UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

ENCLOSURE 1

EXAMINATION REPORT - 50-413/92-302

Facility Licensee: Duke Power Company

Facility Name: Catawba Nuclear Station

Facility Docket Nos.: 50-413 and 50-414

Examinations were administered at Catawba Nuclear Station near York, South Carolina.

Chief Examiner: Donny G Hoover for
Ronald F. Aiello — Date Signed: 12/2/92

Approved By: Michael E. Ernstes
Michael E. Ernstes, Chief
Operator Licensing Section 2
Operations Branch
Division of Reactor Safety — Date Signed: 12/2/92

SUMMARY

Scope: Written examinations and operating tests were administered to five Reactor Operator (RO) and seven Senior Reactor Operator (SRO) applicants during the week of October 19, 1992.

Results: Six SROs and one RO passed these examinations. All others failed.

A weakness was found in many knowledge areas tested on the written examination. Half the applicants failed the written examination (para 4.a).

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REPORT DETAILS

1. Persons Contacted

   W. Barron, Director, Operator Training
   S. Bradshaw, Shift Operations Manager
   M. Brady, Shift Supervisor
   M. Geddie, Operations Superintendent
   R. Katalinich, Nuclear Instructor
   W. McCollum, Catawba Station Manager
   M. Tuckman, Catawba Site Vice President

2. NRC Examiners

   R. Aiello, Chief Examiner, Region II
   T. Guilfoil, Sonalysts
   W. McGonegal, Sonalysts
   K. Parkinson, Sonalysts

3. Other NRC Personnel Attending Exit Interview

   R. Watkins, Region II
   J. Zeiler, Resident Inspector

4. Discussion

   a. Written Examination

      The results of the written examination were surprisingly poor. Four of the five RO candidates failed. The RO candidates had an average score of 75.1 percent. The SRO upgrades, who currently hold an RO license, had an average score of 86.1 percent. Since approximately 75 percent of the questions were similar between the two examinations, this suggests that the training department may be ineffective in preparing the candidates for the examination. One of the seven SRO candidates also failed the examination.

      The written exam identified many weak knowledge areas. There were several questions which were missed by the majority of the candidates. The following lists some of the operator knowledge areas tested by these questions. The question numbers are in [].

      RO Written Exam

      Planned emergency exposure [5]
      Nonlicensed operator manipulation of controls [13]
      Reactor Coolant Pump (NCP) operation [19],[66]
      Feedwater system (CF) operation [32],[48]
      ECCS valve interlocks [41]
      Pressurizer heater power supplies [42]
      Reactor coolant flow detector design [47]

Spent Fuel Pool System (KF) response to a blackout [50]
Loss of condenser vacuum actions [72]
Loss of All AC immediate action basis [73]
Digital Rod Position Indication (DRPI) failure [84]
Preventing Fuel Water Storage Tank (FWST) depletion [89]

SRO Written Exam

Planned Emergency Exposure [6]
Precautions for placing a battery charger in service [35]
Reactor Coolant Flow Detector design [45]
Spent Fuel Pool System (KF) response to a blackout [48]
Control Rod Bank selector switch use [57]
Reactor Coolant Pump (NCP) operation [65]
Pressurizer PORV leak indication [82]

A strength was noted in the quality of the exam prereview. The facility members assigned to prereview the examination took a proactive approach to ensure the questions were valid, technically accurate, and worded using terms familiar to the candidates.

b. Operating Examination

The candidates used reference material excessively when addressing JPM follow-up questions. This indicated a lack of familiarity with some important topics. Specifically, the candidates were weak in conduct of operations and radiological requirements. Many of the candidates labored through the administration procedures.

The simulator examinations showed improved communication between the operators, especially during plant transients. The candidates' utilization of the Annunciator Response and Emergency Procedures was noteworthy.

c. Inspection

The inspector conducted a review of the licensee's 1992 Licensed Operators Requalification Program Sample Plan according to NUREG-1021, ES-601, Attachment 2. No weaknesses or deficiencies were identified.

The inspector reviewed the licensee's process for tracking licensed operator control evolutions identified in 10 CFR 55.59 (C)(3)(i). This review included a random sampling of individual records to verify compliance. No deficiencies in the tracking process were identified. However, written feedback from the instructors was not consistently provided to the individual operators and their respective Shift Supervisor.

The inspector reviewed the facility's program for EOP rewrite during the preparation week. The communications between the procedure writers, the training department and the operations department have been effective in incorporating the concerns of the operators.

A strength was identified in the development of the "Simulator Management Observation Book." This book catalogs the written comments provided by the Site Vice President, Station Manager, Superintendent of Operations, Director of Operations, and Operations line management, who are all required to routinely observe the simulator training.

d. Material Condition of the Plant

The label plate for bus lockout relay 86S was missing from the breaker panel. "Magic marker" had been used to write the identifying information on the label plate face.

The examiner identified a potential safety hazard in the Unit 1 Auxiliary Feedwater (CA) pump room. A wooden scaffolding pad was improperly positioned. Specifically, the post was resting on the side of the wooden block, compromising stability.

The kick-plate next to the hatch in the ETA switchgear room was loose at the corners resulting in a potential trip hazard.

The inspector found one procedure in the simulator to be out of date. The training staff was using Revision 8 of Procedure OP/1/A/6200/01 (Shift and Vent NV Seal Water Injection Filters) in the simulator. The control room copy was Revision 9. The simulator copy was replaced with the proper revision.

No problems were encountered with either security or health physics in-processing.

5. Exit Meeting

At the conclusion of the site visit, the examiners met with representatives of the plant staff, indicated in paragraph 1 above, to discuss the results of the examinations and inspection findings. The licensee did not identify as proprietary any material provided to or reviewed by the examiners. The examiners further described the areas inspected and discussed in detail the inspection findings.

ENCLOSURE 2

SIMULATOR FIDELITY REPORT

Facility Licensee: Duke Power Company

Facility Docket No.: 50-413

Operating Tests Administered On: October 20 - 24, 1992

This form is to be used only to report observations. These observations, in and of themselves, do not constitute audit or inspection findings and are not, without further verification and review, indicative of noncompliance with 10 CFR 55.45(b). These observations do not affect NRC certification or approval of the simulation facility other than to provide information which may be used in future evaluations. No licensee action is required solely in response to these observations.

No simulator fidelity items were identified.

Duke Power Company
Catawba Training Center
4850 Concord Road
York, SC 29745

(803)831-3000

DUKE POWER

ENCLOSURE 3

October 20, 1992

TO: Mr. Mike Ernstes, Chief Examiner

SUBJECT: NRC Exam Comments
Catawba Nuclear Station

The following attached comments and references have been prepared as a result of our post exam review of the CNS NRC administered SRO and RO exams on 10/16/92. Please take into account these comments in your grading of the examinee's exams to provide an accurate evaluation of their individual responses. We are very pleased at the high quality exam that was administered. We commend you in your efforts.

If you have any questions, please contact Reggie Kinray at (803) 831-3119.

Wendell K. Barron

W. H. Barron
Director Operations Training
Catawba Nuclear Station

REK/kkg

Attachments

cc: J. D. Wylie
E. M. Geddie
M. J. Brady

Question: RO #57 and SRO #53

Which ONE [1] of the following reasons explains why Component Cooling [KC] valves 56A and 81B [ND Heat Exchanger Inlets] open on Lo FWST level following Ss [Safety Injection]? [Refer To KC drawing below].

A. Prevent ND pump runout in the event of loss of one train.

B. Prevent KC pump runout in the event of loss of one train.

C. Prevent water hammer in the ND system.

D. Prevent water hammer in the KC system.

Answer: A

Response:

KC is opened to ND to provide cooling when pumping hot containment sump water. See attached. No correct answer.

Recommendation:

Delete from exam.

2) Close at 75%
3) Recirc and Sample

b. Assured Source - RN

c. Chemicals Added
1) Sodium Nitrite, to pick up Oxygen
2) Sodium Tetraborate (Borax), to maintain a high pH for carbon steel corrosion protection.
3) Sodium Bicarbonate, Buffer pH.
4) Benzo Tri Azule (BZT), to protect copper.
5) Precautions:
a) Wash off any KC water thoroughly, may cause an irritation to the skin.
b) Immediately wash eyes, will burn them.
6) Notify chemistry after the makeup to Surge tank and recirc is complete.

d. Level Indication in CR.
1) Low level in Surge tank (computer point) 50%
2) Low low level
a) 34%
b) Closes train related non-essential header isolation valves.

B. KC Pumps

1. Two per train - one train normally running.
2. Power Supply - ETA/B
3. Normal Parameters (ISS OBJ #6)
a. Pressure - 100 psig (CR indication)
b. Flow (RO/SRO OBJ #4, #5)
1) CR indication
2) Aux. S/D Panel indication
3) Flow will depend on the components in service
a) ND Hx-5000 gpm
b) KF Hx-3000 gpm
c) other components normally in service supply 3500 gpm

c. Runout Flow
1) 4800 gpm per pump
2) ALARM AT 4800 gpm - one pump
3) High Flow Annunciator for 2 Pumps - 9400 gpm
4) Since KC trains. are currently aligned together, runout of one train of KC pumps following failure

of the other train could occur. The logic on the following KC vlvs. prevent this possible runout:

a) KC vlvs. 1A. 2B, 50A & 53B (AB hdr) close on Sp or Lo FWST lvl. following an Ss.

b) KC vlvs. 3A, 18B, 228B & 230A (RB Isol.) Close on Sp or Lo FWST lvl. following Ss.

c) KC vlvs. 56A & 81B(ND Hx inlets) open on Sp or Lo FWST lvl. following an Ss.

NOTE: This logic applies to both Unit 1 & Unit 2. Monitor lights for 1 & 2 KC 56-A & 81B on monitor panel Group 1.

d. Minimum Flow
   1) 1000 gpm/pump
   2) KC37/40 Auto open at 3150 gpm decreasing and close at 5800 gpm increasing

4. Cool their own motor via essential header.
5. Auto start
   a. Train related blackout
   b. Ss
6. Controls
   a. Control Room
   b. Auxiliary Shutdown Panel
7. Location (Unit 1 - Aux. Bldg. 560', Unit 2 - Aux. Bldg. 577)

C. KC Hx's (ISS/RO/SRO #2)
1. Tube Side RN - Easier to clean
2. Shell side KC
3. KC pressure > RN pressure
   a. Tube leak to RN
   b. Keeps excessive Chlorides out of KC
   c. RN flow temp, controlled
      1) KC out 90°F
      2) Hi- High Temp. Alarm 120°F
4. Location - Aux. Bldg. 577'
5. The "KC HX A(B) RN Outlet flow-lo" annunciator was constantly in alarm during normal operations in the "KC TEMP" mode due to relatively low heat load. An NSM was installed to eliminate this nuisance alarm by interlocking each annunciator with a Ss signal such that the alarm will only be enabled while a Ss signal is present. It also provides a 72 second time delay after the Ss signal to allow the RN valve to stroke full open.

signal is generated. Flow will commence only after KC56A is open, however. The Ss signal overrides all non-safety modulation control. In the non-safety configuration, this valve modulates to maintain a desired flow rate. Modulation control is activated from the Control Room by depressing the amber 'RESET' push-button (KC-57A ND Hx 'A' Flow Control Ss Reset).

KC57A fails to the open position when ASP train 'A' is activated. This allows flow through the ND heat exchanger if desired by the operators to achieve a controlled cooldown of the Unit. There are no controls for this valve on the ASP.

Valve:	KC81B		
Description:	KC to Residual Heat Removal Heat Exchanger 'B' Supply Isolation Valve		
Active:	Yes	1E Power:	Yes
ESF:	Yes	IWV:	Category B
ESF Position:	Open	Stroke Time:	60 seconds
ESF Response Time:	76 seconds	Cont. Iso. Time:	N/A

KC81B is a motor operated valve which serves to isolate KC flow to the ND heat exchanger during normal operations; diverting flow to the non-essential headers. Since the ND system is required to mitigate the consequences of a large break LOCA, this valve automatically opens to admit cooling flow to the ND heat exchanger 'B' when the following signals have been generated:

1. Lo FWST level following a safety injection
2. Sp (Phase 'B' isolation signal)

Controls for KC81B are provided on ASP 'B' and MCB in the control room which consists of 'OPEN-CLOSE' pushbuttons and 'red-green' indication lights and give the operator the ability to control this valve as desired to achieve a controlled cooldown of the Unit. When ASP 'B' is activated, this valve receives no auto-actuation signals but transfers 'as is'.

Valve:	KC82B		
Description:	Residual Heat Removal Heat Exchanger 'B' Control Valve		
Active:	Yes	1E Power:	Yes
ESF:	Yes	IWV:	Category B
ESF Position:	Open	Stroke Time:	40 seconds
ESF Response Time:	76 seconds	Cont. Iso. Time:	N/A

KC82B is an air operated valve which serves to regulate KC flow to the ND heat exchanger to support Unit shutdown operations. Since the ND system is also required to mitigate the consequences of a large break LOCA, this valve automatically opens to unisolate the outlet side of the ND heat exchanger 'B' when an Ss signal is generated. Flow will commence only after KC81B is open, however. The Ss signal overrides all non-safety modulation control. In the non-safety configuration, this valve modulates to maintain a desired flow rate. Modulation control is activated from the Control Room by depressing the amber 'RESET' push-button (KC-82B ND Hx 'B' Flow Control Ss Reset).

KC82B fails to the open position when ASP train 'B' is activated. This allows flow through the ND heat exchanger if desired by the operators to achieve a controlled cooldown of the Unit. There are no controls for this valve on the ASP.

Valve:	KC54B		
Description:	Train 'B' Recirculation Line Isolation		
Active:	Yes	1E Power:	Yes
ESF:	No	IWV:	N/A
ESF Position:	N/A	Stroke Time:	N/A
ESF Response Time:	N/A	Cont. Iso. Time:	N/A

KC54B is a motor operated valve which serves to isolate the recirculation line to the KC 'B' train surge tank. This valve is normally opened only to mix the contents of the surge tank after chemical manipulations. This valve shall have the ability to close during a design basis event to prevent the possible degradation of 'B' train KC due to excessive essential header bypass flow. This valve is remotely controlled only from the control room by its control switch on MC11 which consists of 'OPEN-CLOSE' pushbuttons and 'red-green' indicating lights and receives no signals to auto-actuate.

