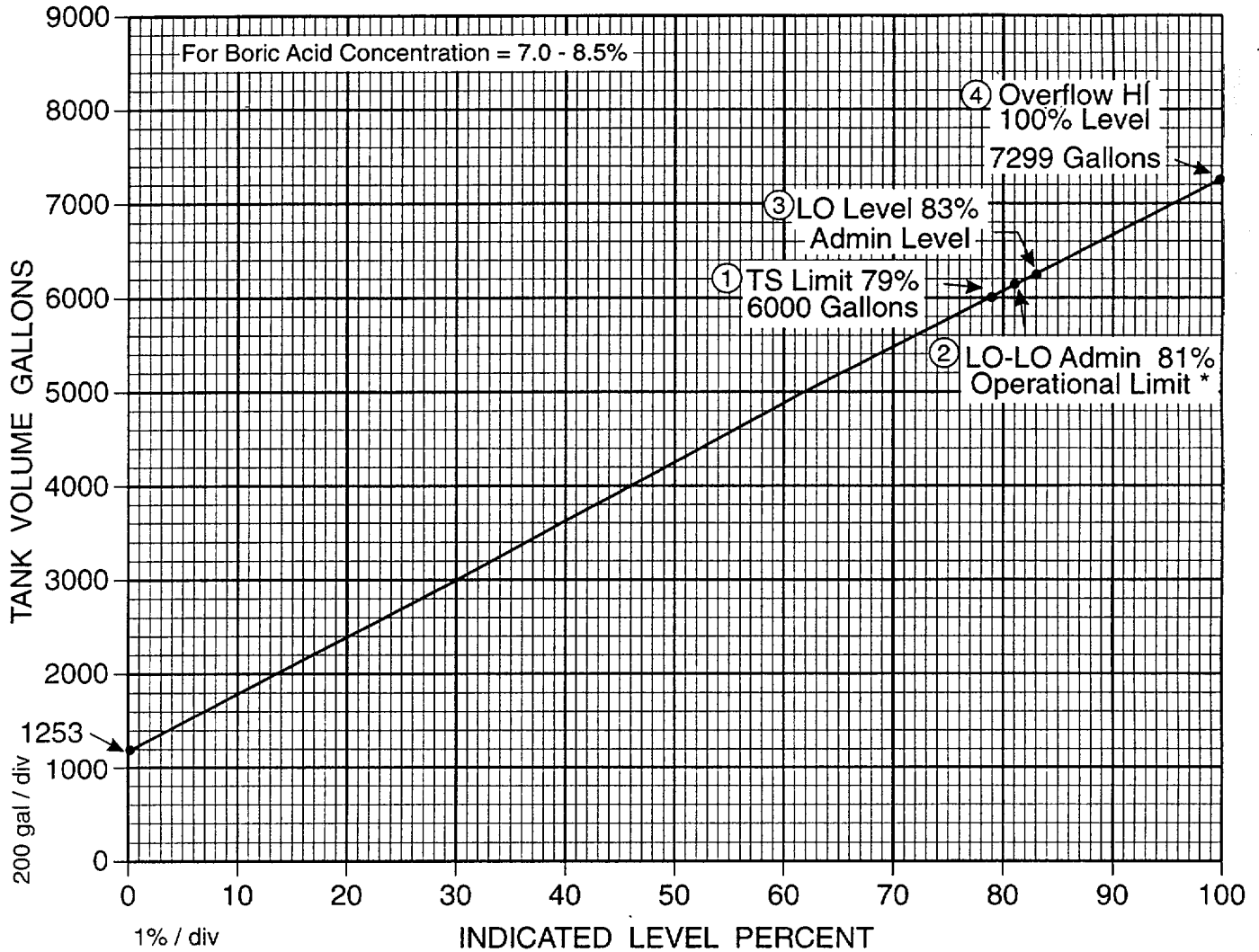
NUMBER 1-ES-0.1	ATTACHMENT TITLE GALLONS OF BORIC ACID NEEDED TO INCREASE RCS BORON BY 200 PPM	REVISION 24
ATTACHMENT 1		PAGE 2 of 2

- ___ b. Check the BAST boron concentration for the in-service tank.
Use the range within which the current concentration falls.
- ___ c. Multiply the value listed (gallons) by the number of equivalent
stuck rods determined in Step 1 and borate that amount.

CURRENT RCS BORON (PPM)	BAST 7.0-7.24	BAST 7.25-7.49	BAST 7.50-7.74	BAST 7.75-7.99	BAST 8.0-8.24	BAST 8.25-8.5
0-100	1198	1156	1117	1080	1046	1014
101-200	1208	1165	1126	1088	1054	1021
201-300	1218	1175	1134	1097	1061	1028
301-400	1229	1184	1143	1105	1069	1036
401-500	1239	1194	1153	1114	1077	1043
501-600	1250	1204	1162	1122	1085	1051
601-700	1261	1214	1171	1131	1094	1059
701-800	1272	1225	1181	1140	1102	1066
801-900	1283	1235	1191	1149	1110	1074
901-1000	1295	1246	1201	1158	1119	1082
1001-1100	1307	1257	1211	1168	1128	1091
1101-1200	1318	1268	1221	1177	1137	1099
1201-1300	1331	1279	1231	1187	1146	1108
1301-1400	1343	1290	1242	1197	1155	1116
1401-1500	1356	1302	1253	1207	1164	1125

- ___ d. Adjust boration amount based on the value calculated in
1-OP-RX-002.

ATTACHMENT 58
(Page 1 of 1)
BORIC ACID STORAGE TANKS



Graphics No: KM1130

- | | |
|---------------------------------|------|
| ① TS Limit (6000 gallons) | 79% |
| ② LO-LO Admin Operational Limit | 81% |
| ③ LO Level Admin Limit | 83% |
| ④ Overflow High Level | 100% |

* 81% ~ TS Limit with Gauge
Inaccuracy Minimum Operational Limit

BORIC ACID STORAGE TANKS
1-CH-TK-1A, B, C

QUESTION 7: (1.0)

Given the following plant conditions:

- Reactor startup is in progress.
- Shutdown banks have been withdrawn.
- Control bank "D" is at 150 steps.
- The reactor is at 5% power controlling on the steam dumps.
- Multiple failures result in RCS pressure increasing to 2750 psig.

What is the required team response required by Technical Specifications?

- a. Be in hot shutdown within 6 hours.
- b. Be in cold shutdown in 30 hours.
- c. Be in hot shutdown within 1 hour.
- d. Suspend the startup until the pressure is below 2235 psig.

QUESTION 8: (1.0)

Given the following plant conditions:

- A main steam break occurred with the unit at 100% power.
- Safety injection actuated and all equipment functioned correctly.
- The RO noted that control rod H-14 IRPI indicates 226 and all other rod bottom lights are illuminated.

Which ONE of the following identifies the required team response?

- a. Initiate Emergency boration.
- b. No additional actions are required.
- c. Rack out both rod drive MG set supply breakers.
- d. Attempt to manually insert the rod.

QUESTION 9: (1.0)

Given the following plant conditions:

- The unit has been placed on line.
- The turbine is at 15% power.
- Annunciator F-B6, TURB LO VAC, alarmed ten minutes ago.
- The reactor operator observes main condenser vacuum at 24.8" Hg and degrading.

In accordance with 1-AP-14.00, Loss of Main Condenser Vacuum, if vacuum can not be recovered the team should _____.

- a. reduce turbine load until vacuum is stable
- b. initiate 1-AP-23.00, Rapid Load Reduction
- c. trip the turbine while continuing with 1-AP-14.00
- d. trip the reactor and go to 1-E-0 while continuing with 1-AP-14.00

QUESTION 10: (1.0)

Given the following plant conditions:

- A complete loss of vital bus 1-III occurred with the unit at 100% power.
- Repairs will require at least one hour before the bus can be re-energized.
- CC flow to the "A" RCP could not be restored and the team tripped the unit.
- Five minutes after the trip, RCS average temperature decreased to 538°F in the idle RCS loop.

Which ONE of the following actuations will occur, if any?

- a. No actuation will occur.
- b. High steam flow SI only will occur.
- c. Steam line isolation only will occur.
- d. High steam flow SI and steam line isolation will both occur.

QUESTION 11: (1.0)

While responding to a Hi Hi CLS actuation on Unit 2 the Reactor Operator receives annunciator 2B-H2, BCHX OUTLET Hi Temp. Unit 1 is shutdown with RCP's running.

Which ONE of the following events caused the annunciator to alarm?

- a. Phase III Containment Isolation.
- b. Load Shed.
- c. "E" and "F" transfer bus undervoltage.
- d. Load Sequencing.

QUESTION 12: (1.0)

Given the following plant conditions:

- Unit 1 was at 100% power when noxious fumes forced evacuation of the control room.
- 1-AP-20.00, Main Control Room Inaccessibility, was entered.

Which ONE of the following identifies the control manipulation required to transfer charging flow control to the ASDP?

- a. Place the switch for half station 1-CH-FCV-1122 to "LOCAL".
- b. Place the "H" Group Transfer Switch to "LOCAL".
- c. Place the "J" Group Transfer Switch to "LOCAL".
- d. Place the switch for Manual/Auto controller FCV-FC-1122 to "LOCAL".

QUESTION 13: (1.0)

Which ONE of the following conditions describes a loss of containment integrity?

- a. The seals on the Personnel airlock (inner and outer) are tested 18 days after use while at power.
- b. The inner containment airlock door is left open while performing maintenance on the outer door O-rings at Cold Shutdown.
- c. One containment airlock door is opened for maintenance at Intermediate Shutdown.
- d. A containment penetration exceeds Tech Spec leakage rate limits while at Cold Shutdown.

QUESTION 14: (1.0)

A letdown radiation monitor alarm prompts the team to verify a mixed bed IX is in service.

Which ONE of the following identifies the basis for this action?

- a. A mixed bed IX must be in service because the letdown radiation monitor is located in series with the IX.
- b. A mixed bed IX will remove excess Lithium that could potentially damage the fuel.
- c. A mixed bed IX will help reduce radioactive activity in the RCS by trapping the radioactive particles.
- d. A mixed bed IX will raise primary pH which will minimize fuel element damage.

QUESTION 15: (1.0)

Given the following plant conditions:

- Unit 1 is stable at 50% power.
- Rod control is in AUTOMATIC with "D" bank at 190 steps.
- T_{ave} and T_{ref} are initially matched at 560°F.
- A failure in the median/high select T_{ave} control unit results in T_{ave} indicating 556°F.

As a result, control rods will _____.

- a. insert at 40 steps per minute
- b. withdraw at 40 steps per minute
- c. insert at 32 steps per minute
- d. withdraw at 32 steps per minute

QUESTION 16: (1.0)

Which ONE of the following will directly result in a Unit 1 Reactor Trip from 100% power?

- a. With MG 1-1 tagged out for maintenance, "C" RSST locks out.
- b. Loss of the 1C1-2 transformer supplying Rod control.
- c. With MG 1-2 tagged out for maintenance, breaker 15A7, 480 supply breaker, trips open.
- d. Loss of semi-vital bus power to the IRPI cabinets.

QUESTION 17: (1.0)

The following conditions exist:

- Unit 1 tripped from 30% power due to a loss of the "A" RSST.
- The Unit 1 Terry Turbine tripped on overspeed.
- The #3 EDG failed to auto start.
- The Outside Service Building Operator has isolated the "J" train of AFW.

Which ONE of the following system relationships exists?

- a. "B" Motor Driven AFW pump recirculation line is isolated.
- b. With Unit 1 AFW cross-tie established from Unit 2, Unit 1 "J" AFW will be re-established.
- c. If Unit 1 "J" bus is restored, Unit 1 "J" header AFW flow will initiate unmitigated.
- d. The Unit 1 "J" train must be un-isolated to initiate Unit 2 AFW cross-tie.

QUESTION 18: (1.0)

You are monitoring 100% power operation using the SPDS in the TSC. During this monitoring the following Top Level Display Functions are shown:

1-Reactivity Control	Green
2-Core Heat Removal	Red
3-Secondary Heat Removal	Green
4-RCS Integrity	Red
5-Radioactivity Control	Red
6-Containment Conditions	Red

Which ONE of the following identifies the accident in progress?

- a. Steam Generator Tube Rupture.
- b. Steam Line Break Inside Containment.
- c. Steam Line Break Outside Containment
- d. Small Break LOCA.

QUESTION 19: (1.0)

The following conditions exist:

- The Unit Reactor Operator noticed pressurizer level decreasing rapidly and performed AP-16.00, Excessive RCS leakage.
- The team initiated a manual SI based on excessive RCS leakage.
- A Health Physics technician reported steam from the Safeguards valve pit area.
- With RCS pressure at 1650 psig, the Unit Reactor Operator reported LHSI flow at 4500 gpm per pump.
- The team has entered ECA-1.2, LOCA outside Containment.
- Immediately after closing 1-SI-MOV-1890C, all LHSI flow reduced to zero.

Which ONE of the following identifies the status of the leak (assuming there is only one leak location)?

- a. RCS leak is still active.
- b. RWST leak is still active.
- c. The leak is isolated.
- d. The leak is NOT on the LHSI piping.

QUESTION 20: (1.0)

All running RCP's must be stopped after Hi Hi CLS actuation.

Which ONE of the following is the reason for the RCP's being stopped?

- a. to reduce RCS inventory loss via the break.
- b. to prevent a deeper core uncover due to two phase flow within the RCS.
- c. to minimize electrical load on the Reserve Station Service busses during Hi Hi CLS.
- d. to prevent damage to the RCP motor from a loss of Component Cooling.