Valve:	KC56A		
Description:	KC to Residual Heat Removal Heat Exchanger 'A' Supply Isolation Valve		
Active:	Yes	1E Power:	Yes
ESF:	Yes	IWV:	Category B
ESF Position:	Open	Stroke Time:	60 seconds
ESF Response Time:	76 seconds	Cont. Iso. Time:	N/A

KC56A is a motor operated valve which serves to isolate KC flow to the ND heat exchanger during normal operations; diverting flow to the non-essential headers. Since the ND system is required to mitigate the consequences of a large break LOCA, this valve automatically opens to admit cooling flow to the ND heat exchanger 'A' when the following signals have been generated:

1. Lo FWST level following a safety injection
2. Sp (Phase 'B' isolation signal)

Controls for KC56A are provided on ASP 'A' and MC11 in the control room which consists of 'OPEN-CLOSE' pushbuttons and 'red-green' indicating lights and give the operator the ability to control this valve as desired to achieve a controlled cooldown of the Unit. When ASP 'A' is activated, this valve receives no auto-actuation signals but transfers 'as is'.

Valve:	KC57A		
Description:	Residual Heat Removal Heat Exchanger 'A' Control Valve		
Active:	Yes	1E Power:	Yes
ESF:	Yes	IWV:	Category B
ESF Position:	Open	Stroke Time:	35 seconds
ESF Response Time:	76 seconds	Cont. Iso. Time:	N/A

KC57A is an air operated valve which serves to regulate KC flow to the ND heat exchanger to support Unit shutdown operations. Since the ND system is also required to mitigate the consequences of a large break LOCA, this valve automatically opens to unisolate the outlet side of the ND heat exchanger 'A' when an Ss

Question: SRO #39

See attached exam question.

Response:

Answer key is incorrect. The key states that the correct answer is 1, 8, 1, 5. The question Cross-reference document states that the correct answer is 4, 8, 2, 5.

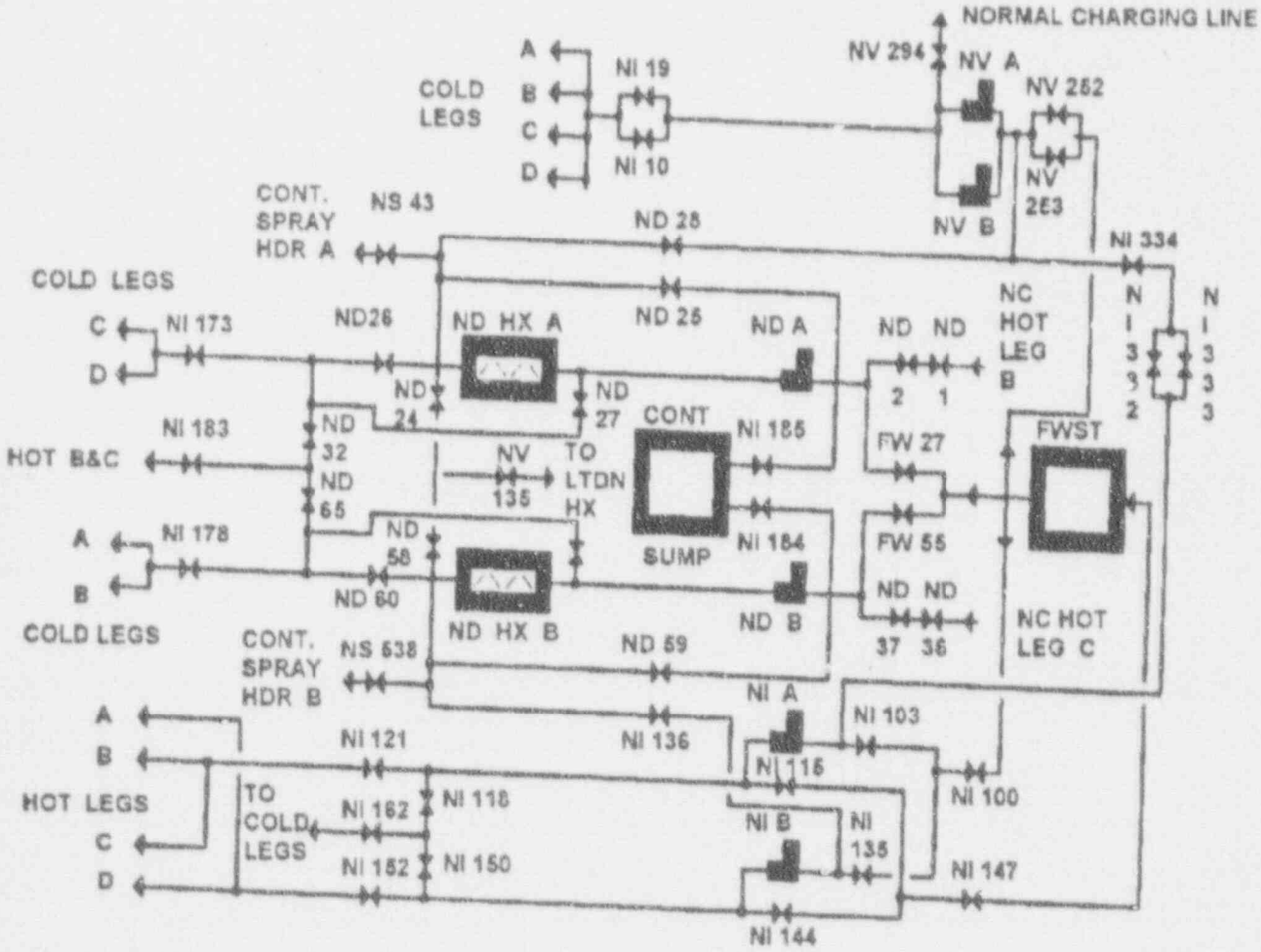
Recommendation:

Change answer to 4, 8, 2, 5.

QUESTION: 039 (2.00) SRO Only

For the ECCS drawing below, match the interlock conditions from Column B that are required to open the valve in Column A. [NOTE: Items in Column B can only be used once, and only a single answer may occupy one answer space.]

Column A [VALVE]		Column B [INTERLOCK CONDITION]
_____	a. NI 147	1. NC pressure less than 385 psig
_____		2. FW 27 closed
		3. FW 55 closed
_____	b. NI 185A	4. ND 28 closed
_____		5. ND 1 or 2 closed
		6. ND 36 or 37 closed
		7. NI 115 closed
		8. NI 136 closed



ENCLOSURE 4

NRC RESOLUTION OF FACILITY COMMENTS

SRO #39

NRC Resolution: Comment accepted. Answer key changed to:

a) 4, 8
b) 2, 5

SRO #53 and RO #57

NRC Resolution: Comment accepted. Question deleted from both examinations.

Facility: Catawba 1 & 2 Exam Date: 1992/10/16

Catawba
SRO Master
92-302

Knowledge and Ability Record Form
COUNT MATRIX

Summarizing Counts by K/A Group
for
PWR - Senior Reactor Operator

	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	SG	Total
Plant Wide Generics												17
Plant Systems I	2	1	1	1	1	1	1	2	1	2	6	19
Plant Systems II	1	1	2	4	1	1	1	1	2	1	1	16
Plant Systems III	1	0	0	1	0	0	0	0	1	0	1	4
Emergency/Abn I	1	1	3	.....			6	2	.....		11	24
Emergency/Abn II	1	0	1	.....			5	4	.....		5	16
Emergency/Abn III	0	0	1	.....			0	1	....		1	3
Totals	6	3	8	6	2	2	13	10	4	3	25	=====
Model Total												99

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Knowledge and Ability Record Form
PLANT-WIDE GENERIC RESPONSIBILITIES

PWR - Senior Reactor Operator Target: 17 % Actual: 17.2 %

K/A	Rep	Topic	Rating R/S
194001A104		Ability to operate the plant phone, paging system, and two-way radio	3.0/3.2
194001A106		Ability to maintain accurate, clear and concise logs, records, status boards and reports	3.4/3.4
194001A107		Ability to obtain and interpret station electrical and mechanical drawings	2.5/3.2
194001A109	2	Ability to coordinate personnel activities inside the control room	2.7/3.9
194001A111		Ability to direct personnel activities inside the control room	2.8/4.1
194001A116	2	Ability to take actions called for in the Facility Emergency Plan, including (if required) supporting or acting as the Emergency Coordinator	3.1/4.4
194001K101	2	Knowledge of how to conduct and verify valve lineups	3.6/3.7
194001K102		Knowledge of tagging and clearance procedures	3.7/4.1
194001K103		Knowledge of 10 CFR 20 and related facility radiation control requirements	2.8/3.4
194001K104	3	Knowledge of facility ALARA program	3.3/3.5
194001K105		Knowledge of facility requirements for controlling access to vital/control areas	3.1/3.4
194001K109		Knowledge of safety procedures related to high pressure	3.4/3.4

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Knowledge and Ability Record Form
PLANT SYSTEMS
PWR - Senior Reactor Operator - 40 %

Group I Plant Systems Target: 19 % Actual: 19.2 %

001 Control Rod Drive	017 In-Core Temperature	061 Aux./Emer. Feedwater
003 Reactor Coolant Pump	022 Containment Cooling	063 DC Electrical Dist.
004 Chemical & Volume	025 Ice Condenser	068 Liquid Radwaste
013 E. Saftey Actuation	026 Containment Spray	071 Wast Gas Disposal
014 Rod Position Indic.	056 Condensate System	072 Area Radiation Mon.
015 Nuclear Instrument.	059 Main Feedwater System	

K/A	Rep	Topic	Rating R/S
001000G006		Knowledge of bases in technical specifications for limiting conditions for operations and safety limits	2.9/3.8
001000K103		CRDM	3.4/3.6
001000K558		Reason for overlap of control banks	2.7/3.2
003000G006		Knowledge of bases in technical specifications for limiting conditions for operations and safety limits	2.7/3.8
003000K201		RCPS	3.1/3.1
004000A401		Boron and control rod reactivity effects	3.8/3.9
004010A205		CIAS, SIAS	4.1/4.3
013000A105		Main steam pressure	3.4/3.6
014000G008		Knowledge of the annunciator alarms and indications, and use of the response instructions	2.9/3.1
015000A?03		Verification of proper functioning/operability	3.9/3.9
015000K406		Reactor trip bypasses	3.9/4.2
015000K604		Bistables and logic circuits	3.1/3.2
017020K101		Plant computer (COLSS)	3.2/3.2
022000A404		Valves in the CCS	3.1/3.2
025000K301		Containment	3.8/3.8
026000G005		Knowledge of limiting conditions for operations and safety limits	3.3/3.9
061000A202		Loss of air to steam supply valve	3.2/3.6
063000G010		Ability to explain and apply all system limits and precautions	3.1/3.2
072000G007		Knowledge of purpose and function of major system components and controls	2.6/2.9

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Knowledge and Ability Record Form
PLANT SYSTEMS
PWR - Senior Reactor Operator - 40 %

Group II Plant Systems Target: 17 % Actual: 16.. %

002 RCS	012 RPS	029 CPS	039 MRSS	073 PRM
006 ECCS	016 NNIS	033 SFPCS	055 CARS	075 CIRC
010 PZRPRS	027 CIRS	034 FHES	062 AC	079 SAS
011 PZRLCS	028 HRPS	035 S/GS	064 ED/G	086 FPS
				103 Containment

K/A	Rep	Topic	Rating R/S
002000K403		Venting the RCS	2.9/3.2
002000K603		Reactor vessel level indication	3.1/3.6
006000G006		Knowledge of bases in technical specifications for limiting conditions for operations and safety limits	2.9/4.0
006000K409		Safety injection valve interlocks	3.8/4.1
010000A403		PORV and block valves	4.0/3.8
010000K201		PZR heaters	3.0/3.4
011000A211		Failure of PZR level instrument-low	3.4/3.6
012000K501		DNB	3.3/3.8
016000A301		Automatic selection of NNIS inputs to control systems	2.9/2.9
016000K101		RCS	3.4/3.4
028000A101		Hydrogen concentration	3.4/3.8
029000K302		Containment entry	2.9/3.5
033000K303		Spent fuel temperature	3.0/3.3
039000A302		Isolation of the MRSS	3.1/3.5
064000K411		Automatic load sequencer: safeguards	3.5/4.0
086000K406		CO}	3.0/3.3

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Knowledge and Ability Record Form
PLANT SYSTEMS
PWR - Senior Reactor Operator - 40 %

Group III Plant Systems Target: 4 % Actual: 4.0 %

005 Residual Heat Removal System
007 PZR Relief Tank/Quench
008 Component Cooling Water System
041 Steam Dump System Bypass Control
045 Main Turbine Generator
076 Service Water System
078 Instrument Air System

K/A	Rep	Topic	Rating R/S
005000G007		Knowledge of purpose and function of major system components and controls	3.3/3.4
008000K102		Loads cooled by CCWS	3.3/3.4
008030A304		Automatic actions associated with the CCWS that occur as a result of a safety injection signal	3.6/3.7
041020K417		Reactor trip	3.7/3.9

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Knowledge and Ability Record Form
EMERGENCY PLANT EVOLUTIONS
PWR - Senior Reactor Operator - 43 %

Group I Emergency and Abnormal Plant Evolutions Target: 24 % Actual: 24.2 %

000001 Continuous Rod With.	000026 Loss of CCW	000059 LRW Release
000003 Dropped Control Rod	000029 ATWS	000067 Plant Fire Onsite
000005 Inoperable/Stuck Rod	000040 Steam Line Rupture	000068 CR Evacuation
000011 Large Break LOCA	000051 Loss of Vacuum	000069 Loss Containment
000015 RCP Motor Malfunction	000055 Blackout	000074 Inadeq. Core Cool
000024 Emergency Boration	000057 Loss of AC Elec. Instrument Bus	000076 High RCS Activity

K/A	Rep	Topic	Rating R/S
000001G007		Ability to explain and apply all system limits and precautions	3.1/3.3
000001G008		Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications	3.2/3.8
000003G005		Knowledge of annunciator alarms and indications, and use of the response instructions	3.6/3.6
000003G010		Ability to perform without reference to procedures those actions that require immediate operation of system components or controls	3.9/3.8
000005G005		Knowledge of the annunciator alarms and indications, and use of the response instructions	3.1/3.3
000011A103		Securing of RCPs	4.0/4.0
000011A104		ESF actuation system in manual	4.4/4.4
000011A111		Long-term cooling of core	4.2/4.2
000011G010		Ability to perform without reference to procedures those actions that require immediate operation of system components or controls	4.5/4.5
000015G010		Ability to perform without reference to procedures those actions that require immediate operation of system components or controls	3.4/3.4
000015K207		RCP seals	2.9/2.9
000026A105		The CCWS surge tank, including level control and level alarms, and radiation alarm	3.1/3.1
000029G011		Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures	4.4/4.6
000029K312		Actions contained in EOP for ATWS	4.4/4.7
000040G012		Ability to utilize symptom based procedures	3.8/4.1
000051A202		Conditions requiring reactor and/or turbine trip	3.9/4.1
000057A101		Manual inverter swapping	3.7/3.7
000059A102		ARM system	3.3/3.4
000067A203		Fire alarm	3.3/3.5
000067G012		Ability to utilize symptom based procedures	3.4/3.4
000074K103		Processes for removing decay heat from the core	4.5/4.9
000074K304		Tripping RCPs	3.9/4.2
000074K311		Guidance contained in EOP for Inadequate Core Cooling	4.0/4.4
000076G012		Ability to utilize symptom based procedures	2.9/3.1

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Knowledge and Ability Record Form
EMERGENCY PLANT EVOLUTIONS
PWR - Senior Reactor Operator - 43 %

Group II Emergency and Abnormal Plant Evolutions Target: 16 % Actual: 16.2 %

000007 Reactor Trip	000027 PZR PCS Malfunction	000054 Loss of MFW
000008 Stuck Relief Value	000032 Loss of SRNI	000058 Loss of DC
000009 Small Break LOCA	000033 Loss of IRNI	000060 GRW Release
000022 Loss of RCS Makeup	000037 SG Tube Leak	000061 ARMS Alarm
000025 Loss of Residual Heat	000038 SG Tube Rupture	000065 Loss of IAS

K/A	Rep	Topic	Rating R/S
000007A103		RCS pressure and temperature	4.2/4.1
000007G010		Ability to perform without reference to procedures those actions that require immediate operation of system components or controls	4.2/4.1
000008K101		Thermodynamics and flow characteristics of open or leaking valves	3.2/3.7
000009A237		Existence of adequate natural circulation	4.2/4.5
000022A102		CVCS charging low flow alarm, sensor, and indicator	3.0/2.9
000022A109		RCP seal flows, temperatures, pressures, and vibrations	3.2/3.3
000025G011		Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures	3.6/3.9
000027A218		Operable control channel	3.4/3.5
000032G008		Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications	2.8/3.3
000033A202		Indications of unreliable intermediate-range channel operation	3.3/3.6
000038K302		Prevention of secondary PORV cycling	4.4/4.5
000054G012		Ability to utilize symptom based procedures	3.2/3.2
000058A101		Crosstie of the affected dc bus with the alternate supply	3.4/3.5
000065A103		Restoration of systems served by instrument air when pressure is regained	2.9/3.1
000065A201		Cause and effect of low-pressure instrument air alarm	2.9/3.2
000065G010		Ability to perform without reference to procedures those actions that require immediate operation of system components or controls	3.2/3.3

COPY

Knowledge and Ability Record Form
EMERGENCY PLANT EVOLUTIONS
PWR - Senior Reactor Operator - 43 %

Group III Emergency and Abnormal Plant Evolutions Target: 3 % Actual: 3.0 %

000028 Pressure Level Malfunction
000036 Fuel Handling Accident
000056 Loss of OffSite Power

K/A	Rep	Topic	Rating R/S
000028A202		PZR level as a function of power level or T-ave including interpretation of malfunction	3.4/3.8
3010		Ability to perform without reference to procedures those actions that require immediate operation of system components or controls	3.7/3.9
000056K302		Actions contained in EOP for loss of offsite power	4.4/4.7

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U. S. NUCLEAR REGULATORY COMMISSION
SITE SPECIFIC EXAMINATION
SENIOR OPERATOR LICENSE
REGION 2

CANDIDATE'S NAME: _____

FACILITY: Catawba 1 & 2

REACTOR TYPE: PWR-WEC4

DATE ADMINISTERED: 92/10/16

INSTRUCTIONS TO CANDIDATE:

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires a final grade of at least 80%. Examination papers will be picked up four (4) hours after the examination starts.

TEST VALUE	CANDIDATE'S SCORE	%	
100.00		%	TOTALS
	FINAL GRADE		

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

_____
Candidate's Signature

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A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

If you change your answer, write your selection in the blank.

MULTIPLE CHOICE

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035 a b c d ___
036 a b c d ___
037 a b c d ___
038 a b c d ___
039 MATCHING
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2 ___
b ___
2 ___

MULTIPLE CHOICE

040 a b c d ___

MASTER COPY

A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

If you change your answer, write your selection in the blank.

041	a	b	c	d	___	064	a	b	c	d	___
042	a	b	c	d	___	065	a	b	c	d	___
043	a	b	c	d	___	066	a	b	c	d	___
044	a	b	c	d	___	067	a	b	c	d	___
045	a	b	c	d	___	068	a	b	c	d	___
046	a	b	c	d	___	069	a	b	c	d	___
047	a	b	c	d	___	070	a	b	c	d	___
048	a	b	c	d	___	071	a	b	c	d	___
049	a	b	c	d	___	072	a	b	c	d	___
050	a	b	c	d	___	073	a	b	c	d	___
051	a	b	c	d	___	074	a	b	c	d	___
052	a	b	c	d	___	075	a	b	c	d	___
053	a	b	c	d	___	076	a	b	c	d	___
054	a	b	c	d	___	077	a	b	c	d	___
055	a	b	c	d	___	078	a	b	c	d	___
056	a	b	c	d	___	079	a	b	c	d	___
057	a	b	c	d	___	080	a	b	c	d	___
058	a	b	c	d	___	081	a	b	c	d	___
059	a	b	c	d	___	082	a	b	c	d	___
060	a	b	c	d	___	083	a	b	c	d	___
061	a	b	c	d	___	084	a	b	c	d	___
062	a	b	c	d	___	085	a	b	c	d	___
063	a	b	c	d	___	086	a	b	c	d	___

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A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

If you change your answer, write your selection in the blank.

087	a	b	c	d	___
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098	a	b	c	d	___
099	a	b	c	d	___

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(********** END OF EXAMINATION **********)

NRC RULES AND GUIDELINES FOR LICENSE EXAMINATIONS

During the administration of this examination the following rules apply:

1. Cheating on the examination means an automatic denial of your application and could result in more severe penalties.

2. After the examination has been completed, you must sign the statement on the cover sheet indicating that the work is your own and you have not received or given assistance in completing the examination. This must be done after you complete the examination.

3. Restroom trips are to be limited and only one applicant at a time may leave. You must avoid all contacts with anyone outside the examination room to avoid even the appearance or possibility of cheating.

4. Use black ink or dark pencil ONLY to facilitate legible reproductions.

5. Print your name in the blank provided in the upper right-hand corner of the examination cover sheet and each answer sheet.

6. Mark your answers on the answer sheet provided. USE ONLY THE PAPER PROVIDED AND DO NOT WRITE ON THE BACK SIDE OF THE PAGE.

7. Before you turn in your examination, consecutively number each answer sheet, including any additional pages inserted when writing your answers on the examination question page.

8. Use abbreviations only if they are commonly used in facility literature. Avoid using symbols such as < or > signs to avoid a simple transposition error resulting in an incorrect answer. Write it out.

9. The point value for each question is indicated in parentheses after the question.

10. Show all calculations, methods, or assumptions used to obtain an answer to any short answer questions.

11. Partial credit may be given except on multiple choice questions. Therefore, ANSWER ALL PARTS OF THE QUESTION AND DO NOT LEAVE ANY ANSWER BLANK.

12. Proportional grading will be applied. Any additional wrong information that is provided may count against you. For example, if a question is worth one point and asks for four responses, each of which is worth 0.25 points, and you give five responses, each of your responses will be worth 0.20 points. If one of your five responses is incorrect, 0.20 will be deducted and your total credit for that question will be 0.80 instead of 1.00 even though you got the four correct answers.

13. If the intent of a question is unclear, ask questions of the examiner only.

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14. When turning in your examination, assemble the completed examination with examination questions, examination aids and answer sheets. In addition, turn in all scrap paper.

15. Ensure all information you wish to have evaluated as part of your answer is on your answer sheet. Scrap paper will be disposed of immediately following the examination.

16. To pass the examination, you must achieve a grade of 80% or greater.

17. There is a time limit of four (4) hours ior completion of the examination.

18. When you are done and have turned in your examination, leave the examination area (EXAMINER WILL DEFINE THE AREA). If you are found in this area while the examination is still in progress, your license may be denied or revoked.

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QUESTION: 001 (1.00)

If a valve is found out of position during independent verification of its position, which ONE [1] of the following actions must be taken or performed?

a. Immediately notify the operator at the controls [OATC] and reposition the valve with the OATC's permission.

b. Immediately notify the shift supervisor [SS] and reposition the valve with the SS's permission.

c. Immediately reposition the valve, then notify the OATC.

d. Immediately reposition the valve, then notify SS.

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QUESTION: 002 (1.00)

Which ONE [1] of the following statements describes the PURPOSE [as defined in OMP 2-18 "Tagout Removal and Restoration [R&R] Procedure"] of the Venting Restoration Sheet?

a. Explain how to vent equipment prior to maintenance.

b. Describe how to vent infrequently operated equipment prior to operation of the equipment.

c. Record equipment placed in an "OUT OF NORMAL" condition and to insure the equipment is returned to its normal condition.

d. Document independent verification of vent valves.

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QUESTION: 003 (1.00)

If a safety tag violation has occurred, which ONE [1] of the following statements describes how the safety tag violation is reported?

a. A Tag Occurrence Report Form is sent to the Station Manager.

b. A Tagout/Removal & Restoration Record sheet is annotated with a description of the violation and retained with the tagout records.

c. In accordance with Technical Specification Section 5.0 Administrative Controls.

d. In accordance wit OMP 2-11, "Operating Department Reporting".

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QUESTION: 004 (1.00)

Which ONE [1] of the following radiation exposures describes a Duke Power Company administrative radiation exposure limit?

a. 3000 mRems/quarter gamma exposure to the whole body.

b. 6000 mRems/quarter gamma exposure to the skin.

c. 52 MPC-hours internal radiation exposure in any seven days.

d. 1500 MPC-hours internal radiation exposure per quarter.

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QUESTION: 005 (1.00)

Which ONE [1] of the following statements describes how operators are identified by the use of color coded identification tape while in the Lower Containment during outages?

a. Yellow tape worn on the upper portion of the arm.

b. Red tape worn on the shoulder.

c. Magenta and yellow tape worn on the chest.

d. Green tape worn on the upper part of the body.

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QUESTION: 006 (1.00)

If all factors are equal, which ONE [1] of the following volunteers should be selected for a Planned Emergency Exposure?

a. 20 year old man.

b. 30 year old woman.

c. 40 year old man.

d. 50 year old woman.

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QUESTION: 007 (1.00)

The following conditions exist:

- You are the Shift Supervisor [SS].
- It is 0135 in the morning.
- A 25 year old man has volunteered to remedy or correct a situation for life saving purposes.

Which ONE [1] of the following is the maximum whole body dose you may authorize the man to receive while remedying the situation?

a. 5 rems.

b. 25 rems.

c. 40 rems.

d. 75 rems.

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QUESTION: 008 (1.00)

Which ONE [1] of the following statements describes the control of high radiation master keys?

a. Master keys retained in the Radiation Protection Office are issued to security personnel during a Site Assembly.

b. Master keys are retained in a sealed box in the Shift Supervisor's office and may only be used in an emergency.

c. Shift Supervisor with concurrence of Radiation Protection must approve issue of a master key and only in an emergency.

d. Radiation Protection must approve issue of a master key prior to issuance.

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QUESTION: 009 (1.00)

The following plant conditions exist:

- The plant is in MODE 4.
- Personnel must work in the main steam doghouse.

Which ONE (1) of the following positions must be notified of personnel working in the main steam doghouse?

a. Operator at the controls and Shift Supervisor.

b. Operator at the controls and Balance of Plant Operator.

c. Individual's work supervisor and Protected Area First Aid Staff.

d. Individuals's work supervisor and Security Medical Emergency Response Team [MERT].

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QUESTION: 010 (1.00)

During a fire or medical emergency, which ONE [1] of the following individuals is responsible for controlling Motorola HT 440 two-way radio communications?

a. Shift Technical Advisor.

b. Operator at the Controls.

c. Unit Supervisor.

d. Shift Supervisor.

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QUESTION: 011 (1.00)

Which ONE [1] of the following conditions or items should have an entry in the Open Item Summary of the Control Room Logbook?

a. Any Control Room equipment placed in an "Out of Normal" position and not R&R'd.

b. Any OPERABLE automatic valve in an abnormal position and R&R'd.

c. Initiation of Shutdown Requests.

d. Temporary Modifications [Brown Tags].

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QUESTION: 012 (1.00)

Which ONE [1] of the following statements describes how revisions are designated on the Control Room copy of electrical elementary diagrams [CNEE]?

a. The diagram will be red-marked to show the details of the modification and stamped "OPS INTERIM".

b. The diagram will be red-marked to show the details of the modification and stamped "AS-BUILT".

c. The revised area will be outlined in red ink and the diagram will be stamped "SEE INTERIM AS-BUILT".

d. The revised area will be blacked out and the diagram stamped "SEE OPS INTERIM IN THE DRAWING SUPPLEMENT FILE."

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QUESTION: 013 (1.00)

If the Charlotte Dispatcher notifies Catawba Nuclear Station that the Unit Interface Controller [UIC] operating limits require resetting, which ONE [1] of the following positions is responsible for resetting the UIC operating limits?

a. Nuclear Control Operator or Shift Support Technician.

b. Operator at the Controls or Shift Technical Advisor.

c. Shift Operations Manager or Unit Operations Manager.

d. Maintenance Engineering Services or Protective Relay Engineering Group.

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QUESTION: 014 (1.00)

Which ONE [1] of the following individual[s] is authorized to adjust the sound level of annunciators in the Control Room?

a. Operator at the Controls.

b. Shift Support Technician.

c. Nuclear Control Operator.

d. I&E personnel.

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QUESTION: 015 (1.00)

A non-licensed operator [NLO] who is NOT in an approved license training class is doing Control Room observation. Which ONE [1] of the following Control Room equipment or operations may the NLO operate or perform under the direct observation of an actively licensed RO or SRO?

a. Boration of Reactor Coolant System.

b. Startup of Residual Heat Removal System.

c. Reactor Coolant Pump.

d. Turbine Generator.

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QUESTION: 016 (1.00)

Which ONE [1] of the following statements describes when follow-up notifications to the County and State Warning Points are required?

a. Within 5 minutes of the implementation of any emergency procedure.

b. Within 15 minutes of any change in Protective Action Recommendations [PARs].

c. Every 30 minutes if an emergency has been classified as an Alert or higher.

d. Every hour if an emergency has been classified as a Site Area Emergency or higher.

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QUESTION: 017 (1.00)

Which ONE [1] of the following conditions warrants a Site Assembly?

a. Radiation levels in unrestricted areas of the Auxiliary Building are equal to or greater than 1 mr/hr.

b. Radiation levels in restricted areas of the Auxiliary Building are greater than 2 mr/hr.

c. EMF-41 indicates Auxiliary Building Airborne Radiation Level is greater than 1,000,000 cpm.

d. Radiation levels in unrestricted areas of the Auxiliary Building are equal to or greater than 1 mr/hr with EMF-41 indicating Auxiliary Building Airborne Radiation Level greater than 10,000 cpm.