QUESTION 21: (1.0)

The Operating team has just swapped charging pumps and the following conditions exist:

Charging flow control is in automatic.

Charging flow indicates 40 gpm.

“B” Charging pump indicates 82 amps (12 amps above normal).

Program Pressurizer level indicates 53.7%.

Actual Pressurizer level indicates 49%.

1-CH-FCV-1122 indicates full demand.

Which ONE of the following has initiated this response?

- a. 1-CH-FCV-1122 air supply line severed.
- b. “A” charging pump discharge check valve failed.
- c. 1-CH-HCV-1311, Auxiliary Spray valve failed open.
- d. Regenerative heat exchanger tube leak.

QUESTION 22: (1.0)

The following conditions exist:

- The RCS is at 256°F, 300 psig.
- The RCS is solid.
- RHR is in-service, with 1-CH-PCV-1145 controlling RCS pressure.
- Outside air is valved into Containment.
- A loss of ALL instrument air occurs.

Assuming all systems respond as expected, which ONE of the following identifies the effect on the RCS?

- a. Temperature will decrease.
- b. Pressure will increase to a maximum of 2235 psig.
- c. Pressure will increase to a maximum of 365 psig.
- d. Inventory will decrease.

QUESTION 23: (1.0)

During the performance of 1-FR-P.1, Response to Imminent Pressurized Thermal Shock Condition, the team is directed to stop both low-head safety injection (LHSI) pumps and all but one charging pump.

Which ONE of the following describes the potential consequences of failure to perform these actions?

- a. Containment failure.
- b. Brittle failure of the reactor vessel.
- c. Loss of suction to containment spray pumps.
- d. Loss of suction to LHSI and charging pumps.

QUESTION 24: (1.0)

During performance of FR-S.1, Response to Nuclear Power Generation/ATWS, manual alignment of the Charging pump suction to the RWST is performed if emergency boration is unavailable.

Which ONE of the following identifies why manual SI initiation is **NOT** performed?

- a. Trips the running Main Feed Pumps.
- b. Excessive RCS pressure spike due to an auto turbine trip.
- c. Phase I Containment Isolation.
- d. Initiates electrical transient due to a Main Generator Trip.

QUESTION 25: (1.0)

20 minutes after a reactor trip from 66% power, the following NI indications exist:

- N-35 indicates 4.0×10^{-9} amps, SUR indicates 0 DPM.
- N-36 indicates 2.1×10^{-11} amps, SUR indicates -0.1 DPM.
- Source range detectors N-31 and N-32 are de-energized.

Which ONE of the following describes the abnormality in the above condition?

- a. N-35 is undercompensated.
- b. N-36 is undercompensated.
- c. N-35 is overcompensated.
- d. N-36 is overcompensated.

QUESTION 26: (1.0)

Which ONE of the following Steam Generator primary to secondary leakage conditions would permit continued power operation in accordance with Tech Specs?

- a. "A" leakage at 1.2 gpm.
- b. "A" leakage at .812 gpm and "C" SG at .25 gpm.
- c. "A" leakage at .345 gpm, "B" leakage at .25 gpm, and "C" leakage at .3 gpm.
- d. "A" leakage at .33 gpm, "B" leakage at .34 gpm, and "C" leakage at .335 gpm.

QUESTION 27: (1.0)

The following conditions exist during a Spent Fuel Cask load in the Fuel Building:

- Annunciator RM-C-3, Fuel Pit Bridge ALERT/FAILURE alarmed.
- Radiation Monitor indicates 7.32 mr/hr.
- High alarm test indicates 1.00E1 mr/hr.
- Alert alarm test indicates 5.00E0 mr/hr.
- Local reports from the Fuel Building indicate cloudiness in the water.

Which ONE of the following immediate actions is required for this situation?

- a. Direct HP to establish alternate radiation monitoring.
- b. Evacuate the fuel building.
- c. Manually dump both banks of bottled air.
- d. Immediately start one emergency MCR supply fan.

QUESTION 28: (1.0)

Which ONE of the following is performed in accordance with FR-Z.3, Response to Containment High Radiation?

- a. Isolate SW to 2/4 inservice RSHXs.
- b. If containment pressure has not increased to 23 psia, initiate CS flow to add NaOH.
- c. Verify that non-essential containment penetrations are isolated.
- d. Establish Containment Purge and Exhaust.

QUESTION 29: (1.0)

Given the following plant conditions:

- Unit 1 tripped from 100% power due to a loss of all main and auxiliary feedwater.
- All efforts to restore S/G feedwater flow have failed.
- RCS bleed and feed has now been initiated.

In all cases, RCS bleed and feed will _____.

- a. prevent core uncover
- b. prevent an inadequate core cooling condition
- c. provide temporary core cooling until a secondary heat sink can be restored
- d. depressurize the RCS sufficiently to enable the team to place RHR in service

QUESTION 30: (1.0)

Unit 2 is at Hot Shutdown with the steam dump system in Tave Mode. Steam Dump Controller offset has allowed Tave to increase up to 554°F. The Unit 2 semi-vital bus lost power 5 minutes ago.

Which ONE of the following identifies the status of the Unit 2 PORV's?

- a. All open and being automatically controlled in Local/Auto.
- b. All open and being automatically controlled in Remote/Auto.
- c. All shut and being manually controlled in Local/Auto.
- d. All shut and being manually controlled in Remote/Auto.

QUESTION 31: (1.0)

With unit 1 at 100% power, the RO takes the following data from the power range NIs.

	<u>N-41</u>	<u>N-42</u>	<u>N-43</u>	<u>N-44</u>
Upper Detector Current	159.7	139.5	157.0	141.7
100% Upper Detector Current	266.6	234.5	262.9	237.4
Lower Detector Current	166.0	145.1	160.7	144.4
100% Lower Detector Current	278.6	236.7	270.0	240.2

Using the references provided, determine which ONE of the following is correct.

- a. QPTR is 1.0253.
- b. QPTR is 1.0158.
- c. QPTR is 1.0195.
- d. QPTR is 1.0209.

Radial Tilt Calculation Worksheet

Unit

Upper Flux Channels

Time	Data	NI-41	NI-42	NI-43	NI-44	Average NI $\frac{41+42+43+44}{4}$	Peak NI- <u> </u>	Radial Tilt PEAK AVERAGE
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							

Lower Flux Channels

Time	Data	NI-41	NI-42	NI-43	NI-44	Average NI $\frac{41+42+43+44}{4}$	Peak NI- <u> </u>	Radial Tilt PEAK AVERAGE
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							
	Actual							
	Normalized							
	Actual+Normalized							

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Completed By:

Date: 6/10/98

Date: 6/10/98

Date:

QUESTION 32: (1.0)

Given the following plant conditions:

- Unit 1 is at 28% power.
- Annunciator 1C-C4, RCP 1C SEAL LKOFF HI FLOW, has just alarmed.
- "C" RCP no. 1 seal leak-off flow is indicating >8 gpm.

What actions are required?

- a.
 - 1) Stop "C" RCP.
 - 2) Verify "C" loop flow decreases to zero.
 - 3) Close "C" RCP seal leak-off valve.
- b.
 - 1) Go to 1-E-0, Reactor trip or Safety Injection, while continuing with AP-9.00.
 - 2) When the reactor is tripped, then close "C" RCP seal leak-off valve.
 - 3) Stop "C" RCP and verify ≤ 5 minutes have passed since seal failure occurred.
- c.
 - 1) Monitor RCP pump radial temperature and seal water return temperature.
 - 2) Initiate unit shutdown to allow stopping "C" RCP within 1 hour.
 - 3) When the unit is in HSD, then stop "C" RCP.
 - 4) Close "C" RCP seal leak-off valve.
- d.
 - 1) Go to 1-E-0, Reactor Trip or Safety Injection, while continuing with AP-9.00.
 - 2) When the reactor is tripped, then stop "C" RCP.
 - 3) Verify "C" loop flow decreases to zero.
 - 4) Close "C" RCP seal leak-off valve.

QUESTION 33: (1.0)

Unit 1 was tripped from 100% power due to a Main Steam Trip valve spurious closure. Unit 2 remains at 100% power. During electrical swapover, breaker 15E1 tripped on fault.

Which ONE of the following describes the Unit 1 and Unit 2 Reactor Coolant Pump (RCP) status?

- a. All RCPs running.
- b. All RCPs running except 1B.
- c. All RCPs running except 1B and 2B.
- d. All RCPs running except 2B.

QUESTION 34: (1.0)

The following conditions exist:

- RCS pressure is 300 psig.
- RCS temperature is 251°F.
- The RCS is solid.
- Flow through 1-RH-HCV-1142 is 50 gpm.

If a spurious SI occurs, which ONE of the following identifies RCS pressure response?

- a. increases due to three running charging pumps.
- b. increases due to letdown isolation.
- c. decreases due to the running RHR pump tripping.
- d. decreases due to administrative isolation of containment I/A.

QUESTION 35: (1.0)

With Unit 1 at 100% power, a partial phase "1" containment isolation signal results in closure of letdown isolation valve 1-CH-TV-1204A. No other valves or components are affected by the signal.

Which ONE of the following is correct concerning the affect of this transient on letdown flow?

- a. Indicated Letdown flow goes to zero; actual Letdown flow continues to the PRT.
- b. Indicated Letdown flow goes to zero; actual Letdown flow continues to the PDT.
- c. Indicated Letdown flow fluctuates as the relief valve lifts; actual Letdown flow continues to the PRT.
- d. Indicated Letdown flow fluctuates as the relief valve lifts; actual Letdown flow continues to the PDTT.

QUESTION 36: (1.0)

Following a LOCA with core damage, the following conditions were determined to have existed:

- Maximum clad temperature reached 2175°F.
- Cladding oxidation was 15% of original cladding thickness.
- Hydrogen generation from Zirc-water reaction was 3%.
- One train of ESF equipment failed to operate.

Which ONE of the above conditions exceeded (violated) 10CFR50.46, ECCS acceptance criteria?

- a. Clad temperature.
- b. Clad oxidation.
- c. Hydrogen generation.
- d. ESF equipment availability.

QUESTION 37: (1.0)

Which ONE of the following evolutions is prohibited?

- a. Entry into the Incore Sump Room with the flux thimbles retracted.
- b. Access into an RCP Motor Cubicles during reduced inventory conditions.
- c. Entry into an airborne radioactivity area without a SCBA.
- d. A ten minute entry into 15 Rem/Hr area to protect property during a Site Area Emergency.

QUESTION 38: (1.0)

The following parameters are indicated on the ICCM:

- Wide range pressure – 1988 psig.
- Highest quadrant CETC – 606°F.
- Lowest quadrant CETC – 600 °F.
- Average of the 5 highest CETC – 603 °F.
- “A” loop Th – 596 °F.
- “B” loop Th – 594 °F.

Which ONE of the following identifies the expected displayed subcooling margin?

- a. 40 °F
- b. 36 °F
- c. 33 °F
- d. 30 °F

QUESTION 39: (1.0)

With Unit 2 at 100% power, a spurious Hi Hi CLS occurs.

Which ONE of the following identifies the effect on indicated partial pressure?

- a. The indication is inaccurate, indicated pressure will be lower than pre-event values.
- b. The indication is inaccurate, indicated pressure will be higher than pre-event values.
- c. The indication is accurate, indicated pressure will be lower than pre-event values.
- d. The indication is accurate, indicated pressure will be higher than pre-event values.

QUESTION 40: (1.0)

Unit One is operating at 100% when the Reactor Operator notices that Main Feed Pump suction pressure suddenly decreased and stabilized at the lower pressure.

Which ONE of the following initiated the sudden pressure decrease in Main Feed Pump suction pressure?

- a. Another Polishing Building ion exchanger bed was put into service.
- b. FCV-CN-107 failed open.
- c. AOV-CN-122 failed open.
- d. The HP Heater Drain Pump Normal Level Control valve failed open.

QUESTION 41: (1.0)

The following conditions exist:

- Unit 2 is at 100% power.
- All Main Feed Regulation Valve Controllers are in automatic.
- Rod Control is Manual.
- The turbine is in Operator Auto and IMP-OUT.
- Steam Flow, Feed Flow, and Pimp are selected for Channel IV.

Which ONE of the following identifies S/G level response if pressure transmitter 1-MS-PT-1447 fails low?

- a. Steam Generator levels will decrease to the SF/FF mismatch with S/G low level Rx Trip setpoint.
- b. Steam Generator levels will decrease to the S/G low low level Rx Trip setpoint.
- c. Steam Generator levels will decrease to 33%.
- d. Steam Generator levels are not affected.

QUESTION 42: (1.0)

With the Unit One Steam Driven Auxiliary Feed pump tagged out for maintenance, what is the Unit 1 source of auxiliary feedwater if both Units are in emergency procedure ECA-0.0?

- a. Fire Protection and Domestic Water Tanks (1-FP-TK-1A/B).
- b. Emergency Condensate Makeup Tank (1-CN-TK-3).
- c. Distillate Water Storage Tank (1-WT-TK-101).
- d. Emergency Condensate Storage Tank (1-CN-TK-1A).

QUESTION 43: (1.0)

Unit One is performing a normal startup and is currently at 2% power when a safety injection occurs. The reactor operator notices that both motor driven auxiliary feed pumps are running after the safety injection.

Which ONE of the following identifies the time after the safety injection that the motor driven auxiliary feed pumps started?