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QUESTION: 018 (1.00)

Which ONE (1) of the following descriptions explains why 125 Vdc and 70 Vdc power supplies are used in the DC Hold Cabinet?

a. The 70 Vdc is used to latch the grippers and the 125 Vdc is used to hold the grippers.

b. The grippers are latched by adding the 125 Vdc and 70 Vdc then the 125 Vdc is used to hold the grippers.

c. 125 Vdc is used to latch the grippers and 70 Vdc is used to hold the grippers.

d. 125 Vdc is used to latch the grippers and as an alternate hold voltage; and 70 Vdc is used to hold the grippers and as an alternate latch voltage.

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QUESTION: 019 (1.00)

Which ONE [1] of the following reasons explains why the control banks are overlapped?

a. Permits the use of a lower rod insertion limit.

b. Reduces the number of required Control Rod Drive Mechanisms.

c. Reduces the consequences of a continuous rod withdrawal accident.

d. Gives a more uniform reactivity addition per rod step.

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QUESTION: 020 (1.00)

The following plant conditions exist:

- Unit 2 is in Mode 1.
- Rod movement tests are in progress in accordance with Technical Specification 4.1.3.1.2.
- All the rods in control bank A, group 1 fail to move due to a control malfunction.

Which ONE [1] of the following statements describes the action required to be taken? [Technical Specifications 3.1.3.1 and 4.1.3.1.2 are attached]

a. Be in HOT STANDBY within 6 hours.

b. Determine that the SHUTDOWN MARGIN is satisfied within 1 hour and be in HOT STANDBY within 6 hours.

c. Enter Technical Specification 3.0.3.

d. Continue plant operation while TS 3.1.3.1 action d. is taken.

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QUESTION: C21 (1.00)

Which ONE [1] of the following statements explains WHY each reactor coolant pump [NCP] has a safety breaker installed in series with its 6900 V supply breaker?

a. Prevent damage to the high voltage supply.

b. To prevent a mechanical failure of the electrical penetration assembly due to fault current if one protective device fails.

c. To prevent damage to the high voltage [6900 V] supply breaker in the event of an NCP sheared shaft.

d. To prevent damage to the high voltage [6900 V] supply breaker in the event of an NCP locked rotor.

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QUESTION: 022 (1.00)

If NC [Reactor Coolant] System cold leg temperature is 265 degrees F, which ONE [1] of the following statements explains why secondary water temperature must be less than 315 degrees F prior to starting the NC Pumps?

a. Protect against NC System overpressure caused by energy additions from the secondary.

b. Protect against a loss of shutdown margin caused by energy loss to the secondary.

c. Prevent excessive NC System cooldown rates.

d. Prevent loss of pressurizer level due to excessive NC System cooldown.

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QUESTION: 023 (1 00)

The following plant conditions exist:

- The plant is operating at 100% power at BOL.
- All systems are operable.
- Control Bank "D" starts stepping in slowly, but at a noticeable rate.

Which ONE [1] of the following events will cause this response?

a. A leak has developed in the Regenerative Heat Exchanger.

b. A leak has developed in the Letdown Heat Exchanger.

c. A leak has developed in the tube bundle of the Seal Water Heat Exchanger.

d. A leak in the Excess Letdown Heat Exchanger.

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QUESTION: 024 (1.00)

The following plant conditions exist:

- Boric Acid Transfer Pump 1A running following an auto start demand from the Reactor Makeup system
- A spurious Ss signal was received

Which ONE [1] of the following operations must be performed to shutdown Boric Acid Transfer Pump 1A following reset of the Ss [Safety Injection] sequencer?

a. Select "OFF" on the pump control switch.

b. Start the other Boric Acid Transfer Pump.

c. Verify that the VCT level is above the auto makeup setpoint and select "OFF" on the pump control switch.

d. Reset the Boric Acid Transfer Pump and select "OFF" on the pump control switch.

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QUESTION: 025 (1.00)

If a steam leak on Unit 2 is causing steamline pressure to decrease at a constant rate, which ONE [1] of the following statements explains the plant's response to the steam leak?

a. A steamline low pressure safety injection [SI] will occur at an indicated pressure less than the setpoint.

b. A steamline low pressure SI will occur at an indicated pressure greater than the setpoint.

c. Since the steamline low pressure SI circuit is rate sensitive, the rate of decrease is multiplied by 10 and an SI will occur when the rate of decrease reaches 100 psi/sec.

d. Since the steamline low pressure SI circuit is rate sensitive, the constant rate of change is multiplied by 10 and an SI will occur at an indicated pressure less than the setpoint or the rate of decrease is greater than 100 psi/sec.

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QUESTION: 026 (1.00)

The following plant conditions exist:

- Unit 2 at 43% power.
- The Digital Rod Display System "NON-URGENT" Annunciator is in alarm.
- No other alarms have been received.

Which ONE [1] of the following conditions caused the alarm?

a. Data B failure.

b. All three control units failed.

c Data A rod position is 180 steps and Data B rod position is 192 steps.

d. A rod is stuck.

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QUESTION: 027 (1.00)

The following readings were noted on the Power Range and Intermediate Range Channels:

N-35 @ 5 x 10E-5
N-36 @ 8 x 10E-6
N-41 @ 8.5%
N-42 @ 9%
N-43 @ 8.5%
N-44 @ 9%

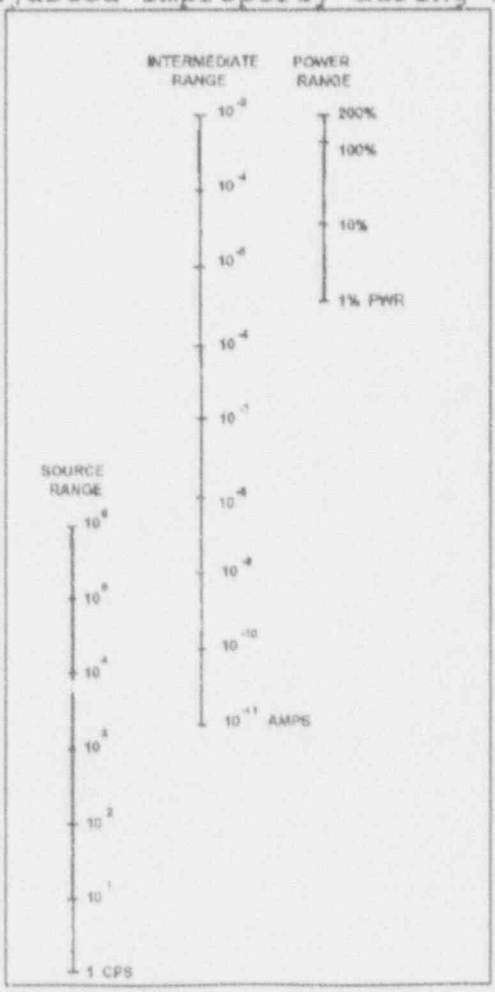
Which ONE [1] of the following describes the problem indicated by these readings? [See figure below]

a. N-35 reading high for current conditions.

b. N-36 reading low for current conditions.

c. N-41 and N-43 adjusted improperly during last calorimetric.

d. N-42 and N-44 adjusted improperly during last calorimetric.



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QUESTION: 028 (1.00)

The reactor is operating at 13% power when Intermediate Range Nuclear Instrument N-35 fails LOW. Which ONE [1] of the following responses will occur.

a. Reactor Trips on Source Range High Flux Level Trip.

b. Intermediate Range [IR] High Flux Rod Stop [C-1] comes in.

c. Power Above Permission P-10 status light for N-35 goes out.

d. Power Above Permissive P-6 status light for N-35 goes out.

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QUESTION: 029 (1.00)

If a Containment entry is made during reactor startup with the Intermediate Range reading less than 10 E-10 amps, which ONE [1] of the following reasons explains why the Containment Evacuation Alarm cannot be used to warn personnel to evacuate containment?

a. High Flux at Shutdown Alarm is blocked.

b. High Flux at Shutdown Alarm only sounds the annunciator in the Control Room.

c. Source Range High Level Reactor Trip is blocked.

d. Alarm actuation may initiate magnetic interference that could cause a spurious reactor trip.

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QUESTION: 030 (1.00)

Which ONE [1] of the following statements explains how Control Room operators can recognize that an incore thermocouple is being monitored at the Incore Thermocouple Panel?

a. The plant computer thermocouple temperature will be indicated by a yellow reading.

b. The plant computer will show an alarm because the signal to the computer will be disconnected.

c. The local control annunciator will alarm.

d. The thermocouple temperature reading will flash on the plant computer screen.

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QUESTION: 031 (1.00)

If the Lower Containment Ventilation units are shifted to HIGH speed, which ONE [1] of the following statements describes how the Containment Ventilation [VV] System responds?

a. Both the thermostat valve and the cooling water bypass fail closed.

b. The thermostat valve fails closed and the cooling water bypass is throttled to control temperature.

c. Both the cooling water bypass valve and thermostatically controlled valve fail open.

d. The cooling water bypass fails open to allow the thermostat valve to control on temperature.

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QUESTION: 032 (1.00)

According to Technical Specification Bases, which ONE [1] of the following statements describes the effect of operation with the Ice Condenser Doors open?

a. In the event of a LOCA, the containment peak pressure transient may exceed 14.7 psig.

b. In the event of a LOCA, the containment peak pressure transient will be less than 14.7 psig.

c. During a LOCA the released Reactor Coolant System Fluid may be diverted away from the ice condenser bays.

d. Inadequate sublimation of the ice bed may not occur because of warm air intrusion.

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QUESTION: 033 (1.00)

The following plant conditions exist:

- Unit 1 at 63% power.
- NS Pump 1A recirc valve to the FWST is open while performing a test on NS Pump 1A.
- NS53B was shut to perform maintenance on NS Pump 1B.
- Other NS valves are aligned as indicated in the NS drawing provided below.

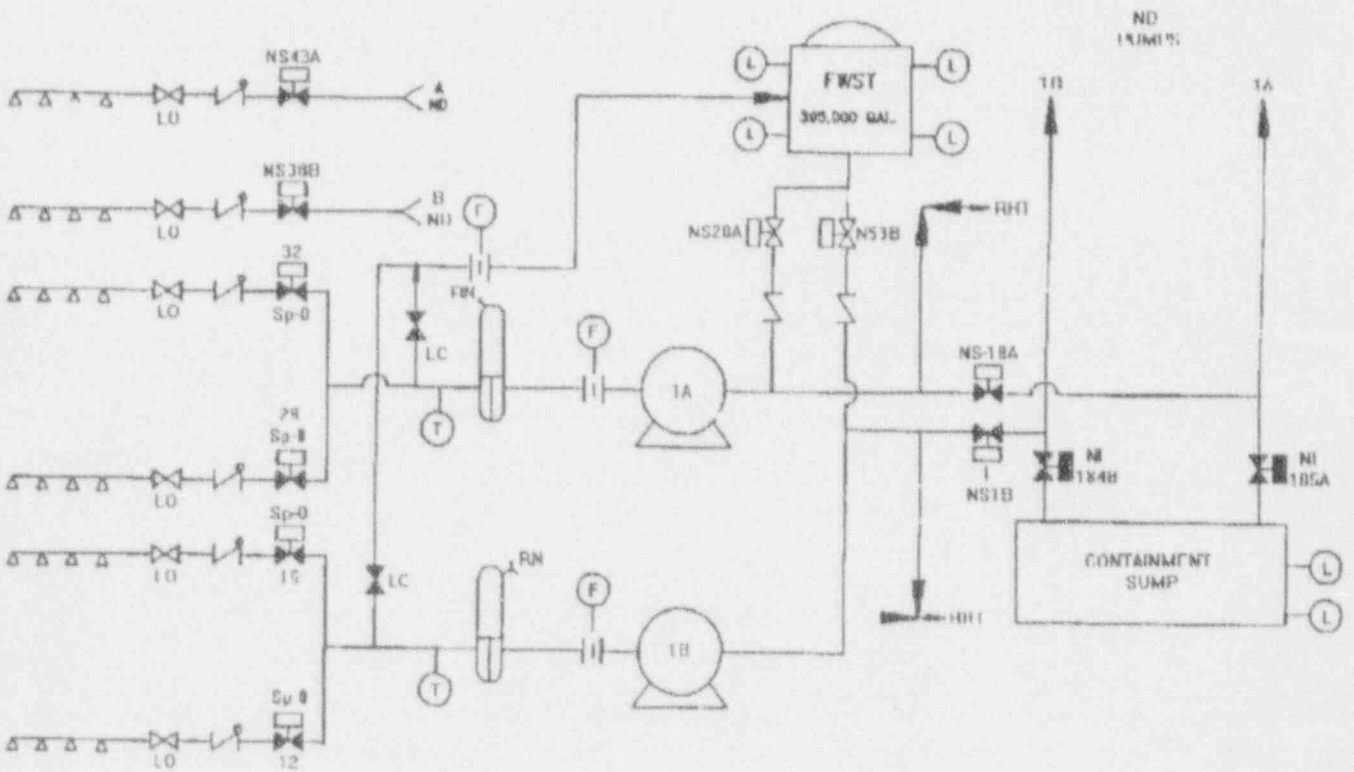
Which ONE [1] of the following actions is required? [Technical Specification 3.6.2 is attached].

a. Perform surveillance 4.6.2.a. on completion of the test on the NS Pump 1A.

b. Provide an alternate flow path by opening NS 38B and NI 184B.

c. Enter technical specification 3.0.3.

d. Verify that NS pump 1A develops a differential pressure head greater than or equal to 185 psid.



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QUESTION: 034 (1.00)

Which ONE [1] of the following statements concerning the Auxiliary Feedwater System describes the operation of the Turbine Driven Pump [TDCA]?

a. If instrument air pressure is lost, the steam isolation valves fail open to start the TDCA.

b. If either of the Motor Driven Pump's [MDCA] flow exceeds 780 gpm after a valid start signal, the TDCA will auto start.

c. The TDCA pump will auto start upon loss of both Main Feedwater pumps.

d. The TDCA will automatically start upon an undervoltage signal on one [1] NCP bus.

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QUESTION: 035 (1.00)

Which ONE [1] of the following reasons explains why the AC input breaker must be closed first when placing a battery charger in service?

a. To prevent exceeding the auctioneering Diode Assembly peak voltage limit when closing the output breaker.

b. To ensure charging rectifiers are not exposed to an overvoltage condition when closing circuit breakers.

c. To protect the output breakers from heavy surge currents.

d. To limit charging current to minimize battery explosion potential.

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QUESTION: 036 (1.00)

Which ONE [1] of the following statements describe the use of installed sources in Area Radiation Monitors [EMF]?

a. NC filters area EMF uses an installed source to verify alarms.

b. Steam line EMF use an installed source to prevent spurious alarms.

c. Reactor Building Refueling Bridge EMF uses an installed source to prevent spurious alarms.

d. Check sources have been removed from Area Radiation Monitors for ALARA concerns.

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QUESTION: 037 (1.00)

If all Reactor Coolant [NC] Pumps are off, which ONE [1] of the following Reactor Vessel Level Indicating System [RVLIS] indications is/are valid?

a. Train A upper range and Train B D/P Range.

b. Train A upper range and Train B lower range.

c. Train A D/P range and Train B upper range.

d. Train A D/P range and Train A lower range.

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QUESTION: 038 (1.00)

The following plant conditions exist:

- The reactor vessel head is in place.
- The reactor coolant system has been drained to mid loop.
- The S/G primary side manways have been removed.

Which ONE [1] of the following statements explains why at least one hotleg is maintained with no nozzle dam installed?

a. Allows the hotlegs to be vented to containment.

b. Prevents syphoning coolant from the core in the event of a loss of core cooling.

c. Vents non-condensible gases that could inhibit natural circulation.

d. Eliminates need for low temperature overpressure protection.

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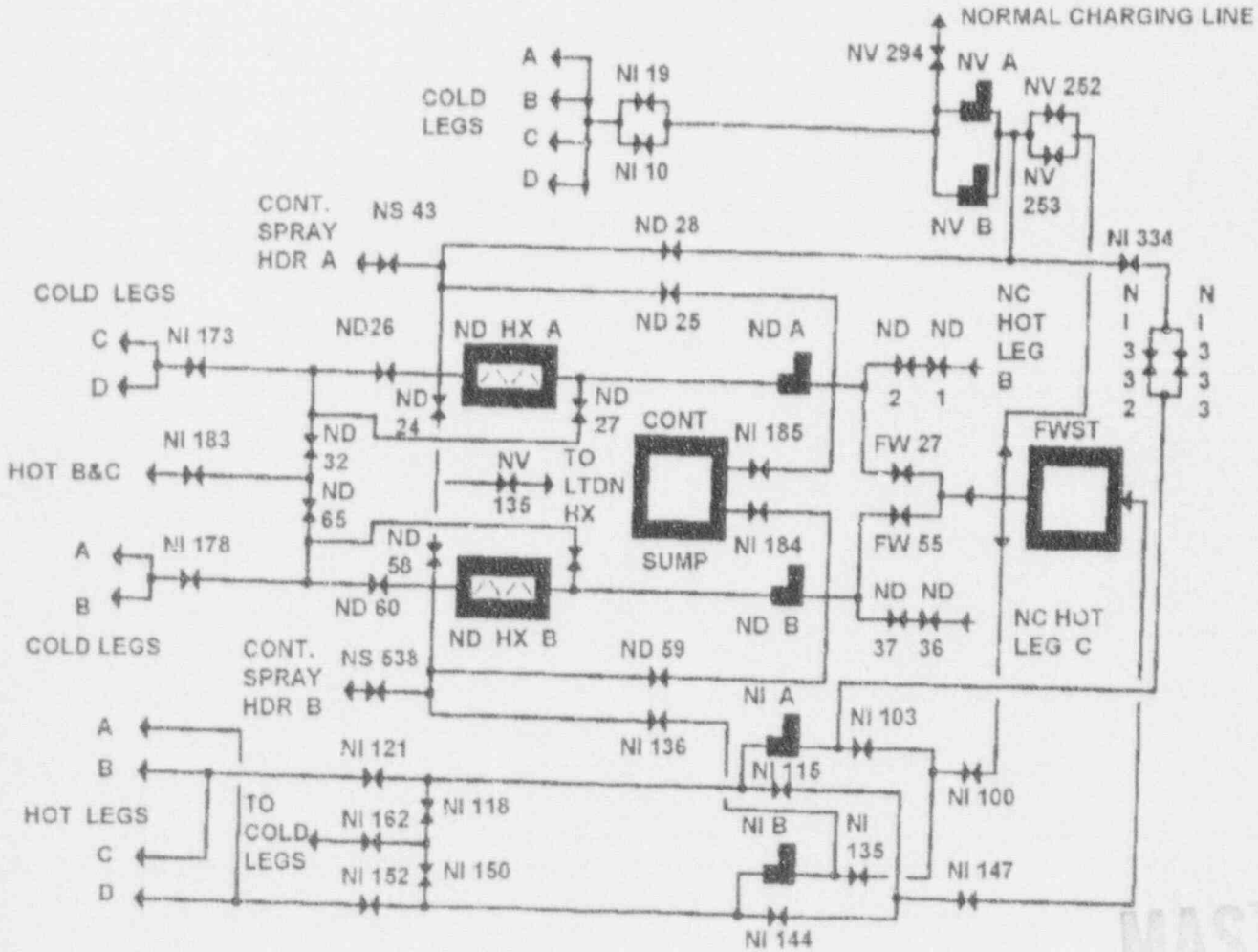
QUESTION: 039 (2.00)

For the ECCS drawing below, match the interlock conditions from Column B that are required to open the valve in Column A. [NOTE: Items in Column B can only be used once, and only a single answer may occupy one answer space.]

	Column A [VALVE]		Column B [INTERLOCK CONDITION]
_____	a.	NI 147	1. NC pressure less than 385 psig
_____			2. FW 27 closed
			3. FW 55 closed
_____	b.	NI 185A	4. ND 28 closed
_____			5. ND 1 or 2 closed
			6. ND 36 cr 37 closed
			7. NI 115 closed
			8. NI 136 closed



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QUESTION: 040 (1.00)

Which ONE [1] of the following statements describes the technical Specification BASES for removal of power to the accumulator power-operated isolation valves?

a. The valve motor operators have a history of overheating.

b. Ensures that the safety analysis assumptions used for accumulator pressure and volume are met.

c. The valves fail to meet single failure criteria.

d. Valve stroking time may exceed the accident analysis values.

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QUESTION: 041 (1.00)

Which ONE [1] of the following identifies the power supplies for Pressurizer Heater Group A?

a. LXD and CDB.

b. LXH and CDB.

c. LXH and CDA.

d. LXI and CDA.

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QUESTION: 042 (1.00)

The following plant conditions exist:

- Pressurizer PORV isolation valve NC-31B is shut to isolate leaking PORV NC-32B
- PORV isolation valve NC-33A is open and PORV NC-34A is shut.
- PORV isolation valve NC-35B remained open when its control switch was placed in close to isolate a leaking PORV NC-36B

Which ONE [1] of the following actions should be taken to SHUT PORV isolation valve NC-35B?

a. Manually close NC-35B circuit breaker on CDB.

b. Manually close NC-35B circuit breaker on EMXC.

c. Position NC-35B Control Switch to "OVERRIDE" position.

d. Position NC-35B Control Switch at the ASP to "CLOSE".

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QUESTION: 043 (1.00)

The following plant conditions exist:

- Unit 1 is at 100% power.
- All control systems are in automatic.
- Pressurizer Level Control Switch is in position 1-2.
- Pressurizer Level Channel II fails LOW.

Without operator intervention, which ONE [1] of the following plant responses will occur?

a. Letdown isolates, Pressurizer Heaters shut off.

b. No effect on charging flow, no Letdown Isolation, Pressurizer Heaters shut off.

c. Charging flow to maximum, no Letdown Isolation, all Pressurizer Heaters shut off.

d. Charging flow to maximum, Letdown Isolates, Pressurizer Heaters shut off.

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QUESTION: 044 (1.00)

The following plant conditions exist:

- Delta T is 100%
- Over Temperature [OT] Delta T setpoint is 138%
- Pressurizer pressure is decreasing due to a small Reactor Coolant System leak

Which ONE [1] of the following responses describes the OT Delta T setpoint relationship to Actual Delta T?

a. Setpoint increases causing the difference between the setpoint and actual Delta T to increase.

b. Setpoint decreases causing the difference between the setpoint and actual Delta T to decrease.

c. Actual Delta T increases and the setpoint decrease causing the difference between setpoint and actual Delta T to increase.

d. Actual Delta T decreases and the setpoint increases causing the difference between setpoint and actual Delta T to decrease.

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QUESTION: 045 (1.00)

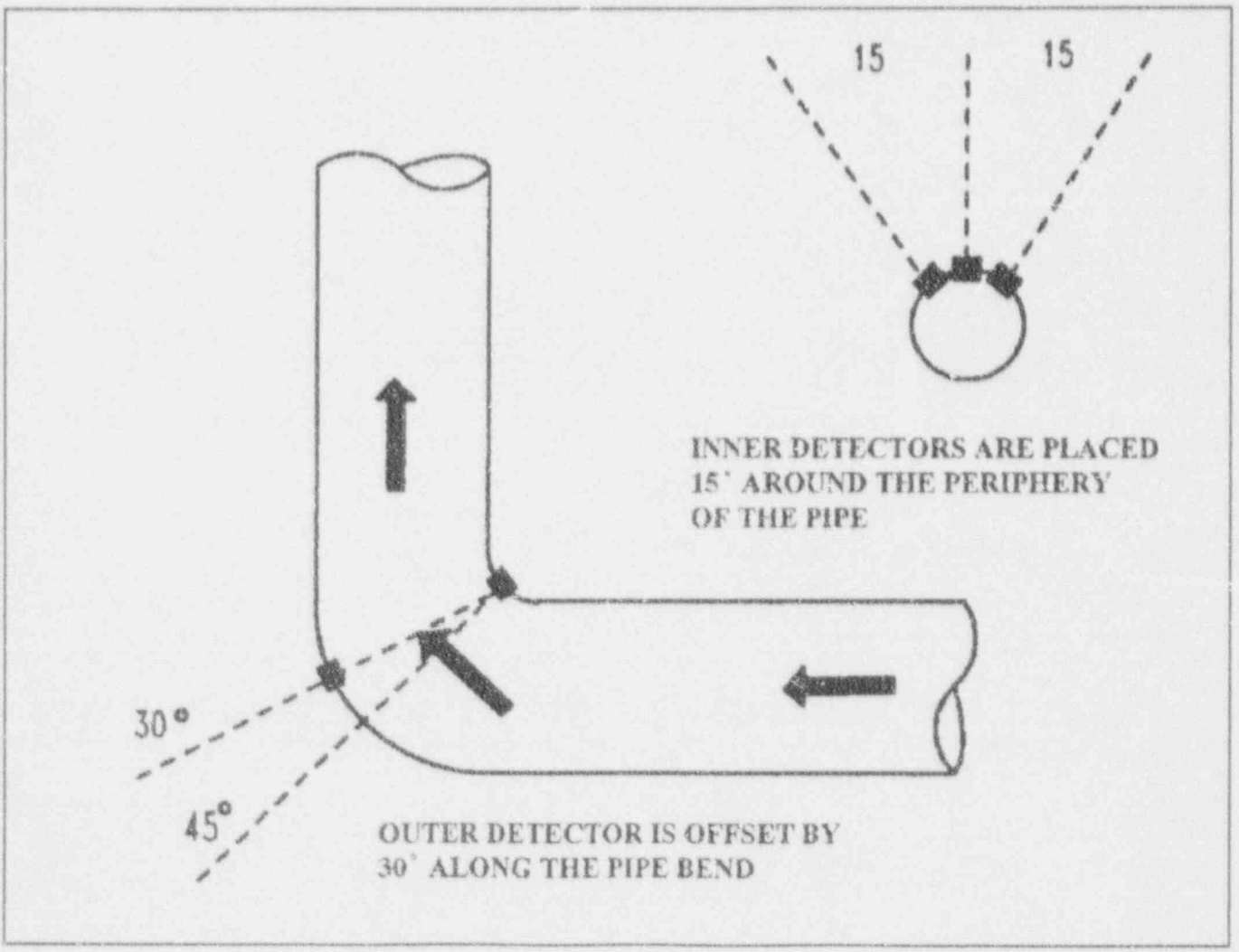
Which ONE [1] of the following statements explains why the outer Reactor Coolant Flow Detector is offset by 30 degrees along the pipe bend? [See the Reactor Coolant Flow Detector below]

a. To minimize detector output for reverse flow conditions.

b. To maximize detector output for normal flow conditions.

c. To minimize detector damage by flow erosion.

d. To maximize detector output during natural circulation.



QUESTION: 046 (1.00)

Which ONE [1] of the following conditions will cause all Steam Generators [S/Gs] on the respective Unit to swap to manual control?

a. Unit 1 S/G "A" Narrow Range Level instrument fails low and S/G "A" Wide Range instrument fails high.

b. Unit 1 Power Range Instrument N41 fails low and S/G "A" Feedwater Flow Median fails low.

c. Unit 2 Power Range Instruments N41 and N42 fail low.

d. Unit 2 Feedwater Temperature Median fails high.

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QUESTION: 047 (1.00)

If the Hydrogen Recombiners are not available following a LOCA, which ONE [1] of the following containment Hydrogen concentrations will be exceeded?

a. 3.5% by weight.

b. 4% by volume.

c. 25 cc/kg.

d. 35 cc/kg.

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QUESTION: 048 (1.00)

Which ONE [1] of the following statements describes the response of the Spent Fuel Pool Cooling System [KF] following a Blackout? [NOTE: Assume NO operator action is taken]

a. Spent Fuel Pool level and temperature will increase.

b. Spent Fuel Cooling Pumps restart automatically but the KF Skimmer Pump must be manually restarted.

c. Makeup to the Spent Fuel Pool from the Fueling Water Storage Tank [FWST] will be isolated.

d. Spent Fuel Pool level will increase because the KF makeup valves [KF-101B and KF-103A] automatically open.

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QUESTION: 049 (1.00)

If the Main Steam Isolation Valves [MSIVs] on Unit 2 are opened before pressure is completely equalized, which ONE [1] of the following responses may occur?

a. Reactor Trip due to High Pressurizer Level.

b. Safety Injection due to Steam Generator swell.

c. Main Steam Line Isolation due to high steam line pressure rate.

d. Steam Generator PORVs lifting due to moisture in the Main Steam Lines flashing to steam.

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QUESTION: 050 (1.00)

The following plant conditions exist:

- A Blackout has occurred.
- A LOCA occurs 13 seconds after the Blackout.

Which ONE [1] of the following statements describes the Emergency Diesel Generator Sequencer operation?

a. Sequencer resets; sheds all loads; and then initiates the LOCA sequence.

b. Sheds all loads; starts the accelerated sequence followed by the committed sequence.

c. Sheds non-LOCA loads and continues starting LOCA loads in the LOCA sequence.

d. Sequencer resets; sheds non LOCA loads; starts the accelerated sequence and the committed sequence.