- a. 0 seconds.
- b. 10 seconds.
- c. 27 seconds.
- d. 50 seconds.

QUESTION 44: (1.0)

During release of the "A" WGD, which ONE of the following will cause an automatic termination of the release?

- a. FI-GW-101, WGD effluent flow meter, fails high.
- b. 1-GW-RI-101, Process Vent Radiation Monitor, is inadvertently de-energized.
- c. 1-GW-AR-150A, Waste gas analyzer oxygen, fails high.
- d. VG-RI-131-1, Vent Stack #2 effluent monitor, fails high.

QUESTION 45: (1.0)

A High alarm on the _____ Radiation monitor will automatically close the Unit 1 Containment purge isolation MOVs.

- a. Unit 1 Containment, 1-RM-RMS-163
- b. Unit 1 Containment High Range, 1-RM-RMS-161
- c. Unit 1 Containment Manipulator crane, 1-RM-RMS-162
- d. Unit 1 Containment High Range (CHRRMS), 1-RM-RMS-127

QUESTION 46: (1.0)

The Unit 1 charging pumps are in the following configuration:

- 1-CH-P-1A – auto-off
- 1-CH-P-1B – auto-off
- 1-CH-P-1C – running on the “H” bus (15H6)

The Load Tap changer on ‘C’ RSS transformer fails and immediately lowers transformer voltage to 3037 volts AC. Which charging pumps will be running on Unit 1, 65 seconds after the transient?

- a. 1-CH-P-1A, 1-CH-P-1B, 1-CH-P-1C
- b. 1-CH-P-1B, 1-CH-P-1C only
- c. 1-CH-P-1A, 1-CH-P-1B only
- d. 1-CH-P-1C only

QUESTION 47: (1.0)

Given the following plant conditions:

- A spurious safety injection occurred with Unit 1 at 100% power.
- SI has been terminated, and charging and letdown are in service.
- RCS pressure is stable at 2235 psig, solid plant pressure control.
- PRZR water temperature is 590°F.

Using the steam tables provided, determine the pressure at which the RCS would stabilize if a PRZR bubble were drawn at the current plant conditions.

- a. 1417 psig.
- b. 1432 psig.
- c. 1438 psig.
- d. 1453 psig.

QUESTION 48: (1.0)

During the initial RCP start following RCS fill and vent, you are assigned to operate reverse acting, letdown pressure controller, 1-CH-PCV-1145 in manual.

After the RCP is started, you notice RCS pressure decreasing. To restore pressure, you will _____.

- a. decrease the demand on the controller to close CH-PCV-1145
- b. increase the demand on the controller to open CH-PCV-1145
- c. decrease the demand on the controller to open CH-PCV-1145
- d. increase the demand on the controller to close CH-PCV-1145

QUESTION 49: (1.0)

With Unit 1 at 5% power, a loss of "A" DC Bus occurs.

Without operator intervention, which ONE of the following states how the Reactor Protection System will respond?

- a. Both reactor trip breakers remain closed.
- b. "A" reactor trip breaker remains closed, "B" reactor trip breaker opens.
- c. "B" reactor trip breaker remains closed, "A" reactor trip breaker opens.
- d. Both reactor trip breakers open.

QUESTION 50: (1.0)

The following conditions exist:

- A Small Break LOCA has occurred.
- ES-1.2, Post LOCA Cooldown and Depressurization is in progress.

Which ONE of the following conditions prevents RHR from being placed in service?

- a. All RCS hot leg temperatures are 337°F.
- b. RCS pressure is 475 psig.
- c. 1-RC-PT-1403 is failed low.
- d. Pressurizer level less than 22%.

QUESTION 51: (1.0)

Given the following plant conditions:

- Unit 1 is at 100% power.
- All plant equipment is operable.
- An I&C tech inadvertently isolates and vents "A" condenser pressure transmitter 1-CN-PT-101A.

Which ONE of the following is correct concerning the affects of this?

- a. Trip signal to main turbine, no affect on condenser steam dumps or "A" condenser pressure indication.
- b. Trip signal to main turbine and loss of "A" condenser pressure indication, no affect on condenser steam dump capability.
- c. Loss of condenser steam dump capability and loss of "A" condenser pressure indication, no affect on main turbine.
- d. Loss of condenser steam dump capability, trip signal to main turbine, and loss of "A" condenser pressure indication.

QUESTION 52: (1.0)

Unit 1 is at 100% power with no equipment out of service and all three containment air recirculation fans (CARFs) running.

If a spurious Hi Hi CLS occurs, which ONE of the following identifies the immediate affects on the CARFs?

- a. All three CARFs trip.
- b. "A" and "B" trip, "C" continues to run.
- c. "B" trips, "A" and "C" continue to run.
- d. "B" and "C" trip, "A" continues to run.

QUESTION 53: (1.0)

Given the following plant conditions:

- Unit is on-line at 100% power.
- All control systems are in AUTOMATIC.
- "C" S/G level channel III fails low.

Assuming no operator action, which ONE of the following is correct?

- a. Feed Flow < Steam Flow Reactor Trip occurs.
- b. No affect on "C" S/G Level control.
- c. "C" FRV valve closes and "C" S/G level decreases.
- d. "C" FRV opens and "C" S/G level increases.

QUESTION 54: (1.0)

Given the following plant conditions:

- Unit 1 generator output breaker has just been closed following a reactor startup.
- All control systems are in AUTOMATIC and aligned per startup procedures.
- Steam Dump Valve 1-MS-TCV-105A is de-energized and tagged out for repair.

If main steam header pressure transmitter PT-464 fails high, which ONE of the following is correct?

- a. All steam dump valves will remain in their present position.
- b. All steam dumps (except 1-MS-TCV-105) fully open and RCS cooldown stops at 543°F.
- c. All steam dumps (except 1-MS-TCV-105) fully open and uncontrolled RCS cooldown condition continues until MSTVs are manually closed.
- d. All steam dumps (except 1-MS-TCV-105) fully open and safety injection occurs when RCS T_{ave} decreases to <543°F.

QUESTION 55: (1.0)

Given the following plant conditions:

- #1 EDG is carrying 1H emergency bus.
- The team is about to transfer 1H bus back to its normal source.
- The diesel operator places the 15H8 synchronizing switch to ON.
- The synchroscope begins rotating very fast in the slow direction (counterclockwise).

The diesel operator will have to _____ #1 EDG speed until the synchroscope is rotating slowly in the _____ direction.

- a. decrease; slow
- b. decrease; fast
- c. increase; slow
- d. increase; fast

QUESTION 56: (1.0)

Station battery 1-A capacity is 1800 amp-hours at a given rate of discharge.

If the discharge rate _____, the battery capacity _____.

- a. increases; decreases
- b. increases; increases
- c. increases; remains constant
- d. decreases; remains constant

QUESTION 57: (1.0)

Given the following plant conditions:

- #1 and #3 EDG's are loaded to 2750 KW each.
- The total amount of fuel in the underground fuel oil storage tanks is at the minimum required by Technical Specifications.
- Due to equipment failures, the aboveground fuel oil storage tank is not available.

#1 and #3 EDG's will run out of fuel oil in approximately _____.

- a. one hour
- b. 3.5 days
- c. four hours
- d. 7 days

QUESTION 58: (1.0)

The Reactor was tripped from 100% power in response to increased steam generator tube leakage.

The post trip indication of primary-to-secondary leakage on the NRC radiation monitors will tend to be _____.

- a. lower than at power indication
- b. approximately equal to at power indication
- c. higher than at power indication
- d. so inaccurate as to be unusable

QUESTION 59: (1.0)

With both units operation at 100% power the 2G transformer trips due to internal fault.

Which ONE of the following identifies the impact on unit operation?

- a. 2G transformer must be restored or Unit 2 must be shutdown.
- b. 2G bus automatically re-energizes and running CW pumps remain running, allowing continued dual unit operation.
- c. 2G bus automatically re-energizes and Unit 2 CW pumps must be manually restarted to allow continued dual unit operation.
- d. 2G bus must be manually crosstied and Unit 2 CW pumps restarted to allow continued dual unit operation.

QUESTION 60: (1.0)

Unit 1 is in Refueling Shutdown with the temporary jumper to the CC heat exchangers in service. The Unit 1 "B" & "D" high level intake structures are stop logged and drained. Unit 2 has sustained minor flooding on the "2C" Circulating Water Line.

What adverse effects will result if stop logs are placed at the Unit 2 "C" high level intake structure.

- a. Loss of Component Cooling Service Water.
- b. Loss of charging pump cooling water.
- c. Unit 2 Turbine Trip on low intake canal level.
- d. Loss of #5 MER chiller cooling water.

QUESTION 61: (1.0)

A rupture in the instrument air (IA) piping causes IA header pressure to decrease to 92 psig. Turbine building IA header pressure remains above 90 psig.

Which ONE of the following correctly states all of the actuations that occur to restore IA pressure?

- a. Running IA compressor loads, standby IA compressor starts and loads.
- b. Standby IA compressor starts and loads.
- c. Running SA compressor loads, standby SA compressor starts and loads.
- d. Standby SA compressor starts and loads.

QUESTION 62: (1.0)

A fire has been reported in the ESGR. There are flames issuing from the UPS 1A2.

Which ONE of the following actions should you direct the Fire Team to take?

- a. Actuate the HP CO₂ System.
- b. Actuate the LP CO₂ System.
- c. Actuate the Halon System.
- d. Rig fire hoses to the panel.

QUESTION 63: (1.0)

A licensed RO is about to swap charging pump service water pumps, which is designated as a "Skill-of-the-Craft" task. The RO has performed the task several times this shift.

Per OPAP-0002, Operations Department Procedures, which ONE of the following is correct concerning the procedure adherence requirements?

- a. The RO can perform the task without a procedure in hand, but must perform the task in accordance with the procedure.
- b. The RO can perform the task without a procedure in hand, since the task is not covered by an approved procedure.
- c. The RO must have the procedure in hand when performing the task, but is not required to sign-off procedure steps.
- d. The RO can perform the task without procedure in hand only if he requests a peer check for each equipment manipulation.

QUESTION 64: (1.0)

Which ONE of the following consequences does a spurious SI present (assuming all systems function as designed)?

- a. Pressurized Thermal Shock due to RWST water injection.
- b. Degraded containment conditions due to PRT rupture.
- c. Degraded heat sink due to Main Feed Pump trip.
- d. Overload of the Station Service Electrical Distribution.

QUESTION 65: (1.0)

Following a refueling shutdown, the RCS is in the process of being heated up and pressurized. The RO notes the CC surge tank level has been increasing for the past hour.

Isolation of which ONE of the following would potentially stop this increase?

- a. RCP seal water return heat exchanger.
- b. Neutron Shield Tank heat exchanger.
- c. Primary Drains Tank cooler.
- d. RHR pumps seal cooler.

QUESTION 66: (1.0)

Which ONE of the following prevents fuel assembly movement with cavity water level less than 23 feet?

- a. Administrative requirements only.
- b. Fuel mast interlock.
- c. Fuel elevator interlock.
- d. Manipulator crane interlock.

QUESTION 67: (1.0)

During performance of turbine valve freedom testing, the test engineer erroneously directs a local turbine trip.

Which ONE of the following components initiates the reactor trip signal?

- a. 74/AST.
- b. 63-AST-4/5/6.
- c. 4/4 Governor valves closed.
- d. 20/ET.

QUESTION 68: (1.0)

During a spurious Hi Hi CLS, the team is unable to reset the Hi Hi CLS signal.

The team must locally secure the _____ pumps to ensure Containment pressure does not drop below ____ psia which would potentially damage the _____.

- a. Containment Spray, 9, Containment Dome Liner
- b. Containment Spray, 8, Containment Basemat
- c. Inside Recirc Spray, 9, Containment Dome Liner
- d. Inside Recirc Spray, 8, Containment Basemat

QUESTION 69: (1.0)

Which ONE of the following identifies the maximum steady state power level that does not exceed the maximum steady state power level allowed by the facility license?

- a. 100%
- b. 107%
- c. 109%
- d. 118%

QUESTION 70: (1.0)

Which ONE of the following manipulations is prohibited during a Reactor Startup?

- a. Withdrawing the shutdown banks and performing a Normal Boration.
- b. Withdrawing the shutdown banks and raising RCS temperature.
- c. Withdrawing the shutdown banks and performing an Alternate Dilution.
- d. Withdrawing the shutdown banks 14 hours after a Reactor Trip from 100% power.

QUESTION 71: (1.0)

Maintenance would like to remove the danger tags from a 4160-volt breaker so they can cycle it in the TEST position. The tag-outs cannot be cleared.

Which ONE of the following correctly describes the operator actions required to facilitate this request?

- a. Remove the danger tags in accordance with an approved partial clearance, rack the breaker to TEST, then return the danger tags to the Operations Annex.
- b. Remove the danger tags in accordance with an approved partial clearance, rack the breaker to TEST, then destroy the danger tags and return the tagging records to the Operations Annex.
- c. Remove the danger tags in accordance with an approved temporary release, rack the breaker to TEST, then place a special order blue tag on the breaker racking device and return the danger tags to the Operations Annex.
- d. Remove the danger tags in accordance with an approved temporary release, rack the breaker to TEST, then place in tags in a temporary release envelope and attach the envelope to the breaker racking device.

QUESTION 72: (1.0)

Given the following Unit 1 conditions:

- All control rods are fully withdrawn.
- A failure in the rod control system causes "D" bank rods to step outward.
- The RO notes the failure and places rod control in MANUAL.
- Group step counters for "D" bank indicate 243 steps.
- IRPIs for "D" bank rods indicate (on the average) 230 steps.