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QUESTION: 051 (1.00)

Which ONE [1] of the following statements explains how CO2 pressure is maintained in the Diesel Generator Low Pressure CO2 storage tank?

a. The refrigeration package is manually started at 295 psig tank pressure to maintain the CO2 in a liquid state.

b. The refrigeration package is manually started at 295 psig tank pressure to maintain the CO2 in a gaseous state.

c. The refrigeration package is automatically started at 305 psig tank pressure to maintain the CO2 in a liquid state.

d. The refrigeration package is automatically started at 305 psig tank pressure to maintain the CO2 in a gaseous state.

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QUESTION: 052 (1.00)

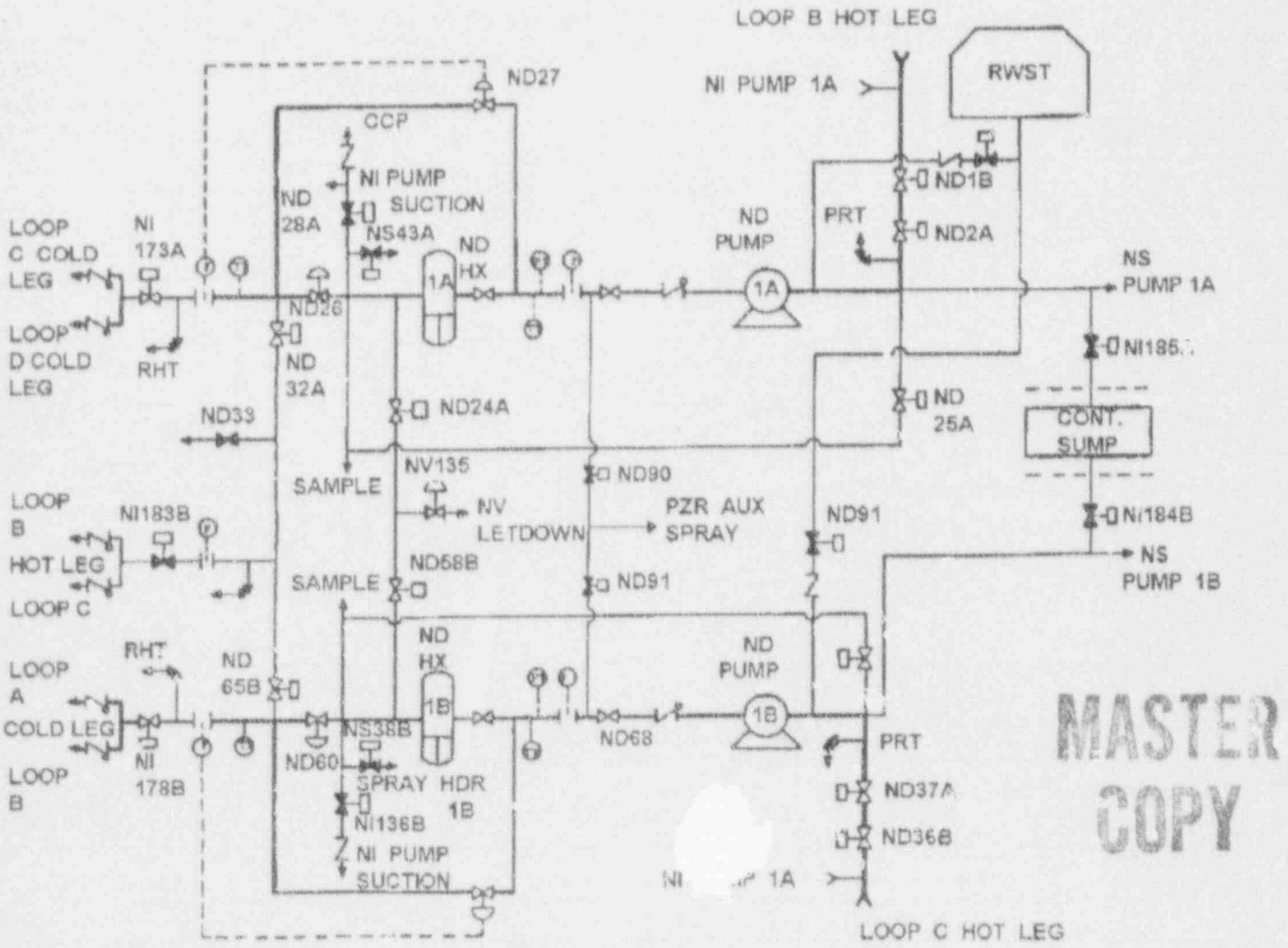
Containment Sump Isolations NI-184B and NI-185A automatically OPEN following a Safety Injection [Ss] with 2/4 Low FWST [Fueling Water Storage Tank] level [37%]. HOW and WHY is the auto swap over blocked? [Refer to ND drawing below]

a. Pressing the "Defeat" pushbutton to prevent the ND pumps from losing suction during a LOCA outside containment.

b. Placing the valve control switch in Pull To Lock to prevent loss of ND Pump suction if the swap over occurs prematurely.

c. Go to the CLOSE position at the ASP to prevent inadvertent draining of the FWST to the Containment Sump.

d. Go to the CLOSE position at the SSF if the valves have spuriously opened due to a fire in the Control Room.



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QUESTION: 053 (1.00)

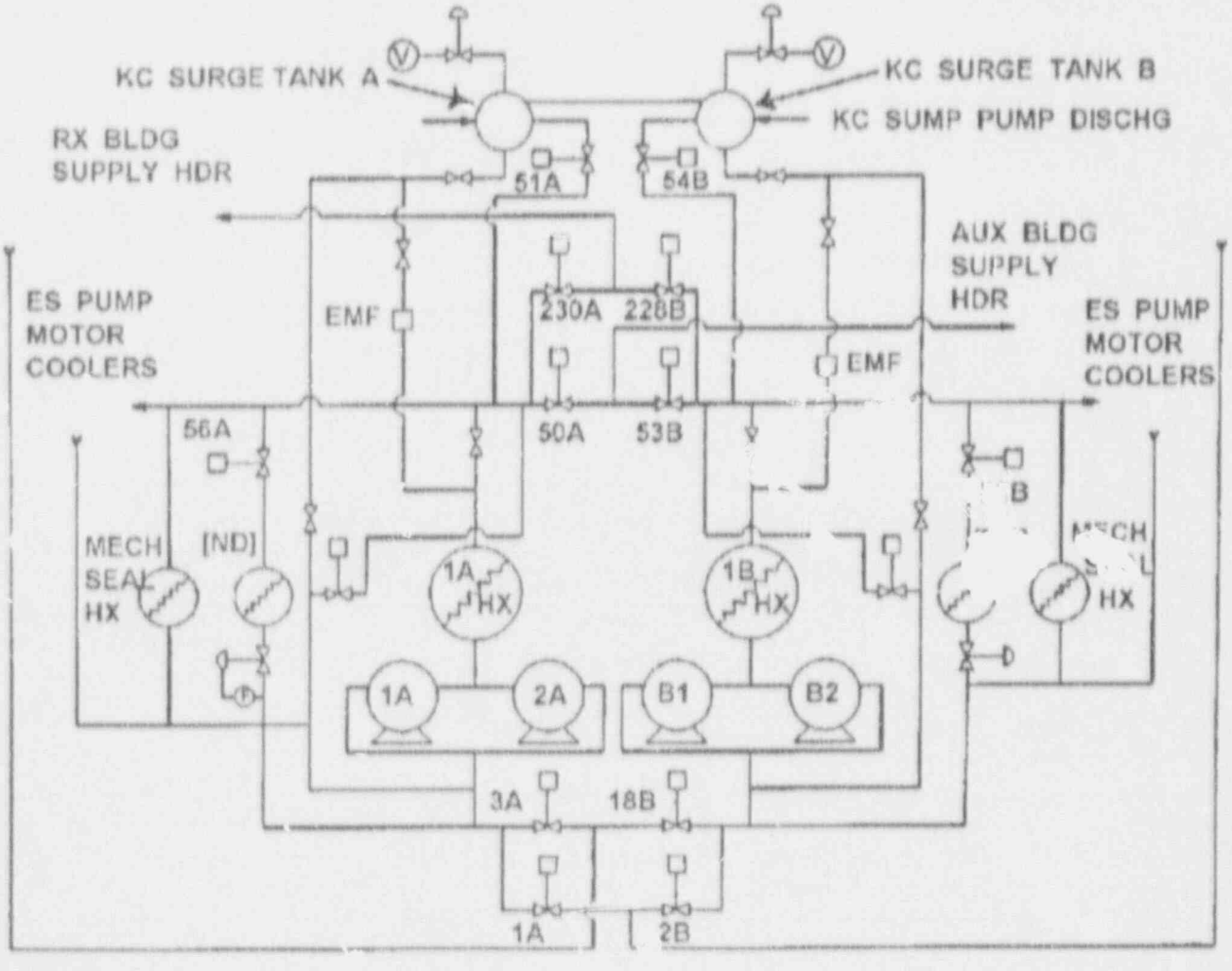
Which ONE [1] of the following reasons explains why Corponent Cooling [KC] valves 56A and 81B [ND Heat Exchanger Inlets] open on Lo FWST level following Ss [Safety Injection]? [Refer To KC drawing below]

a. Prevent ND pump runout in the event of loss of one train.

b. Prevent KC pump runout in the event of loss of one train.

c. Prevent water hammer in the ND System.

d. Prevent water hammer in the KC system.



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QUESTION: 054 (1.00)

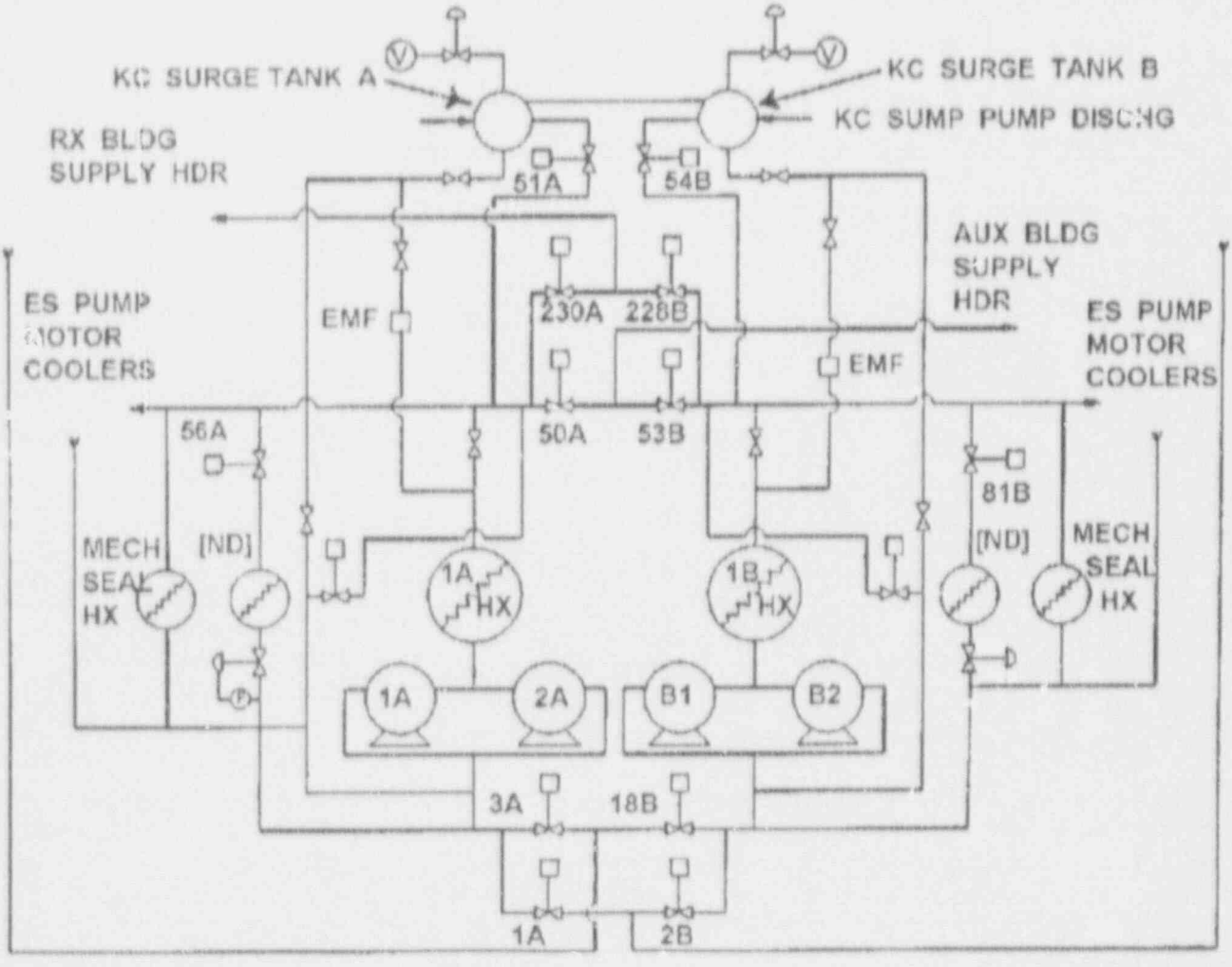
Which ONE [1] of the following statements describes how Component Cooling [KC] system valves align in response to an Sp [Phase B] signal following an Ss [Safety Injection] signal? [Refer to KC drawing below]

a. KC valves 1A, 3A, 50A and 230A open.

b. KC valves 2B, 53B open and 18B and 228B close.

c. KC valves 2B, 53B close and 3A and 230A open.

d. KC valves 2B, 18B, 53B and 228B close.



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QUESTION: 055 (1.00)

Which ONE [1] of the following statements describes a purpose of the Containment Purge [VP] System?

a. Reduce Hydrogen concentration in Containment following a LOCA.

b. Decrease Containment humidity to within acceptable limits for proper operation of refueling instruments.

c. Provide additional cooling to upper Containment during refueling.

d. Reduce fission product concentrations in Containment atmosphere to acceptable limits for personnel access.

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QUESTION: 056 (1.00)

The following plant conditions exist:

- A reactor trip has occurred from 80% power on Unit 2.
- Reactor Trip Breaker "B" failed to open.

Which ONE [1] of the following statements describes how the Steam Dump Control System will respond?

	Plant Trip Controller	Load Rejection Controller	Condenser Dumps	Atmospheric Dumps
a.	Enabled	Enabled	Armed	Armed
b.	Enabled	Not Enabled	Not Armed	Armed
c.	Not Enabled	Enabled	Armed	Not Armed
d.	Not Enabled	Not Enabled	Not Armed	Not Armed

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QUESTION: 057 (1.00)

Which ONE [1] of the following describes when the Individual Control Bank Positions on the Bank Selector Switch may be used?

a. During an emergency and test operations.

b. When less than 15% power during reactor startup or shutdown.

c. During normal operation greater than 15% power.

d. When adjusting rod height to compensate for a dropped rod and manually shutting down the reactor.

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QUESTION: 058 (1.00)

Control Rod F8 has been determined to be trippable but inoperable due to an open in the lift coil circuit but it is only two steps lower than the remaining rods in the group. Which ONE [1] of the following statements describes the action which must be taken? [TS 3.1.1.1 and 3.1.3.6 are attached]

a. Determine that the Shutdown Margin requirement of TS 3.1.1.1 is satisfied within 1 hour and be in Hot Standby within 6 hours.

b. Reduce turbine power to equal to or less than 75% of Rated Thermal Power within 1 hour and reduce the HI Neutron Flux Trip Setpoint to 85% within the following 4 hours.

c. Determine the Shutdown Margin of TS 3.1.1.1 at least once every 12 hours and that FN Delta H is within limits.

d. Maintain the remaining rods in the group within plus or minus 12 steps of F8 while maintaining the rod sequence and insertion limits of TS 3.1.3.6 during subsequent operation.

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QUESTION: 059 (1.00)

The following plant conditions exist on Unit 1:

- Reactor power is 40%.
- Control Bank rod B-4 has dropped.

Which ONE [1] of the following actions will cause a "Rod Control Urgent Failure" alarm actuation during the dropped rod recovery?

a. Placing Rod Control in manual.

b. Resetting the P/A converter to zero.

c. Withdrawing Rod B-4 to its bank position.

d. Placing the lift coil disconnect switches for the remaining rods in the control group to off.

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QUESTION: 060 (1.00)

The following plant conditions exist on Unit 1:

- Reactor power is 43%.
- "RPI AT BOTTOM ROD DROP" in alarm.
- "RPI TWO OR MORE RODS AT BOTTOM" in alarm.
- Bank D control rods stepping out in automatic.
- Tave 3 degrees F below Tref.
- "COMPARATOR P/R CHANNEL DEVIATION" in alarm.

Which ONE [1] of the following statements describes the IMMEDIATE ACTION to be taken?

a. Manually trip the reactor and enter EP/1/A/5000/01, "Reactor Trip or Safety Injection".

b. Place rod control in manual and withdraw control rods as necessary to match Tave and Tref.

c. Place rod control in manual and increase turbine load to maintain Tave and Tref matched.

d. Place rod control in manual and stop any turbine load changes in progress.

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QUESTION: 061 (1.00)

Which ONE [1] of the following responses would be an indication of a control bank failure to move during a power increase from 50% power to 100% power with rod control in automatic?

a. "ROD CONTROL SYS URGENT FAILURE" in alarm.

b. Increasing Tavg and possible "NC SYS HI/LO TAVG" in alarm.

c. High pressurizer level indication and possible alarm.

d. "ROD CONTROL SYS NON-URGENT FAILURE" in alarm.

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QUESTION: 062 (1.00)

The following plant condition exist on Unit 1:

- Recovery from a LOCA is in progress.
- Ss has been terminated.
- Imminent PTS Condition [EP2D1] exists.

Which ONE [1] of the following conditions requires manual reinitiation of Safety Injection by the operator?

a. Pressurizer level less than 5%.

b. NC subcooling greater than 50 degrees F.

c. Core Exit thermocouple readings greater than 700 degrees F.

d. All non-faulted steam generator narrow range levels greater than 82%.

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QUESTION: 063 (1.00)

Which ONE [1] of the following times describes the time interval after a LOCA that ND and NI pumps are aligned for Hot Leg Recirculation?

a. 4 hours.

b. 9 hours.

c. 12 hours.

d. 15 hours.

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QUESTION: 064 (1.00)

The following plant conditions exist on Unit 1:

- Reactor Trip has just occurred.
- Operators are performing the actions of EP-01, "Reactor Trip or Safety Injection".
- "Ice Condenser Doors Open" is in alarm.

Which ONE [1] of the following procedures should the operators be directed to enter?

a. EP-1B, "SI Termination Following Spurious Safety Injection".

b. EP-1C, "High Energy Line Break Inside Containment".

c. EP-1D, "Steamline Break Outside Containment".

d. EP-1E, "Steam Generator Tube Rupture".

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QUESTION: 065 (1.00)

AP/1/A/5500/08 "Malfunction of Reactor Coolant Pump" Immediate Action directs operators to trip an NC Pump if the Pump Lower Bearing Temperature is 225 degrees F or greater. Which ONE [1] of the following reasons explains why the NC pump is tripped if the Pump Bearing Temperature Limit is exceeded?

a. Minimize the risk of melting bearing babitted surfaces and impair NCP coastdown.

b. Reduce the possibility of seal leakoff flashing to steam and damaging the NCP seals.

c. Increased bearing friction may result in uncontrolled rise in bearing temperatures.

d. Minimize the risk of an NC Pump Lube Oil fire.

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QUESTION: 066 (1.00)

The following Unit 1 plant conditions exist:

- Operating in accordance with OP/1/A/6100/03 "Controlling Procedure For Unit Operation".
- Reactor power is 18% proceeding to 85%.
- NC [Reactor Coolant] Pump 1A was tripped when the 1B Pump Lower Bearing Temperature exceeded the alarm setpoint.
- The operator recognized that the wrong NC pump was tripped and tripped NC Pump 1A.

Which ONE [1] of the following actions is required to be performed?

a. Start NC Pump 1B in accordance with OP-6150/02A "NC Pump Operation".

b. Enter OP/1/A/6100/02 "Controlling Procedure For Unit Shutdown".

c. Ensure the reactor tripped and go to EP/1/A/5000/1 "Reactor Trip or Safety Injection".

d. Enter Technical Specification 3.0.3.

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QUESTION: 067 (1.00)

The following plant conditions exist:

- A normal plant cooldown is in progress.
- The computer alarm for the KC Surge Tank indicates a need for makeup from the demineralized water system.
- The water level in Surge Tank 1A is slowly DECREASING.
- Locally, there is no apparent cause for the decreasing surge tank level.
- The associated makeup valve to surge tank 1A is fully open.

Which ONE [1] of the following explanations is the cause of decreasing surge tank level?

a. There is a leak in the KC heat exchanger.

b. There is a leak in the Letdown heat exchanger.

c. There is a leak in the Reactor Coolant Pump Thermal barrier heat exchanger.

d. The plant cooldown rate is excessive.

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QUESTION: 068 (1.00)

When responding to an ATWS condition in accordance with EP/1/A/5000/2A1 "Nuclear Power Generation/ATWS", which ONE [1] of the following reasons explains why Pressurizer pressure is verified to be less than the PORV setpoint?

a. Ensures that a LOCA will not be created by a faulty PZR PORV.

b. Ensures that the PZR PORVs have shut after opening to reduce NC pressure following tripping the turbine.

c. Allows sufficient boration flow rate to the NC system.

d. Prevent reactor pressure from exceeding safety limits during an overpressure transient.

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QUESTION: 069 (1.00)

The following plant conditions exist on Unit 2:

- The plant is operating at 83% power.
- A control rod drops into the core.
- One Negative Rate Trip Bistable light is lit.
- About one minute later a second rod drops into the core in another quadrant.
- A second Negative Rate Trip Bistable light is actuated.
- Power and Tave have decreased slightly but otherwise operations are undisturbed.

Which ONE [1] of the following actions should be taken?

a. Trip the reactor and enter EP/2/A/5000/01 "Reactor Trip or Safety Injection".

b. Reduce power in accordance with OP/2/A/6100/03 "Controlling Procedure for Unit Operation" in preparation for entering OP/2/A/6100/02 "Controlling Procedure For Unit Shutdown".

c. Recover the dropped rods in accordance with AP/2/A/5500/14 "Control Rod Misalignment".

d. Reduce power and enter AP/2/A/5500/16 "Case IV, Power Range Malfunction".

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QUESTION: 070 (1.00)

The following plant conditions exist on Unit 1:

- The plant has experienced a main steamline rupture.
- EP/1/A/5000/2D1 "Imminent Pressurized Thermal Shock" has been entered.

Which ONE (1) of the following statements describes the major actions to be taken?

a. Maintain NC System cooldown rate; maintain NC System pressure.

b. Maintain NC System cooldown rate; depressurize NC System.

c. Stop NC System cooldown; maintain NC System pressure.

d. Stop NC System cooldown; depressurize NC System.

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QUESTION: 071 (1.00)

The following plant conditions exist:

- Unit 1 is at 95% power increasing to 100% power in accordance with OP/1/A/6100/03 "Controlling Procedure For Unit Operation".
- AP/1/A/5500/23 "Loss of Condenser Vacuum" was entered due to Condenser vacuum indication DECREASING.
- Condenser vacuum is currently stable at 24.5 inches of Hg.
- Exhaust Hood Temperature is 228 degrees F and decreasing slowly.

Which ONE (1) of the following actions should be taken?

a. Trip the turbine; trip the reactor; enter EP/1/A/5000/01 "Reactor Trip or Safety Injection".

b. Trip the turbine; enter AP/1/A/5500/02 "Turbine Generator Trip".

c. Stop the power increase and reduce power in accordance with OP/1/A/6100/03 "Controlling Procedure For Unit Operation" Enclosure 4.2 "Power Decrease".

d. Increase load per OP/1/B/6300/01 "Turbine Generator".

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QUESTION: 072 (1.00)

Which ONE [1] of the following statements describes the result of taking Inverter 1EIB Manual Bypass Switch to the "BYPASS" position with the "IN SYNC" light not lit?

a. There is no power on the alternate source; therefore power would be lost to 1ERPB.

b. Since the "IN SYNC" light must be lit before the switch can be moved, the switch would not operate.

c. Since 1ERPB and 1VRD would momentarily be connected out of phase, the switch would probably be damaged.

d. The switch would operate; but the connection would not be transferred because the Kirk-key interlock has not been made.

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QUESTION: 073 (1.00)

During an authorized release of liquid waste, EMF-49 alarms. Which ONE [1] of the following statements describes the action to be taken by the operator?

a. Reset the alarm and wait to see if the alarm returns.

b. Write a work request to have the alarm checked by IAE.

c. Notify Operations Duty Engineer of the alarm condition.

d. Ensure automatic actions occurred.

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QUESTION: 074 (1.00)

Which ONE [1] of the following descriptions identifies the location of a fire which would automatically actuate a Halon Fire Protection System?

a. Operator's Storage Rooms.

b. Document Control Storage Area.

c. Cable Room Corridors on Units 1 & 2.

d. Steam Production Office Building.

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QUESTION: 075 (1.00)

Which ONE [1] of the following individuals becomes the Fire Captain when a fire is reported on-site?

a. Superintendent of Operations.

b. Safety Associate/Specialist, Fire Protection.

c. Shift Supervisor.

d. Assistant Shift Supervisor.

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QUESTION: 076 (1.00)

The following plant conditions exist:

- EP/1/A/5000/2C1 "Loss of Secondary Heat Sink" has been entered.
- Feedwater flow cannot be established.

Which ONE [1] of the following feed and bleed paths will be used?

a. Feeding to the Steam Generators [S/Gs] and using steam dump to bleed steam.

b. Feeding to NC [Reactor Coolant] System and using Pressurizer PORVs to bleed steam.

c. Feeding to NC System and using Normal Letdown to bleed the NC System.

d. Feeding to the S/Gs and using S/G PORVs to bleed steam.

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QUESTION: 077 (1.00)

If EP/1/A/5000/2C1 "Loss of Secondary Heat Sink" has been entered, which ONE [1] of the following reasons explains why NC [Reactor Coolant] Pumps are stopped in loops with Steam Generator wide range level less than 5%?

a. Stops adding unnecessary heat.

b. Prevent NC Pump seal damage due to steam formation in the Number 1 Seal.

c. Allows restoration of feed to the Steam Generator.

d. Allows cooling the associated loop by natural circulation.

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QUESTION: 078 (1.00)

When operating in accordance with EP/1/A/5000/2C1 "Loss Of Secondary Heat Sink", which ONE [1] of the following reasons explain why subcooling and CETs [Core Exit Thermocouples] are monitored throughout the procedure?

a. They provide the feed and bleed initiation criteria.

b. They provide the criteria for exiting from EP2C1.

c. They provide the criteria for securing the reactor coolant pumps.

d. They provide the criteria for feeding the steam generators from the RN System.

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QUESTION: 079 (1.00)

NC [Reactor Coolant] System activity has ranged from 1.1 microCuries per gram dose equivalent I-131 to 1.5 microCuries per gram dose equivalent I-131 for the last 48 continuous hours. Which ONE [1] of the following actions should be taken? [Technical Specification 3.4.8 is attached]

a. Shutdown the reactor to Hot Standby and notify the NRC.

b. Trip the reactor; enter EP/1/A/5000/1 "Reactor Trip or Safety Injection"; and notify the NRC.

c. Reduce reactor power to less than 75% and notify the NRC.

d. Reduce reactor power to 50% and notify the NRC if activity increases.

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QUESTION: 080 (1.00)

If EP/1/A/5000/1A1 "Natural Circulation Cooldown" has been entered from EP/1/A/5000/1A "Reactor Trip Response", which ONE (1) of the following indications is used to determine when to stop NC (Reactor Coolant) System depressurization and allow further upper head cooling?

a. All T-HOTs greater than 200 degrees F.

b. All NC wide range temperatures greater than 200 degrees F.

c. Reactor Vessel UR level less than 97%.

d. NC subcooling greater than 65 degrees F with all CRD vent fans on.

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QUESTION: 081 (1.00)

EP/1/A/5000/01 "Reactor Trip or Safety Injection" Step 3 Action/Expected Response reads:

Verify either 1ETA or 1ETB is energized.

Which ONE [1] of the following statements describes how 1ETA or 1ETB are verified energized?

a. ETA or ETB Line Voltage equal to or greater than 4160 volts.

b. Diesel Generator A and B Blackout Load Sequencer Actuated Status Lights are dark.

c. ETA and ETB Normal or Standby incoming breaker amps are greater than 0.

d. ETA and ETB X, Y, and Z Phase UV Status Lights are dark.

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QUESTION: 082 (1.00)

The following plant conditions exist on Unit 1:

- Reactor is shutdown in Mode 3.
- Pressurizer level is 63%.
- NC [Reactor Coolant] System pressure is 1385 psig.
- PRT [Pressurizer Relief Tank] pressure is 6 psig.

If one pressurizer PORV is leaking slightly, which ONE [1] of the following temperatures will be indicated on the Relief Valve discharge RTD [1NCRD 5940]?

a. 247 degrees F.

b. 263 degrees F.

c. 275 degrees F.

d. 282 degrees F.

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QUESTION: 083 (1.00)

EP/1/A/5000/1A1 "Natural Circulation Cooldown" Step 11 directs the operators to:

Monitor NC System cooldown.

Which ONE [1] of the following sets of indications demonstrate existence of adequate natural circulation?

a. Core exit thermocoup'es decreasing; T-HOT decreasing; NC subcooling increasing.

b. Core exit thermocouples decreasing; T-HOT decreasing; NC subcooling decreasing.

c. T-HOT steady or increasing slowly; T-COLD decreasing; NC subcooling increasing.

d. Core exit thermocouples steady or increasing slowly; Steam Generator pressure decreasing; NC subcooling decreasing.