Which ONE of the following is correct concerning the disparity between the group step counters and the IRPIs?

- a. This is expected; the IRPIs should eventually drift up to indicate approximately 243 steps.
- b. This is expected; the IRPIs should continue to indicate approximately 230 steps.
- c. This is not expected; the IRPIs should have tracked with the group step counters; they are still operable per TS-3.12.C.
- d. This is not expected; the IRPIs should have tracked with the group step counters; they are inoperable per TS-3.12.C.

QUESTION 73: (1.0)

An accident at SPS results in a radioactive plume passing over the high level intake structure. An operator at the high level intake structure receives a whole body dose of 1 rem per hour and he is exposed for 8 hours.

This operator is in the _____ zone and _____ exceeded the legal limit of 10CFR100.

- a. exclusion, has
- b. exclusion, has not
- c. low population, has
- d. low population, has not

QUESTION 74: (1.0)

Vital Bus II was de-energized in Unit 1 while at hot shutdown. The RO is performing the actions of ES-0.1.

Which ONE of the following identifies which RCP must be stopped and how much time is allowed to complete this action (assume all RCP bearing temperatures remain below 200°F)?

- a. RCP 1A, 5 minutes.
- b. RCP 1A, 2 minutes.
- c. RCP 1B, 5 minutes.
- d. RCP 1B, 2 minutes.

Deleted RSB 10/2/00

QUESTION 75: (1.0)

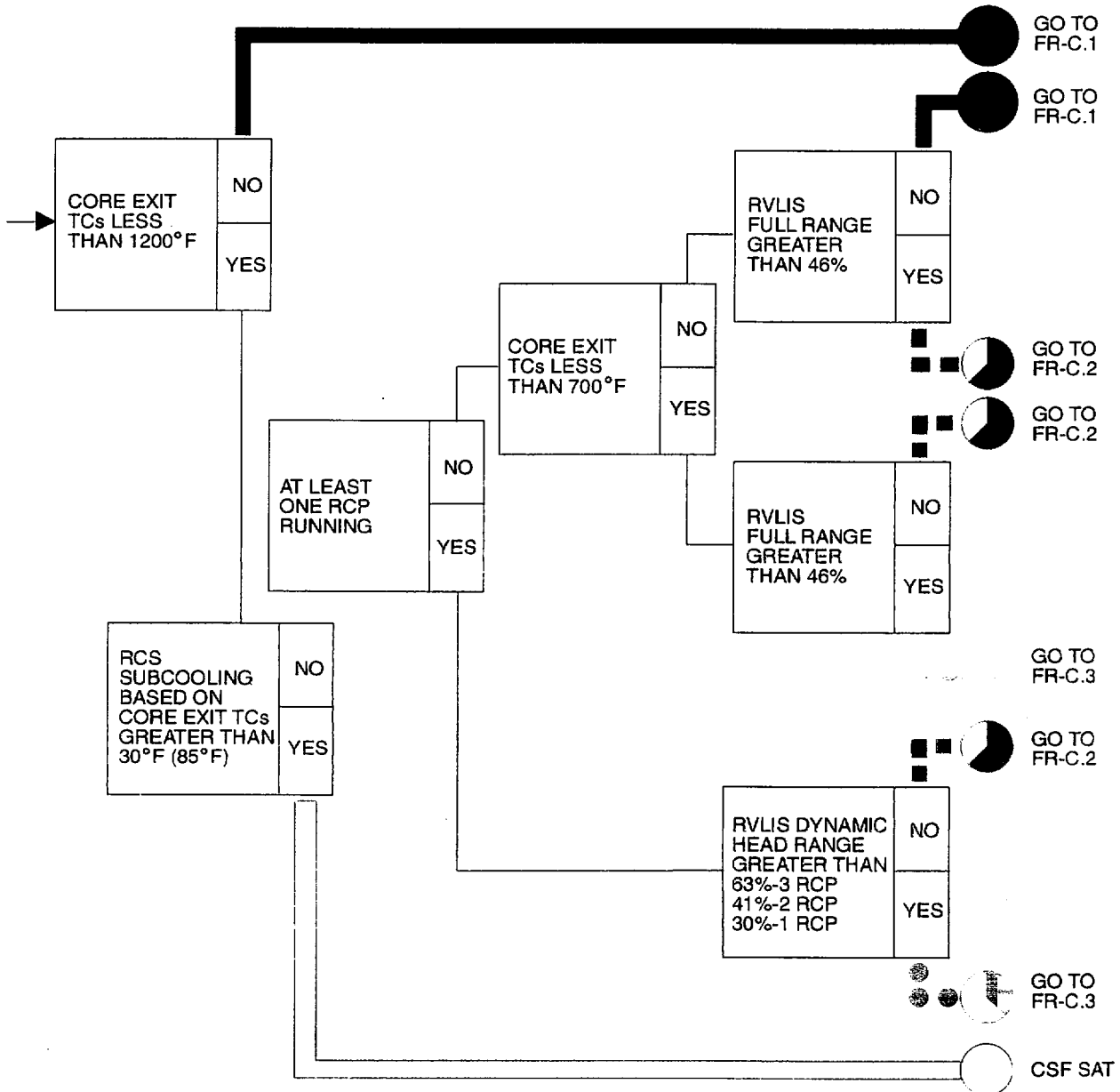
The plant has experienced a large-break LOCA twenty minutes ago from 100% power. The crew has transitioned from 1-E-0, Reactor Trip or Safety Injection, to 1-E-1, Loss of Reactor or Secondary Coolant. The following conditions exist:

- "A" S/G N/R level is 20%, AFW flow is 140 gpm.
- "B" S/G N/R level is 10%, AFW flow is 135 gpm.
- "C" S/G N/R level is 10%, AFW flow is 145 gpm.
- S/G pressure in all S/Gs is 1035 psig.
- RCS pressure is 100 psig and decreasing.
- No RCPs are running.
- Core Exit T/Cs are 705°F.
- All cold-leg temperatures are 280°F.
- RVLIS full-range level is 53%.
- Containment pressure is 37 psia.

Using the attached procedure, which ONE of the following identifies the required procedure to be implemented immediately?

- a. 1-FR-C.2
- b. 1-FR-P.1
- c. 1-FR-Z.1
- d. 1-FR-H.1

Number:	Title:	Revision:
F-2	CORE COOLING	Rev-1A



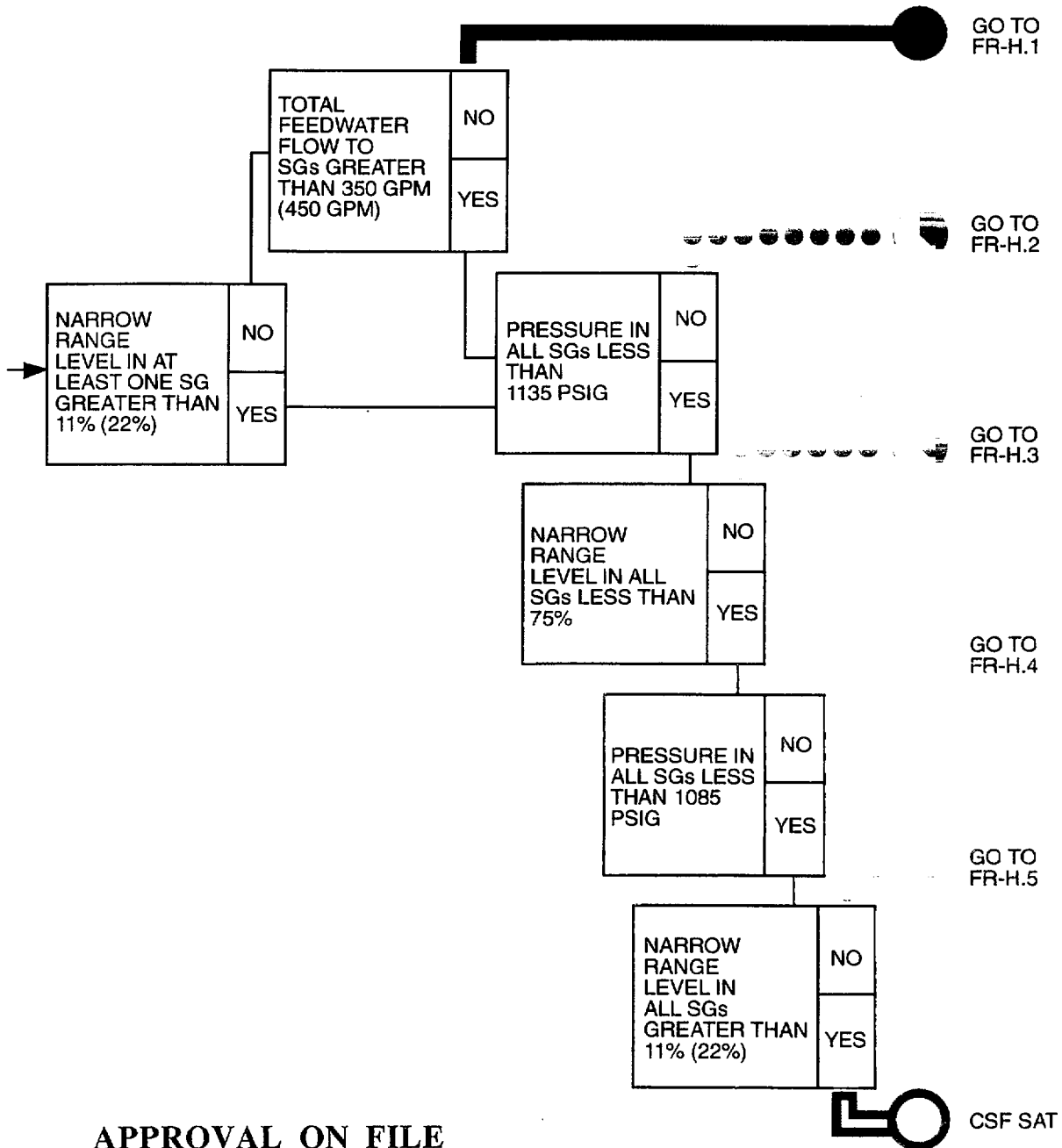
APPROVAL ON FILE

SNSOC CHAIRMAN

DATE

Drawing No. CB380

Number:	Title:	Revision:
F-3	HEAT SINK	4



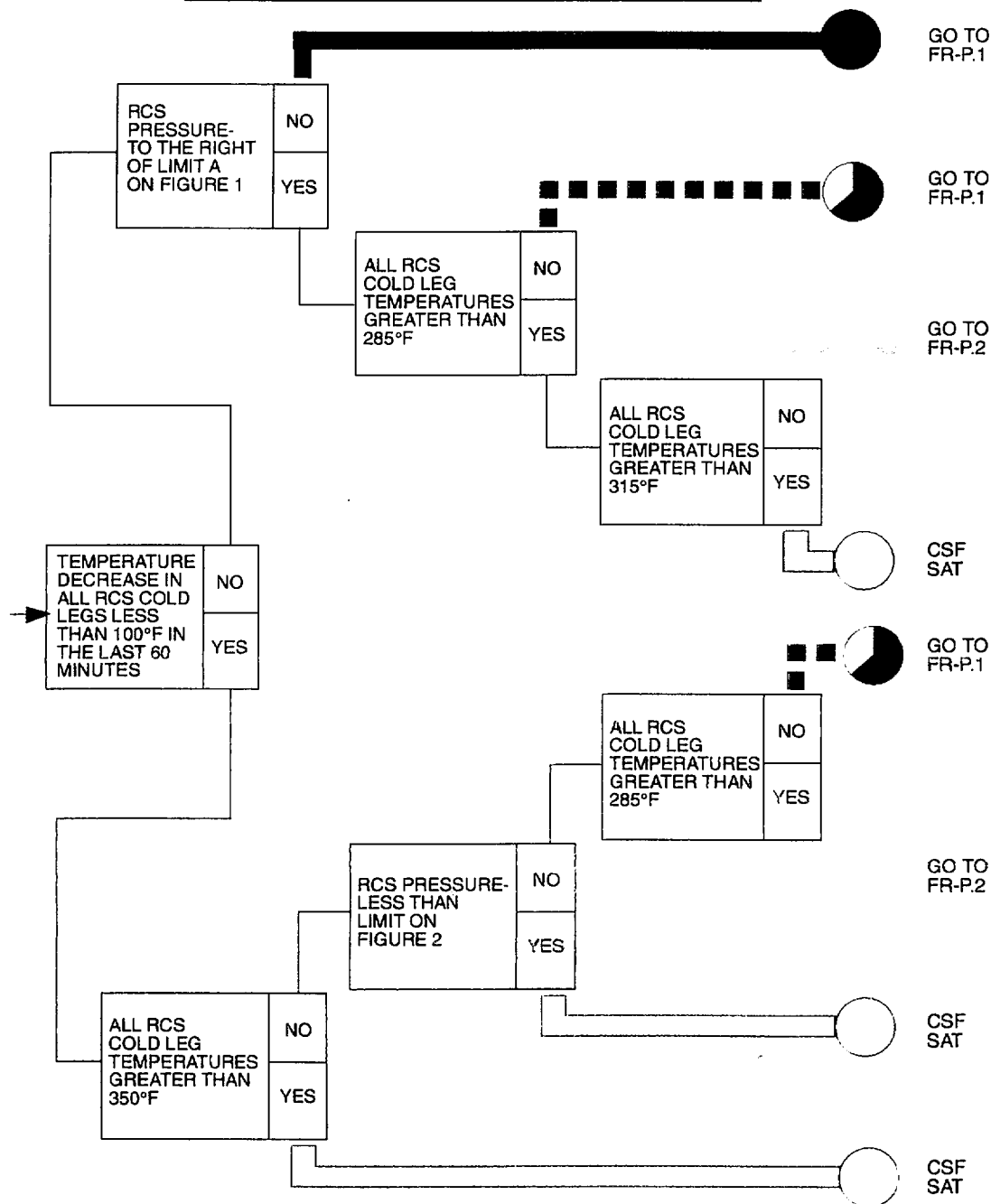
APPROVAL ON FILE

 SNSOC CHAIRMAN

DATE _____

Graphics No. CB381

Number: F-4	Title: INTEGRITY	Revision: 2
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APPROVAL ON FILE

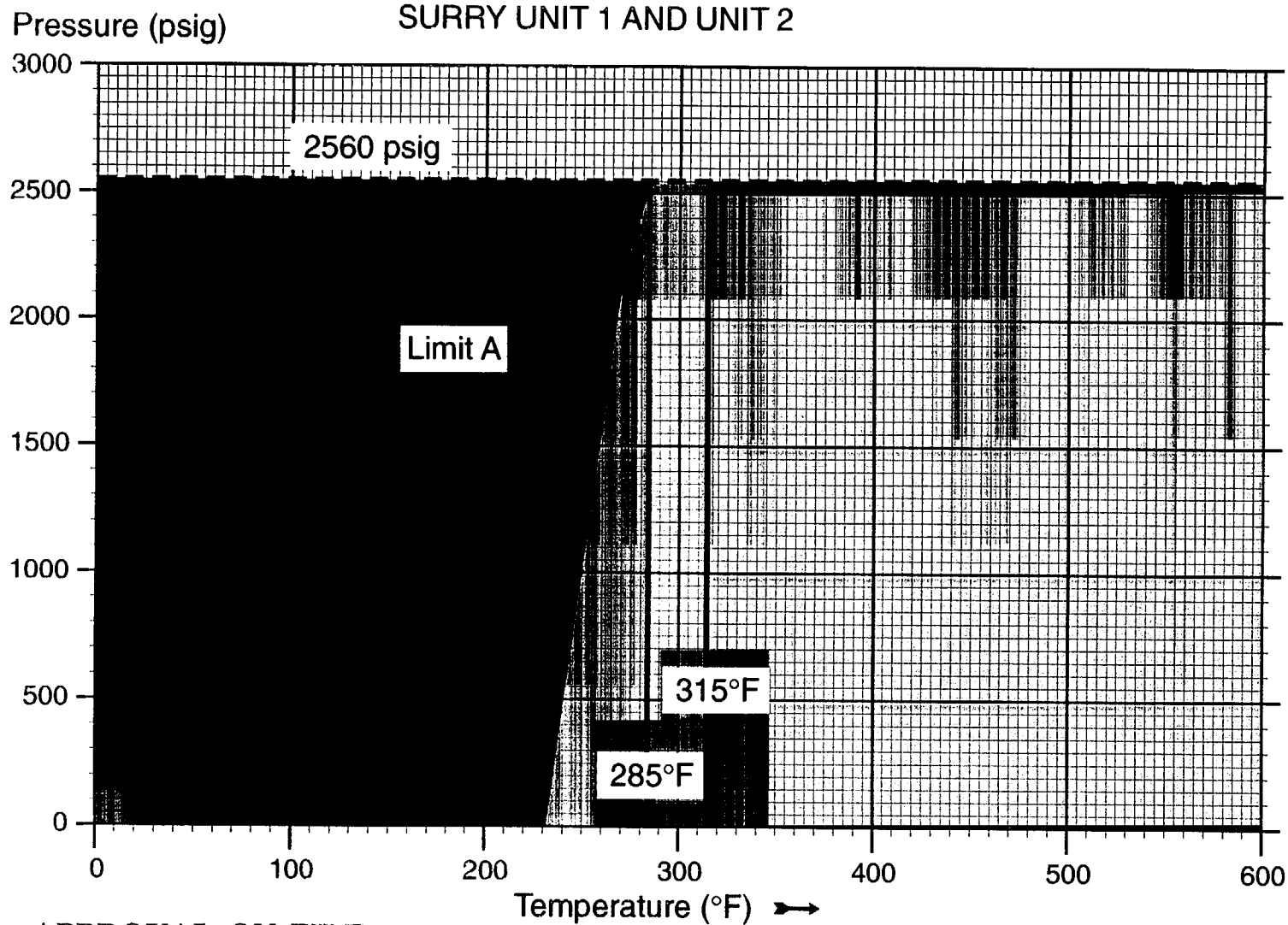
SNSOC CHAIRMAN

DATE

Graphics No. CB383

Number: F-4	Title: INTEGRITY	Revision: 2
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**FIGURE 1 - OPERATIONAL LIMITS CURVE
SURRY UNIT 1 AND UNIT 2**



APPROVAL ON FILE

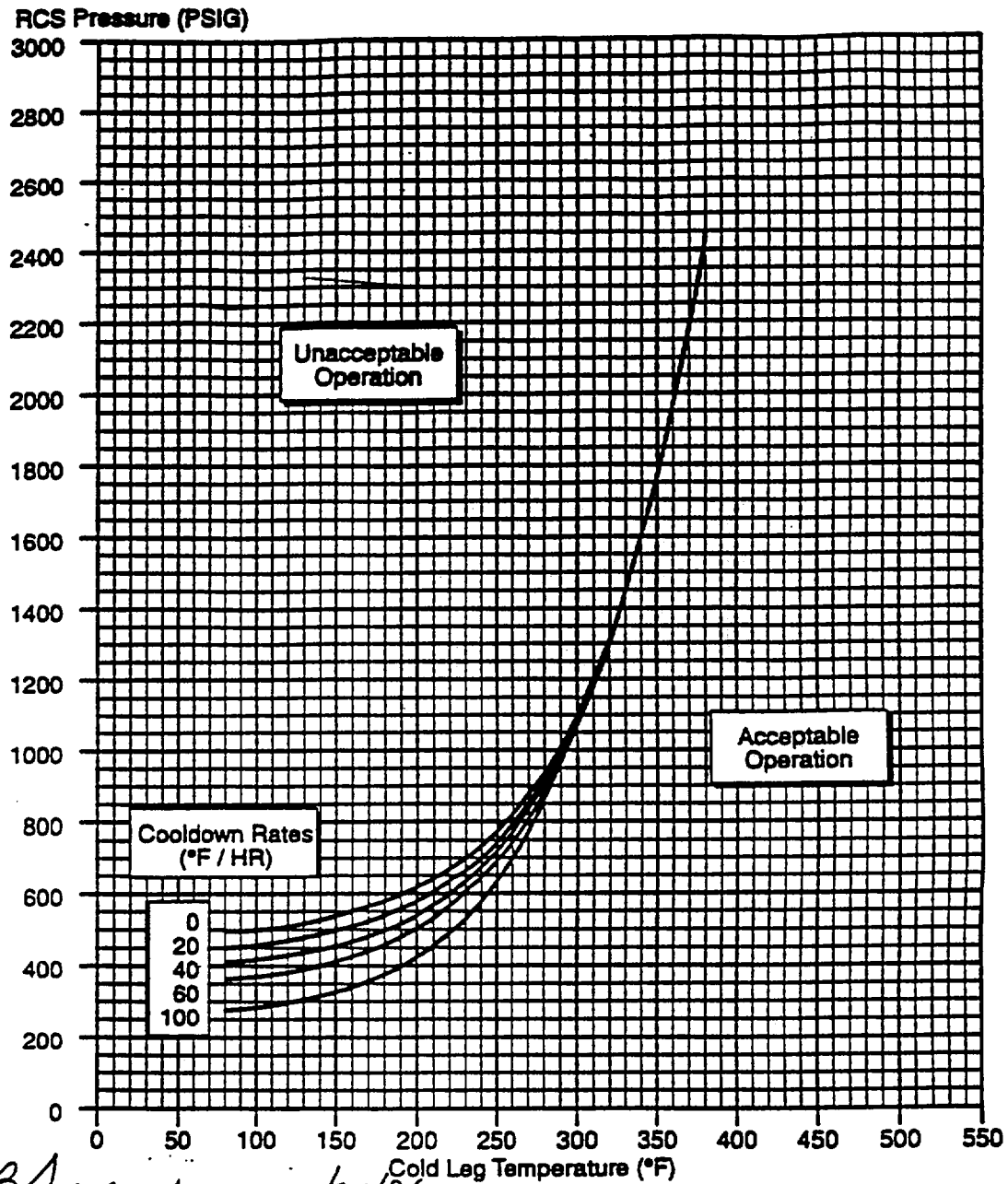
SNSOC Chairman

Date _____

Drawing No: WT316

Number: F-4	Title: INTEGRITY	Revision: 2
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**Figure 2
RCS COOLDOWN RESTRICTIONS**

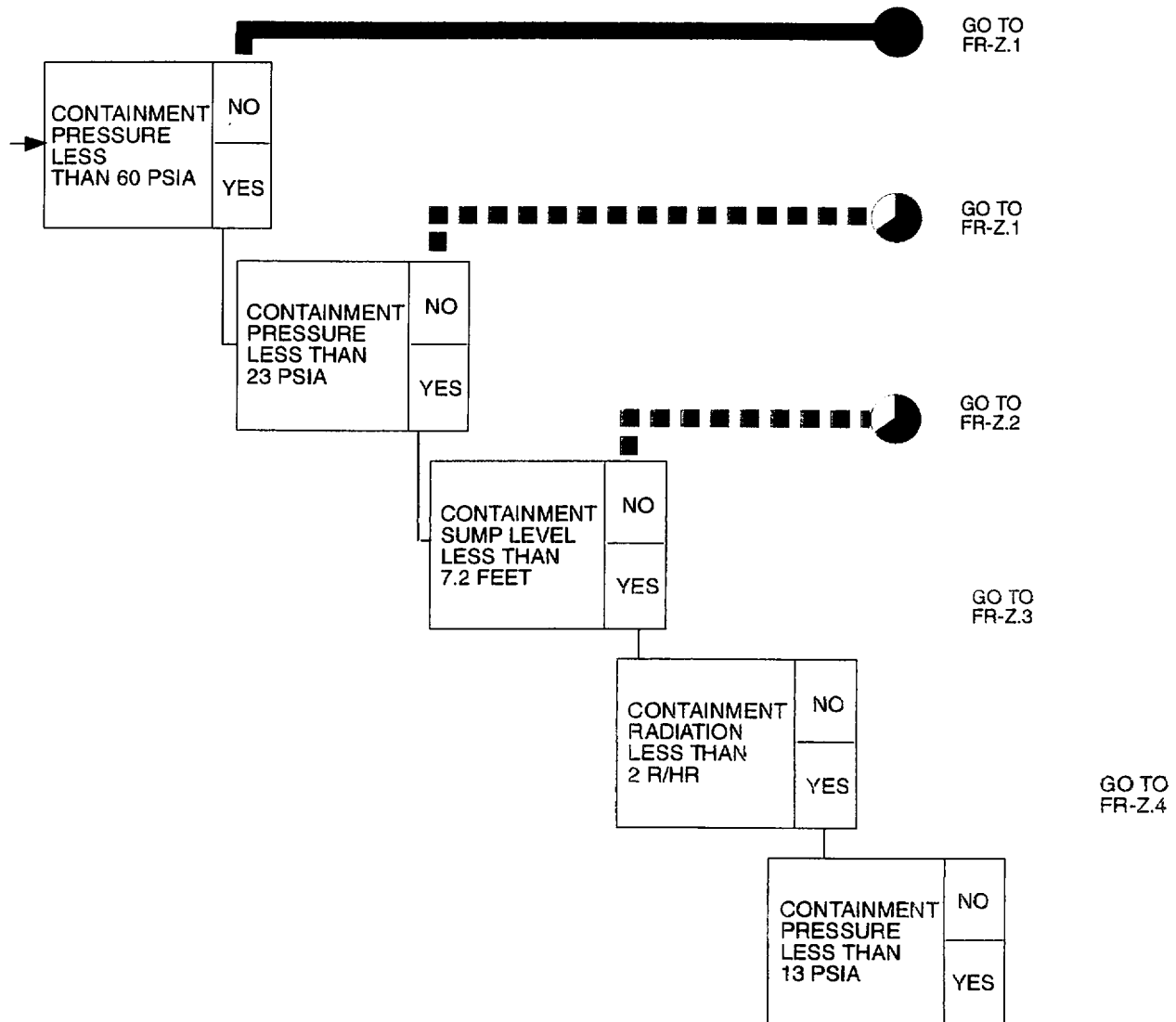


JB Sowers
SNSOC Chairman

1/25/96
Date

Graphs No. CS 1200

Number: F-5	Title: CONTAINMENT	Revision: Rev-1A
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APPROVAL ON FILE

SNSOC CHAIRMAN

DATE

Drawing No. CB382

QUESTION 76: (1.0)

The team is checking if SI can be terminated in accordance with 1-E-1, Loss of Reactor or Secondary Coolant. RCS subcooling and heat sink are both adequate.

Because RCS pressure is increasing and PRZR level is off-scale low, the team is directed to try to stabilize RCS pressure with normal PRZR spray and to **not** terminate SI at this time.

Which ONE of the following correctly states the basis for stabilizing RCS pressure?

- a. Minimizes the potential for brittle failure of the reactor vessel.
- b. Prevents continued reduction in safety injection flow.
- c. Prevents the PRZR safety valves and/or PORVs from lifting.
- d. Prevents excessive primary-to-secondary delta-P across the S/G tube sheets.

QUESTION 77: (1.0)

RCS cooldown is in progress per 1-ES-0.2, Natural Circulation Cooldown with CRDM Fans.

Which ONE of the following correctly describes why SI accumulators MOV's cannot be closed until RCS pressure is less than 1000 psig?

- a. Prevents use of the "Defeat" switches to close the valves.
- b. Ensures RCS leakage can be solely mitigated by the LHSI pumps.
- c. Ensures RCS leakage can be solely mitigated by the HHSI pumps.
- d. Ensures compliance with T.S. 3.3, Safety Injection System.

QUESTION 78: (1.0)

With Unit 1 at 100% power, a seismic event resulted in minor damage to all main steamlines in the Safeguards Building. The team entered 1-ECA-2.1, Uncontrolled Depressurization of all Steam Generators. Given the following conditions:

- “A” S/G Narrow Range level is 8%.
- “B” S/G Narrow Range level is 9%.
- “C” S/G Narrow Range level is 7%.
- RCS cooldown rate is 220°F per hour.

Which ONE of the following is the minimum total AFW flow to the three S/G's?

- a. 300 GPM
- b. 540 GPM
- c. 180 GPM
- d. 350 GPM

QUESTION 79: (1.0)

The following conditions exist:

- #2 EDG is secured for fuel oil filter replacement.
- Breaker 15H8 trips due to internal fault. This action initiates an electrical perturbation tripping “B” and “C” RSST's.
- All systems respond as designed.

Which ONE of the following identifies the most limiting Technical Specification action?

- a. Restore #2 EDG to operable status within 7 days.
- b. Establish Unit 2 backfeed to “E” transfer bus within 8 hours.
- c. Restore 15H8 to operable status within 6 hours.
- d. Place Unit 2 in HSD within 6 hours.

QUESTION 80: (1.0)

Which ONE of the following identifies the purpose of the station Black Battery?

- a. Ensures the station batteries have sufficient power to supply vital DC loads for 2 hours.
- b. Provides a safety related battery that is located above mean sea level.
- c. Ensures adequate station DC power is available to place both units in cold shutdown within 8 hours upon a loss of all AC power.
- d. Provides a backup battery for the station DC distribution system.

QUESTION 81: (1.0)

Given the following plant conditions:

- A fire in the MCR has forced evacuation.
- Unit 1 was manually tripped from 100% power.
- "A" S/G PORV has been reported to be continuously lifting.
- "A" S/G pressure is 980 psig and decreasing.

Per FCA-1.00, the team should _____.

- a. locally block the PORV closed
- b. establish S/G High/Low interface integrity at the ASDP
- c. place the Cable Vault keyswitch panel switch for 1-MS-RV-101A in "EMERG CLOSE"
- d. proceed to Instrument Rack MB8 and take 1-MS-RV-101A to Remote/Manual and close the valve

QUESTION 82: (1.0)

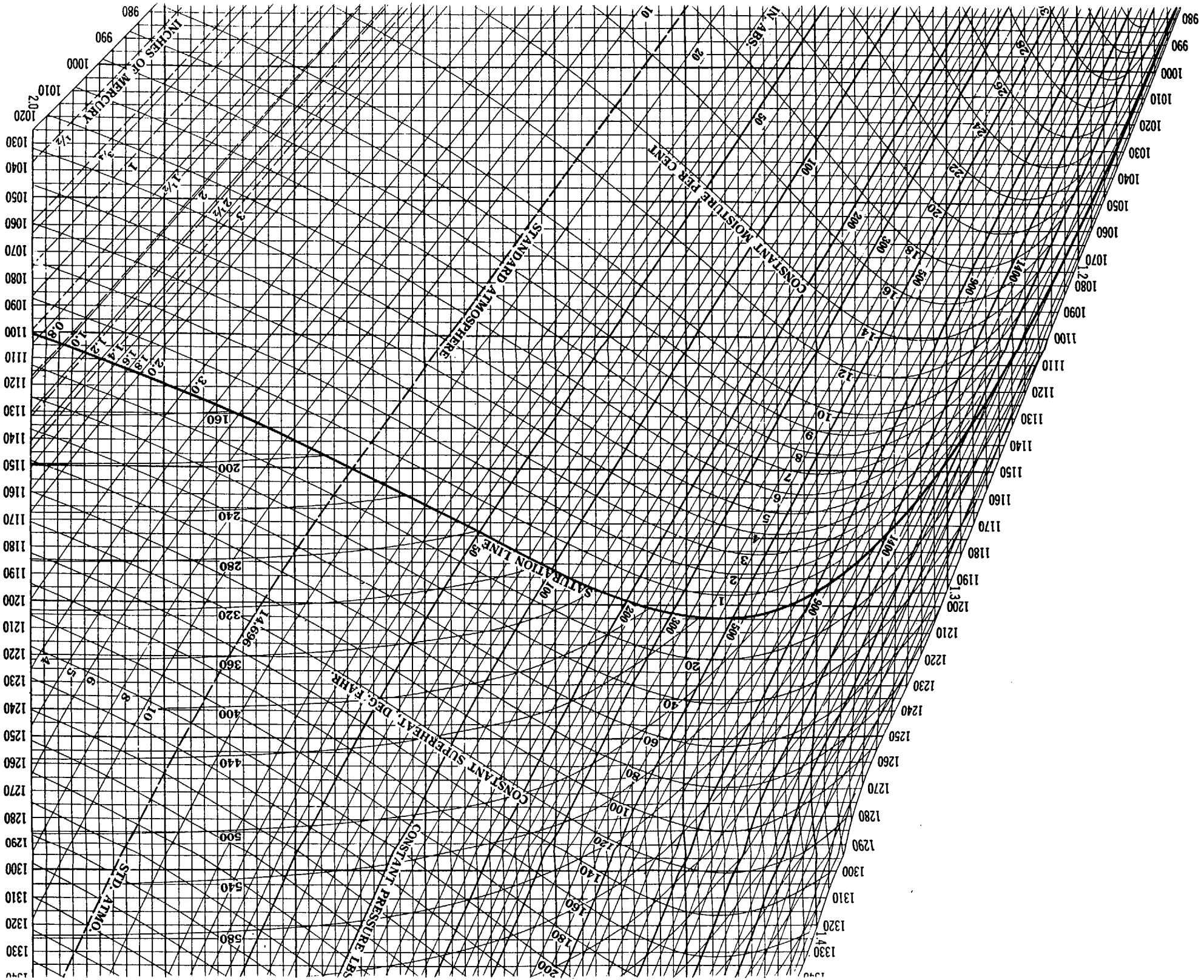
Unit 1 is in Intermediate Shutdown with the following plant conditions:

- RCS temperature = 360°F.
- PRZR pressure = 600 psig.
- PRT pressure = 35 psig.

Using the reference provided, determine which ONE of the following tailpipe temperatures would be indicative of substantial PORV seat leakage.

- a. 483°F
- b. 259°F
- c. 335°F
- d. 281°F

ENTHALPY IN BTU PER LB



QUESTION 83: (1.0)

The team is responding to a LOCA and the following plant conditions exist:

- Reactor trip occurred 20 minutes ago.
- 1-ECA-1.1, Loss of Emergency Coolant Recirculation, is completed through step 15.
- No RCPs are running and the team was unable to establish CC flow to containment.
- One charging pump is running.
- SI flow = 280 gpm.
- The team was unable to start either LHSI pump.
- RVLIS full-range = 69%.
- RCS subcooling = 98°F.
- Core exit TCs are decreasing.
- Containment pressure = 18 psia.
- Containment high-range radiation recorder = 75%.

Using the reference provided, determine the crew's next course of action in accordance with 1-ECA-1.1, Loss of Emergency Coolant Recirculation.

- a. Reset CLS isolation signals, isolate HHSI, and align normal charging.
- b. Depressurize the RCS, check if RHR can be placed in service and continue with the procedure.
- c. Raise RCS makeup flow to maintain RVLIS indication.
- d. Recommend, to the TSC, throttling SI flow to 150 gpm.

NUMBER	PROCEDURE TITLE	REVISION
1-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	13
		PAGE 12 of 27

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

*16. __CHECK IF SI CAN BE TERMINATED:

a) Check RVLIS indication:

- Full range - GREATER THAN 63%
IF NO RCP RUNNING

OR

- Dynamic range - GREATER
THAN 36% IF ONE RCP RUNNING

b) RCS subcooling based on CETCs -
GREATER THAN 80°F [135°F]

a) GO TO Step 21.

b) IF minimum SI flow required as
determined from Attachment 2 is
less than or equal to 150 gpm.
THEN GO TO Step 18.

IF minimum SI flow required as
determined from Attachment 2 is
greater than 150 gpm. THEN do
the following:

1) Consult with TSC to
determine if SI valves
should be throttled, using
Attachment 3 to remove
seal-in contacts from MOVs.

2) GO TO Step 21.

*17. __CHECK IF CLS CAN BE RESET:

a) CTMT pressure - LESS
THAN 14 PSIA

b) Reset both trains of CLS if
necessary

a) GO TO Step 18. WHEN CTMT
pressure less than 14 psia.
THEN do Steps 17b.

18. __STOP LHSI PUMPS AND PUT IN AUTO

13

13

13

13

13

NUMBER	PROCEDURE TITLE	REVISION
1-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	13
		PAGE 13 of 27

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

19. ISOLATE HHSI TO COLD LEGS:

a) Check CHG pump miniflow RECIRC valves - OPEN

- 1-CH-MOV-1275A
- 1-CH-MOV-1275B
- 1-CH-MOV-1275C
- 1-CH-MOV-1373

a) Manually open valves.

b) Close HHSI to Cold Leg

- 1-SI-MOV-1867C
- 1-SI-MOV-1867D
- 1-SI-MOV-1842

20. ESTABLISH CHARGING FLOW:

a) Close CHG flow control

- 1-CH-FCV-1122

b) Verify CHG line isolation - OPEN

- 1-CH-HCV-1310A

b) Manually open valve.

c) Open CHG line isolation MOVs

- 1-CH-MOV-1289A
- 1-CH-MOV-1289B

c) Locally open valve(s).

d) Establish desired charging flow using CHG flow control

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NUMBER	PROCEDURE TITLE	REVISION
1-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	13
		PAGE 14 of 27

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

21. __VERIFY ADEQUATE RCS MAKEUP FLOW:

a) Check RVLIS indication:

- Full range - GREATER THAN 63%
IF NO RCP RUNNING

OR

- Dynamic range - GREATER
THAN 36% IF ONE RCP RUNNING

b) CETCs - STABLE OR DECREASING

a) Raise RCS makeup flow to
maintain RVLIS indication as
necessary.

b) Raise RCS makeup flow to
maintain CETCs stable or
decreasing.

NUMBER	PROCEDURE TITLE	REVISION
1-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	13
		PAGE 15 of 27

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION: Voiding may occur in the RCS during RCS depressurization. Voiding will result in a rapidly increasing PRZR level.

22. DEPRESSURIZE RCS TO REDUCE SUBCOOLING:

a) Check RCS subcooling based on
CETCs - GREATER THAN 30°F [85°F]

a) GO TO Step 23.

b) Use normal PRZR spray

b) IF normal spray NOT available.
THEN use one PRZR PORV.

IF RCS can NOT be depressurized
using any PRZR PORV. THEN use
auxiliary spray.

c) Depressurize RCS until EITHER
of the following conditions
satisfied:

c) IF RCS subcooling is less
than 30°F [85°F]. THEN raise
RCS makeup flow as necessary to
restore subcooling.

- RCS subcooling based on CETCs
- BETWEEN 30°F [85°F] AND
40°F [95°F]

OR

- PRZR level - GREATER THAN 68%
[60%]

d) Stop RCS depressurization

NUMBER	PROCEDURE TITLE	REVISION
1-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	13
		PAGE 16 of 27

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

23. CHECK IF RHR SYSTEM CAN BE PLACED IN SERVICE:

a) Consult with TSC to determine if RHR should be warmed

b) Check the following:

- RCS hot leg temperatures - LESS THAN 350°F

- RCS pressure - LESS THAN 450 PSIG [325 PSIG]

c) Consult with TSC to determine if RHR should be placed in service

b) GO TO Step 24.

24. CHECK IF OVERPRESSURE MITIGATION SYSTEM CAN BE PLACED IN SERVICE:

a) Check RCS pressure - LESS THAN 365 PSIG

- PI-1-403 (NQ)

b) Check PRZR PORV block valves - OPEN

c) Put both Overpressure Mitigation system key switches in - ENABLE (keys 53 and 54)

a) GO TO Step 25. WHEN RCS pressure is less than 365 psig. THEN do Steps 24b and 24c.

b) Open valves.

13

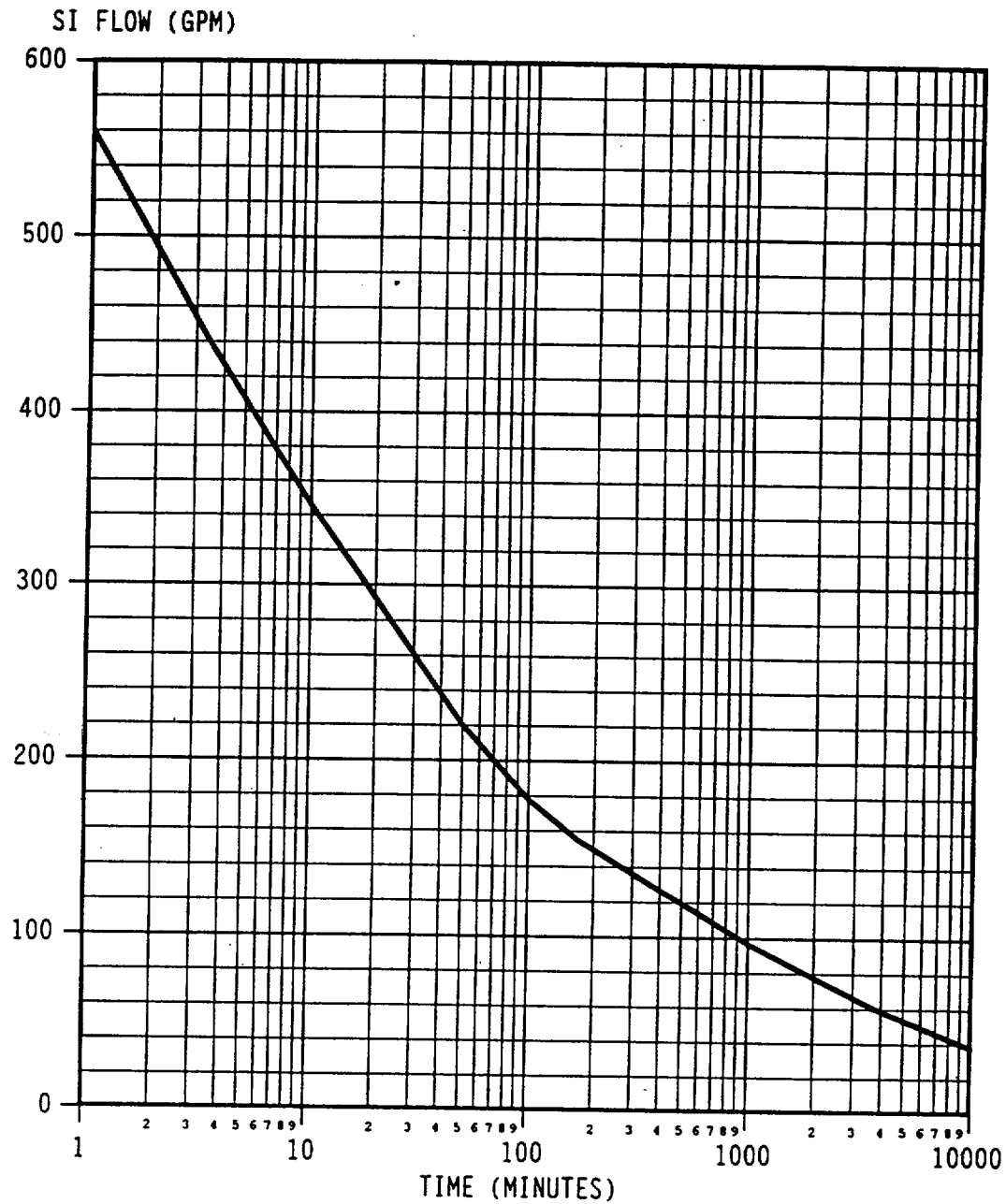
13

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13

NUMBER 1-ECA-1.1	ATTACHMENT TITLE MINIMUM SI FLOWRATE FOR DECAY HEAT REMOVAL VERSUS TIME FROM REACTOR TRIP	REVISION 13
ATTACHMENT 2		PAGE 1 of 1



QUESTION 84: (1.0)

During a reactor startup with Intermediate range indication at 1.5×10^{-11} , N-31 fails high.

Which ONE of the following describes the impact on the Unit startup?

- a. Power can be held at 1.5×10^{-11} provided N-31 is returned to operable status within 48 hours.
- b. Immediate manual reactor trip and performance of E-0 is required.
- c. The reactor trip breakers must be opened.
- d. An automatic reactor trip will occur.

QUESTION 85: (1.0)

The team is performing a unit cooldown and depressurization in accordance with AP-24.01, Large Steam Generator Tube Leak. The Unit is currently at 800 psig in the RCS and the RO has recognized 1-RC-PT-1458 (Pressurizer Narrow Range Pressure) is failed high.

What complication will this present to the operating team?

- a. All SI accumulators will not be capable of being closed.
- b. The "A" Train of ICCM cannot calculate the Margin to Saturation.
- c. Both trains of Over Pressure Mitigation System (OPMS) will be unavailable.
- d. RHR cannot be placed in service.

QUESTION 86: (1.0)

Unit 1 is operating at 100% power when 1-FW-P-1B trips due to an oil leak from the outboard bearing. The RO performs all appropriate actions.

Which ONE of the following automatic start signals will initially close the 1-FW-P-3A pump breaker?

- a. AMSAC.
- b. Steam generator low-low level.
- c. Steam flow > feed flow with low S/G level.
- d. 2 of 2 breakers open on 1 of 2 MFW pumps.

QUESTION 87: (1.0)

Which ONE of the following Emergency Diesel Generator components requires 125VDC power to perform its function?

- a. Governor booster pump.
- b. Fuel transfer pump.
- c. Soak back oil pump.
- d. Radiator louvers.

QUESTION 88: (1.0)

Given the following plant conditions:

- Unit 1 is at 100% power.
- Five minutes ago "F" xfer bus tripped.
- 1H bus was re-energized by its associated diesel.
- 20 seconds ago "D" transfer bus tripped on fault.
- Unit 1 remains at 100% power.

Which ONE of the following identifies the running Unit 1 AFW pump(s)?

- a. "A" and "B" motor driven only.
- b. Terry Turbine and "A" motor driven only.
- c. Terry Turbine and "B" motor driven only.
- d. "A" motor driven only.

QUESTION 89: (1.0)

Following replacement of the packing on RWST chemical addition tank outlet valve 1-CS-MOV-102B, the valve is unisolated and a large spill of sodium hydroxide occurs.

Per VPAP-2203, Spill Prevention, Control, and Countermeasures (SPCC) Plan, which ONE of the following individuals is responsible for coordinating the response effort?

- a. Station Emergency Manager.
- b. Shift Supervisor.
- c. Recovery Manager.
- d. Environmental Compliance Coordinator.

QUESTION 90: (1.0)

Given the following plant conditions:

- During core off-load, a fuel assembly is damaged while being placed in the SFP rack.
- The fuel handlers are unaware of the damage.
- Several days later, an increasing trend is noted on the SFP bridge crane area radiation monitor.
- The running SFP cooling pump automatically trips.

Which ONE of the following is **NOT** a reason why increased **off-site** exposure would result? Assume no operator actions.

- a. Boiling of the SFP water releases particulate radioactivity to the atmosphere.
- b. Overheating and subsequent failure of additional fuel assemblies.
- c. Loss of purification flow increases activity of SFP water.
- d. Loss of shutdown margin due to boron stratification.

QUESTION 91: (1.0)

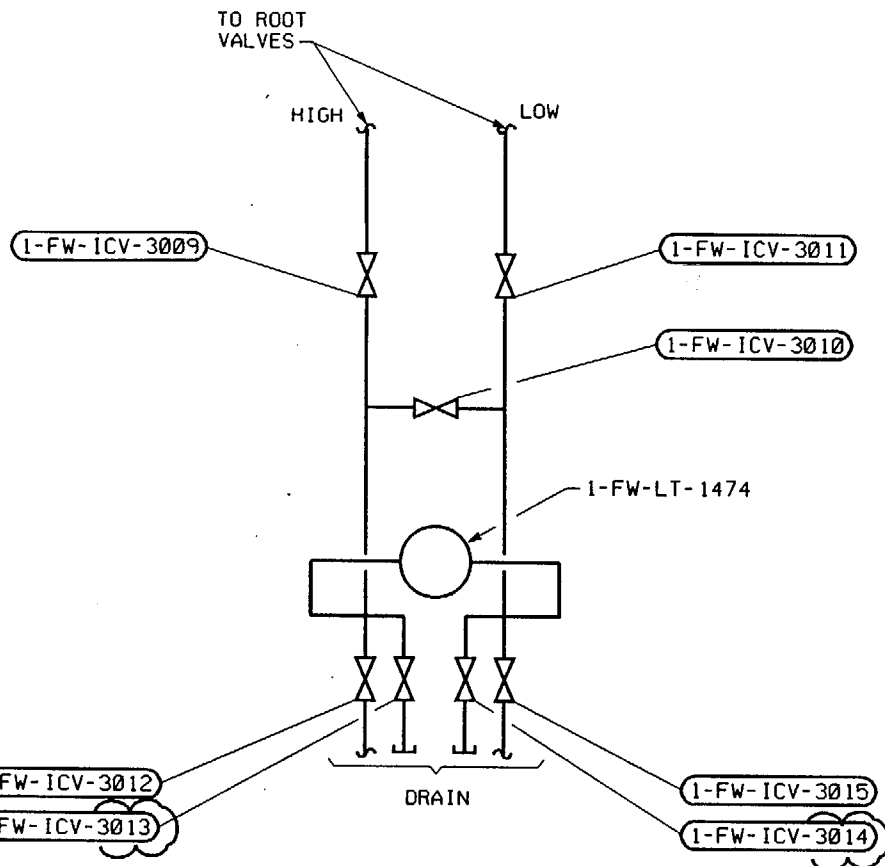
With unit 1 in Cold Shutdown, Instrument Technicians are calibrating "A" S/G narrow-range level transmitter 1-FW-LT-1474.

Using the references provided, determine which ONE of the following correctly lists **all of the valves** associated with 1-FW-LT-1474 that the Instrument Technicians are authorized to manipulate.

- a. 1-FW-ICV-3009, 3010, 3011, 3013, and 3014 **only**.
- b. 1-FW-ICV-3009, 3010, 3011, 3012, 3013, 3014, and 3015 **only**.
- c. 1-FW-ICV-3009, 3010, 3011, 3013, 3014, 1-FW-5 and 6 **only**.
- d. 1-FW-ICV-3009, 3010, 3011, 3012, 3015, and 1-FW-5 and 6 **only**.

REV	DATE	DESCRIPTION	BY	CHKD	ENGR	APPD

REV	DATE	DESCRIPTION	BY	CHKD	ENGR	APPD
1	3/31/92	ORIGINAL ISSUE / CONFIG. MAN.				



NOTES:

1. THIS DRAWING IS TO BE USED FOR INSTRUMENT VALVE NUMBERS ONLY. SEE OTHER FK SERIES DRAWINGS FOR INSTRUMENT LOCATION, TUBE CLASS, VALVE TYPES, ETC. AS APPLICABLE.

REFERENCES:

11448-FM-68A, SH.1



VIRGINIA POWER
NORTH CAROLINA POWER

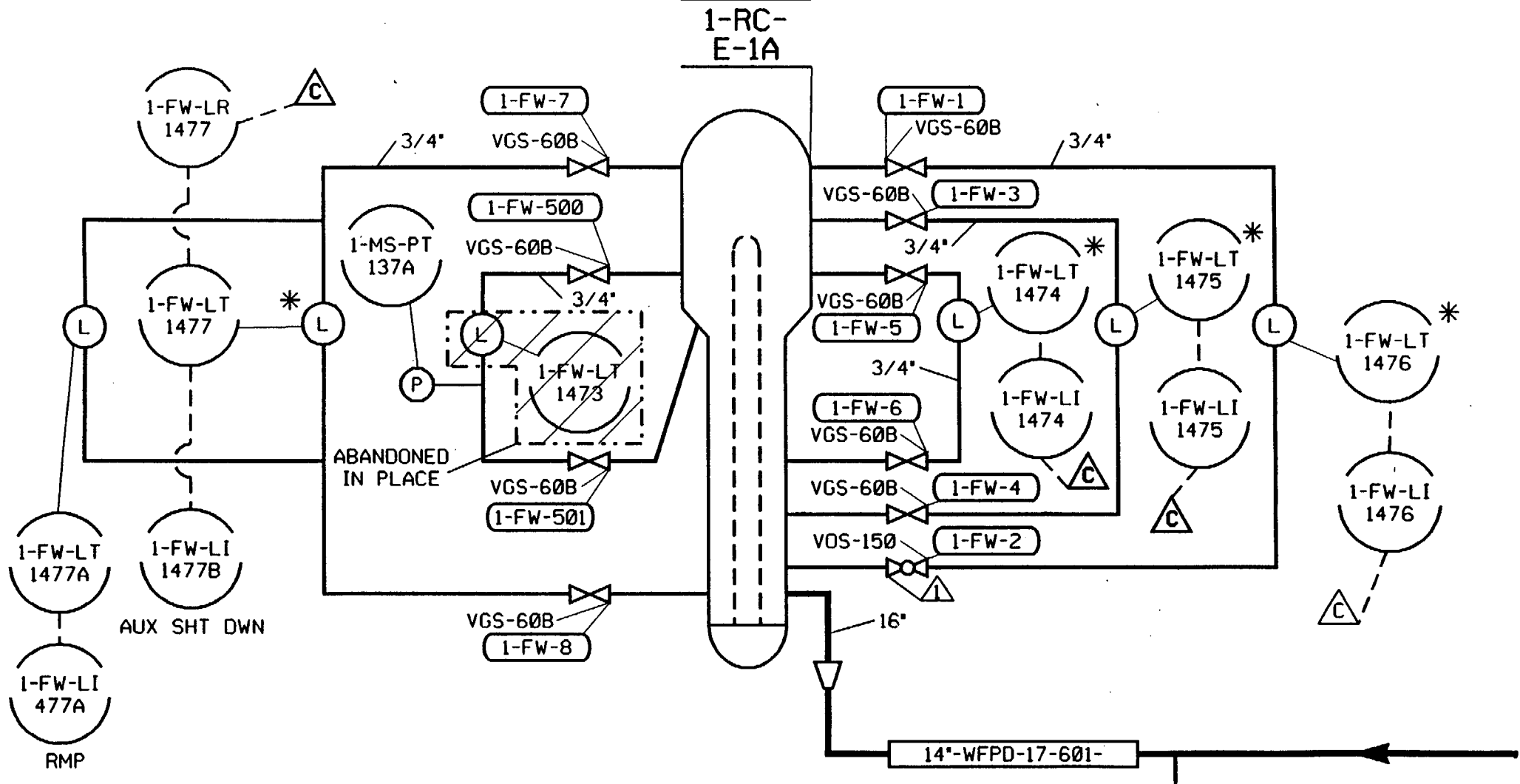
NUCLEAR ENGINEERING SERVICES
RICHMOND, VIRGINIA

DRWN	RPD
CHKD	EESII
ENGR	TMN
APPD	ARF

INSTRUMENT VALVE NUMBERS FOR
1-FW-LT-1474
SURREY POWER STATION - UNIT 1

DATE	CAD NO.	(WINDOES)	DRAWING NO.	SH 1 OF 1	REV
3/31/92	13601221	11474	11448-FK-FW-LT-1474		1

STEAM GENERATOR



QUESTION 92: (1.0)

Given the following values for RCS chemistry parameters at 100% power:

- Chloride = 53 ppb.
- Fluoride = 44 ppb.
- Hydrogen = 12 cc/kg.
- Oxygen = 72 ppb.

Using the references provided, determine the most limiting action.

- a. Immediately initiate unit shutdown; reduce RCS temperature to $\leq 250^{\circ}\text{F}$ as quickly as possible.
- b. Take action to restore hydrogen to within limit within 24 hours; if not restored, initiate unit shutdown to cold shutdown.
- c. Take action to restore hydrogen to within limit within 24 hours; increase monitoring of RCS hydrogen and oxygen, gross beta gamma and suspended solids.
- d. Restore oxygen and chloride to within limits within 7 days; if not restored, perform a technical evaluation and implement a program of corrective measures.

Table 25
Primary System Chemistry - Power Operation
(Reactor Critical)

Analysis	Frequency	Typical Value	Action Levels			Tech. Spec. Ref.	
			1	2	3	NAPS	SPS
Aluminum (ppb)	(6)	≤ 50	--	--	--	--	--
Boron (ppm)	7/W	Variable	--	--	--	--	--
Calcium (ppb)	(6)	≤ 25	--	--	--	--	--
Chloride (ppb)	3 or 5/W ⁽³⁾	≤ 50	> 50	> 150	> 1,500	Tb.3.4-1	3.1.F.1.b
Fluoride (ppb)	3 or 5/W ⁽³⁾	≤ 50	> 50	> 150	> 1,500	Tb.3.4-1	3.1.F.1.c
Hydrogen cc(STP) kg(H ₂ O)	3/W	$\geq 25 - ^{(1)}$ ≤ 50	< 25 or > 50	$\leq 15^{(4)}$	≤ 5	--	--
Lithium (ppm)	7/W	Within the target band for boron/ lithium ⁽²⁾	--	--	--	--	--
Magnesium (ppb)	(6)	≤ 25	--	--	--	--	--
Oxygen (ppb)	3 or 5/W ⁽³⁾	≤ 5	> 5	--	> 100	Tb.3.4-1	3.1.F.1.a
pH @25° C	3/W	Variable	--	--	--	--	--
Silica (ppb)	1/Q	$\leq 1000 ^{(5)}$	--	--	--	--	--
Specific Conductivity (μ S/cm)	3/W	Variable	--	--	--	--	--
Sulfate (ppb)	1/W	≤ 50	> 50	> 150	> 1,500	--	--
Suspended Solids (ppb)	1/Q	$\leq 100 ^{(7)}$	> 200 ⁽⁷⁾	--	--	--	--

- NOTE:** (1) To assist reactor coolant degassing, the reactor coolant dissolved hydrogen concentration may be reduced to < 25 cc/kg, but ≥ 15 cc/kg within 24 hours prior to shutdown without entry into Action Level 1.
- (2) SURRY-"MODIFIED" Lithium Program [Increasing $\text{pH}_{(T)}$ from 6.9 to 7.4]
NORTH ANNA-"Coordinated" lithium program [constant $\text{pH}_{(T)}$ 6.9]
- (3) NAPS - 3/W, SPS - 5/W
- (4) Corrective action is recommended if this value is exceeded but no plant shutdown is suggested. Station Chemistry will increase RCS monitoring of Dissolved Hydrogen and Oxygen, Gross Beta Gamma, and Suspended Solids when operating at or below the Action Level 2 Guideline value of 15cc/kg. IF, while operating with RCS hydrogen between 5 - 15 cc/kg, dissolved oxygen exceeds 50 ppb or TSS and activity exceed 200% of steady state values, THEN, plant shutdown should commence in accordance with Action Level 3 guidelines.
- (5) Reduce silica to $\leq 1,000$ ppb as soon as possible after reaching 100 percent power. Operation with silica $\geq 1,000$ ppb with reactor power at 100 percent is acceptable for up to one month, however, care should be taken to minimize the intrusion of aluminium, calcium, and/or magnesium into the reactor coolant.
- (6) NAPS only -Following refueling, if the RCS silica concentration is ≥ 1 ppm, then RCS aluminium, calcium, and magnesium concentrations should be determined prior to criticality.
- (7) SPS has a UFSAR suspended solids limit of 1.0 ppm for RHR and RCS.

ATTACHMENT 2

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Primary Chemistry Action Statements

1. INTRODUCTION

The chemistry limits and action levels that have been presented in 6.20 are achievable and appropriate for the protection of system materials, ensuring fuel performance, and controlling radiation field buildup.

Three Action Levels have been defined for remedial actions to be taken when the parameters are confirmed to be outside the control values. These Action Levels are not intended to supersede Technical Specifications but can be used in conjunction with those requirements.

2. ACTION LEVEL 1

The Action Level 1 value of a parameter represents the range, outside of which data or engineering judgment indicates that long-term system reliability may be affected, thereby warranting an improvement of operating practices. Action Level 1 values generally represent limits for normal plant operations.

Actions to be taken if a parameter exceeds the Action Level 1 value:

- a. Efforts should be made to restore the parameter to within the appropriate limit within seven (7) days.
- b. If the parameter has not been restored to within the appropriate range within seven (7) days, a technical evaluation should be performed and a program for implementing corrective measures instituted. Such a program may require equipment additions or modifications over the long-term.

3. ACTION LEVEL 2

The Action Level 2 value of parameter represents the value, outside of which data or engineering judgment indicates significant damage could be done to the system in the short-term, thereby warranting a prompt correction of the abnormal condition.

- c. Efforts should be made to bring the parameter within the appropriate Action Level 2 value within twenty-four (24) hours.

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Primary Chemistry Action Statements

- d. If the parameter has not been restored to within the Action Level 2 value within 24 hours, an orderly unit shutdown should be initiated and the plant brought to a cold shutdown condition as quickly as permitted by other plant constraints.
 - If the chemistry value improves to below the Action Level 2 value prior to plant shutdown, full power operation may be resumed.
- e. Following a unit shutdown caused by exceeding the time limit on an Action Level 2 value, a technical evaluation of the incident should be performed and appropriate corrective measures taken before the unit is restarted.

4. ACTION LEVEL 3

The Action Level 3 value of a parameter represents the limit beyond which data or engineering judgment indicates that it is inadvisable to continue to operate the plant.

Action to be taken if a parameter exceeds the Action Level 3 value:

- f. An orderly unit shutdown should be initiated immediately, with a reduction of the reactor coolant temperature to ≤ 250 °F as rapidly as other plant constraints permit.
- g. If the chemistry should improve to below the limits of action Level 3 prior to completing the plant shutdown, power operation may be resumed subject to the requirements defined by the other Action Levels.
- h. Following a unit shutdown caused by entering an Action Level 3 condition, a technical evaluation of the incident should be performed and appropriate corrective measures taken before the unit is restarted.

5. CORRECTIVE ACTIONS

Corrective actions should be implemented when a parameter is approaching or has exceeded an Action Level value. The following actions may be considered typical of those that can be taken:

- i. Verify conditions.
- j. Identify and isolate sources of impurities.

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Primary Chemistry Action Statements

- k. Verify that the reactor coolant purification system is in service with the maximum available flow and that the ion exchanger bed removal efficiencies are adequate.
- l. Increase sample and analysis frequencies for short-term trending purposes and for confirmatory analyses of critical chemistry parameters (the control parameters).

6. TECHNICAL EVALUATIONS

The technical evaluation process for prolonged abnormal water chemistry conditions should include the following:

The evaluation should address both the cause of the abnormal condition and inform the appropriate levels of management of the existence of the condition, the implications, and the possible corrective measures that can be taken over both the short and long terms.

QUESTION 93: (1.0)

A unit 2 refueling outage is scheduled to begin on March 18th. The following sequence of events is anticipated to occur on that date:

- 0100 – Reactor power < 2%.
- 0130 – Enter Hot Shutdown.

The earliest time that core off-load can commence is _____.

- a. 3/22 at 0500
- b. 3/22 at 0530
- c. 3/30 at 1030
- d. 3/30 at 0230

QUESTION 94: (1.0)

Which ONE of the following will prevent core offload?

- a. "A" RHR pump inoperable.
- b. CTMT purge secured.
- c. Fuel Building exhaust secured.
- d. "A" LHSI pump unavailable.

QUESTION 95: (1.0)

The on-shift procedure writer presents a PT revision to the Unit 1 SRO for his review and approval. The SRO is on the "Cognizant Management A" list, but is **NOT** on the "Cognizant Management B" list. The revision changes the acceptable stroke time for a containment isolation trip valve.

Which ONE of the following is correct concerning the SRO's review of the procedure change?

- a. This is a **change of intent**; the SRO **is** authorized to approve the change.
- b. This is a **change of intent**; the SRO is **not** authorized to approve the change.
- c. This is a **non-intent change**; the SRO **is** authorized to approve the change.
- d. This is a **non-intent change**; the SRO is **not** authorized to approve the change.

QUESTION 96: (1.0)

The "A" WGDT has been in holdup for 14 days and requires release.

Which ONE of the following sequences is required to perform a gaseous release?

- a. RP obtains and analyzes a gas sample, RP generates a release permit, Operations verifies release information and commences release.
- b. RP obtains and analyzes a gas sample, Operations verifies the sample is within the existing batch release permit, and commences release.
- c. RP obtains and analyzes a gas sample, Operations verifies the sample is within the existing continuous release permit, and commences release.
- d. Based on initial tank contents and decay time since the tank was placed in holdup, RP generates a release permit, Operations verifies release information and commences release.

QUESTION 97: (1.0)

Unit 1 is in Cold Shutdown and the team is preparing for entry into Refueling Shutdown.

Prior to placing containment purge in service, at least one containment air recirc fan must be in operation _____.

- a. to ensure the purge isolation valves are operable
- b. to provide a flow path for the purge exhaust fans
- c. to provide a flow path for the purge supply fans
- d. to prevent backflow through the ring header

QUESTION 98: (1.0)

Following a steam generator tube rupture coincident with a loss of offsite power, the Station Emergency Manager notes that the following emergency action levels in EPIP-1.01, Emergency Manager Controlling Procedure, are all currently exceeded:

TAB
CLASSIFICATION CONDITION

A-10	Failure of a safety/relief valve to close after pressure reduction, which may affect the health/safety of the public.	Notification of Unusual Event
B-2	Fuel failure with steam generator tube rupture.	General Emergency
B-4	Gross primary to secondary leakage with loss of offsite power.	Site Area Emergency
B-6	Gross primary to secondary leakage	Alert
E-1	Release imminent or in progress and site boundary doses projected to exceed 1 rem TEDE or 5 rem thyroid CEDE.	General Emergency

When the SEM initially accesses the event, _____ should be used for classified.

- a. all tabs
- b. tabs B-2 or E-1
- c. tabs B-2, E-1 and B-4
- d. tabs B-2 and E-1

QUESTION 99: (1.0)

Which ONE of the following Protective Action Recommendations is the most conservative?

- a. Evacuate 360° from 0 to 5 miles; shelter 360° from 5 to 10 miles.
- b. Shelter 360° from 0 to 2 miles; shelter downwind sectors from 2 to 5 miles.
- c. Evacuate 360° from 0 to 5 miles; evacuate downwind sectors from 5 to 10 miles; shelter unaffected sectors from 5 to 10 miles.
- d. Evacuate 360° from 0 to 2 miles; evacuate downwind sectors from 2 to 5 miles; shelter downwind sectors from 5 to 10 miles; shelter unaffected sectors from 2 to 10 miles.

QUESTION 100: (1.0)

During a shutdown LOCA, the SI termination criteria are _____ when RCS cold-leg temperatures are below 285°F, _____.

- a. less restrictive; to prevent RCS overpressurization
- b. less restrictive; to minimize RWST depletion
- c. more restrictive; to ensure adequate reactor vessel refill
- d. more restrictive; to account for RCS pressure drop when SI flow is reduced