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QUESTION: 084 (1.00)

The following Unit 1 conditions exist following a Ss [Safety Injection]:

- NCS pressure is 1050 psig.
- Tave is 557 degrees F.
- All ESF Monitor Panel lights are properly LIT.
- Containment Pressure is 2.8 psig.
- EMF53A [B] indicates 4 R/hr.
- NV/SI flow is 500 gpm.
- NCS boron is 500 ppm.
- Core Burnup is 200 EFPD.

Which ONE [1] of the following actions should be performed by the operator?

a. Borate the NCS to 850 ppm Boron for proper SDM prior to cooldown to less than 200 degrees F NC Wide Range Temperature.

b. Ensure NV-202 and NV-203 are open.

c. Secure NS Pumps that are in service.

d. Secure all NC pumps.

MASTER COPY

QUESTION: 085 (1.00)

Which ONE [1] of the following contains indications that are listed in AP/1/A/5500/12 "Loss of Charging or Letdown" as symptoms of a Loss of Charging?

a. "NCP SEAL WATER LO FLOW" alarm LIT and 'VCT LO LEVEL" alarm LIT.

b. "CHARGING LINE HI/LO FLOW" alarm LIT and "PZR HI LEVEL DEV CONTROL" alarm LIT.

c. "CHARGING LINE HI/LO FLOW" alarm LIT and "REGEN HX LETDN HI TEMP" alarm LIT.

d. "PZR HI LEVEL DEV CONTROL" alarm LIT and "VCT LO LEVEL" alarm LIT.

MASTER COPY

QUESTION: 086 (1.00)

The following plant conditions exist:

- Unit 1 is in Mode 3.
- NC [Reactor Coolant] pressure is 950 psig.
- NC temperature is 455 degrees F and rising slowly.
- All NC Pumps are operating.
- #1 Seal leakoff is 0.9 gpm per pump.
- Seal injection flow is 7.9 gpm per pump.
- #1 Seal leakoff temperature on NC Pump A is 205 degrees F and rising slowly.

Which ONE [1] of the following actions should be taken?

a. Open the #1 Seal bypass valve.

b. Stop NC Pump A.

c. Increase Seal injection flow.

d. Lower the temperature of the KC [Component Cooling] Water.

MASTER COPY

QUESTION: 087 (1.00)

The following Unit 1 plant conditions exist:

- Shutdown in Mode 4.
- Pressurizer level is decreasing slowly.
- NC [Reactor Coolant] pressure is decreasing slowly.
- ND [Residual Heat Removal] flow is high.
- "ND & NS ROOMS SUMP LEVEL EMERG HI" is in alarm.

Which ONE [1] of the following IMMEDIATE ACTIONS must be performed?

a. Secure operating ND pump[s] and SHUT ND System suction and discharge valves to the NC System.

b. Secure operating ND and NC pump[s].

c. Secure operating ND pump[s] and manually initiate Phase A isolation.

d. Secure operating ND and NC pump[s] and manually initiate Phase B isolation.

MASTER COPY

QUESTION: 088 (1.00)

During Mode 1 operation, with the Pressure Control Selector Switch selected to the 1-2 position, which ONE [1] of the following statements describes the effects of Pressurizer Pressure Control Channel I failing LOW? [NOTE: Assume no operator action is taken]

a. All heaters on; PORV NC34 blocked; NC pressure rises; PORVs 32 & 36 open; NC pressure modulates between 2235 and 2315 psig.

b. Sprays full on; PORV 34 opens; PORV 34 closes at 2185 psig; Low Pressure Reactor Trip at 1945 psig; Low Pressure SI at 1845 psig.

c. All heaters on; PORV 32 & 36 open; PORV 32 & 36 close at 2185 psig; spray valves modulate NC pressure between 2260 and 2310 psig.

d. Sprays full on; PORVs 32 & 36 blocked; all heaters on at 2210 psig; heaters modulate to maintain NC pressure between 2210 and 2218 psig.

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QUESTION: 089 (1.00)

The following plant conditions exist:

- Unit 1 is in Mode 2.
- Source Range N31 indicates 1.2 x 10E4 cps.
- Intermediate Range N35 indicates 1.1 x 10E-10 amps.
- Intermediate Range N36 indicates 9 x 10E-11 amps.
- Control Rod Bank C is being withdrawn to criticality.
- Source Range N32 fails off-scale low

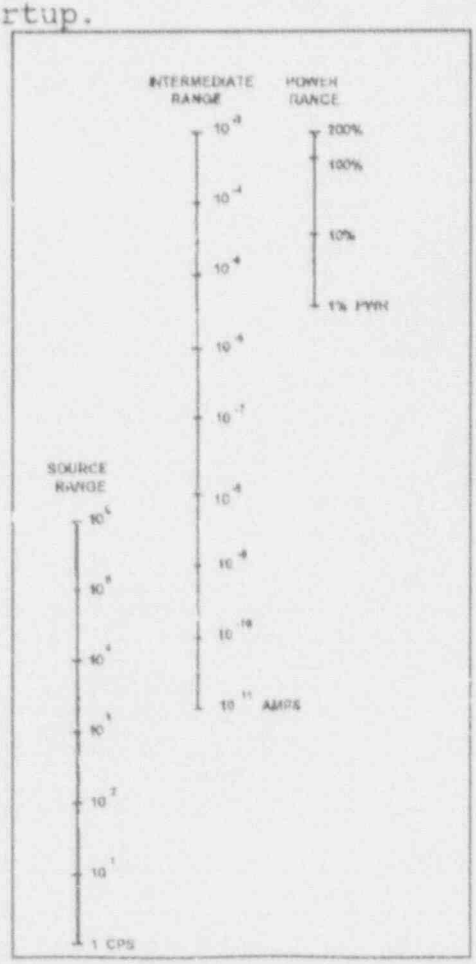
Which ONE [1] of the following actions should be performed? [See figure below] [Technical Specification 3.3.1 is attached]

a. Suspend all operations involving positive reactivity changes.

b. Restore Source Range Channel N32 to OPERABLE within 48 hours or open the Reactor Trip Breakers within the next hour.

c. Block both Channels of Source Range High Level Reactor Trip and continue the startup.

d. Place Source Range Channel N31 in the tripped position and continue the startup.



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QUESTION: 090 (1.00)

The following plant conditions exist:

- Reactor startup is in progress.
- Source Range Channel N31 indicates 7E3 cps.
- Source Range Channel N32 indicates 8E3 cps.
- Intermediate Range Channel N35 indicates 3E-11 amps.
- Intermediate Range Channel N36 indicates 1.5E-10 amps.

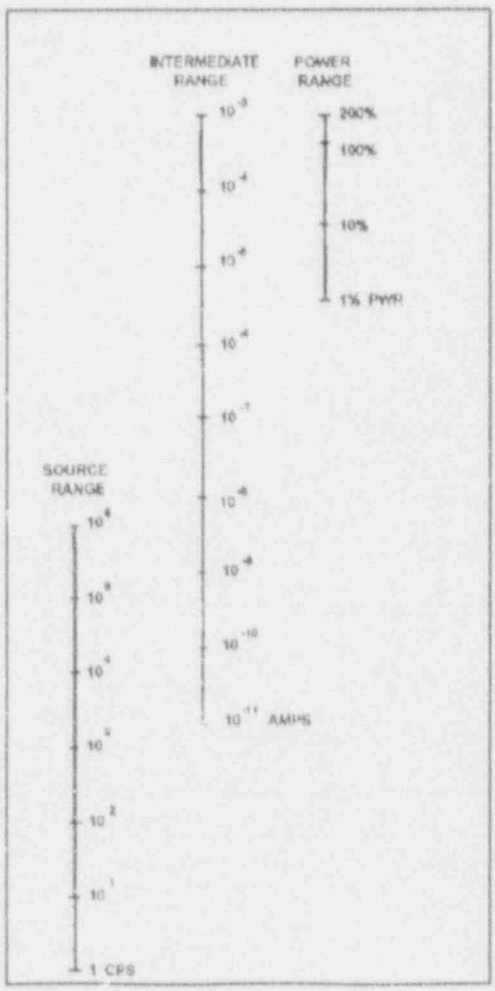
Which ONE [1] of the following statements describes the status of the nuclear instruments? [Note: Figure CN-IC-ENB-3 below]

a. N35 is over compensated.

b. N35 is under compensated.

c. N36 is over compensated.

d. N36 is under compensated.



MASTER COPY

QUESTION: 091 (1.00)

Which ONE [1] of the following reasons describes the basis for maintaining the pressure in a ruptured S/G [Steam Generator] less than 1125 psig?

a. Provide a margin to lifting the steam line safety valves.

b. Minimize secondary system contamination from the NC [Reactor Coolant] System.

c. Prevent excessive cooldown of the NC System from overfeeding the S/G.

d. Allow NC System depressurization and rapid equalizing with S/G pressure.

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QUESTION: 092 (1.00)

The following plant conditions exist:

- AP/1/A/5500/06 "Loss of S/G Feedwater" was entered due to a loss of feedwater supply to the S/Gs.
- Case II actions of AP06 have been completed through Step 14.C.
- Hotwell levels are 0.22 feet W.C.
- CA flow is 590 gpm.

Which ONE [1] of the following actions should be performed? [NOTE: AP/1/A/5500/06 is attached]

a. Shift CA suction to the CACST and UST.

b. Isolate RN from the CA Pump suction.

c. Run only one CA Pump.

d. Stop all CA Pumps.

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QUESTION: 093 (1.00)

Which ONE [1] of the following conditions must be satisfied before blackout switchgear control power may be swapped back from the alternate supply to the normal supply?

a. The undervoltage relay on CDA must be reset.

b. 250 VDC Battery 1DPB or 2DPB breakers are closed.

c. Supply breakers to 4160 & 600V control power and CAPT control power are closed.

d. Battery charger ECA has its AC input and DC output breakers closed.

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QUESTION: 094 (1.00)

Which ONE [1] of the following reasons describes the MOST LIKELY cause of a reactor trip during a sustained loss of Instrument Air.

a. NC [Reactor Coolant] Low Pressure due to excessive cooldown from S/G [Steam Generator] PORVs failing open.

b. S/G Lo Lo Level due to CF [Main Feed] control valves failing closed.

c. NC High Pressure due to failure of pressurizer spray.

d. Pressurizer High Level due to failure of Steam Dumps to operate.

MASTER COPY

QUESTION: 095 (1.00)

Which ONE [1] of the following indications is used to determine the position of VS-78 [VS to VI] in AP/0/A/5500/22 "Loss of VI"?

a. Valve stem.

b. Local indicating light.

c. MC13 in CR OPEN/CLOSE indication.

d. OAC point.

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QUESTION: 096 (1.00)

In addition to ensuring the Unit 2 Control Operator is notified, which ONE [1] of the following actions must be performed immediately if Instrument Air pressure falls to the low pressure alarm setpoint on Unit 1?

a. Dispatch operators to VI [Instrument Air] compressor panels to verify proper compressor operation and to start the backup temporary VI compressor.

b. Dispatch operators to VI compressor panels to verify proper compressor operation and dispatch operators to locate and isolate the leak on the VI system.

c. Dispatch operators to locate and isolate the leak on the VI system and start the backup temporary VI compressor.

d. Dispatch operators to isolate the leak on the VI system and to open 1VS-78 locally.

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QUESTION: 097 (1.00)

The following plant conditions exist:

- Reactor power is 90%.
- Pressurizer Level Control Switch is in Position 1-2.
- Letdown isolated.
- Pressurizer heaters are off.
- Pressurizer level is increasing.
- Charging flow has increased to maximum.

Which ONE [1] of the following reasons explain the cause of the indication listed above?

a. Level II has failed high.

b. Level I has failed high.

c. Level I has failed low.

d. Level II has failed low.

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QUESTION: 098 (1.00)

Which ONE [1] of the following statements describes the entry conditions to EP3B "Loss of All AC Power Recovery With S/I Required" from EP03 "Loss of All AC Power"?

a. Power restored to either 1ETA or 1ETB and greater than 0 degree F subcooling, greater than 5% Pressurizer level and no auto SI.

b. Power restored to either 1ETA or 1ETB or greater than 0 degree F subcooling, greater than 5% Pressurizer level and no auto SI.

c. Power restored to either 1ETA or 1ETB and no subcooling or Pressurizer level greater than 5% or auto SI present.

d. Power restored to either 1ETA or 1ETB or no subcooling or Pressurizer level greater than 5% or auto SI present.

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QUESTION: 099 (1.00)

Two of the Immediate Actions for a Loss of All AC Power are:

- Manua Trip Reactor and Verify Reactor Trip.
- Verify Turbine Trip.

Which ONE [1] of the following statements lists the remaining IMMEDIATE ACTIONS?

a. Verify D/G [Diesel Generator] status.

b. Verify D/G status, dispatch 2 operators to establish NC [Reactor Coolant] Pump Seal injection.

c. Verify D/G status, dispatch 2 operators to establish NC Pump Seal injection, verify NC System isolated.

d. Verify D/G status, dispatch 2 operators to establish NC Pump Seal injection, verify NC System isolated, Ensure RN flow to D/G.

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(********** END OF EXAMINATION **********)

ANSWER: 001 (1.00)

b.

REFERENCE:

OP-CN-ADM-SD, Rev. 09/06-09-92/ELR, Page 30, Para. G.1.& 2.

KA 194001K101 [3.6/3.7]

Both RO and SRO

194001K101 ..(KA's)

ANSWER: 002 (1.00)

d.

REFERENCE:

OMP 2-18, Rev. 31, Page 2, Para. 3.3.C.

KA 194001K101 [3.6/3.7]

Both RO and SRO

194001K101 ..(KA's)

ANSWER: 003 (1.00)

a.

MASTER COPY

REFERENCE:

OP-CN-ADM-SD, Rev. 09/06-09-92/ELR, Page 13, Para. 4.a/c

KA 194001K102 [3.7/4.1]

SRO only

194001K102 ..(KA's)

ANSWER: 004 (1.00)

b.

REFERENCE:

CNS Directive 3.8.6 [TS], Rev. 22, Page 3, Para. 4.1, Page 4, Para. 4.4

KA 194001K103 [2.8/3.4]

Both RO and SRO

194001K103 ..(KA's)

ANSWER: 005 (1.00)

a.

REFERENCE:

CNS Directive 3.8.8, Rev. 27, page 16, Para. 5.17.2 & 5.17.4

KA 194001K104 [3.3/3.5]

Both RO and SRO

194001K104 ..(KA's)

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ANSWER: 006 (1.00)

d.

REFERENCE:

CNS Directive 3.8.5 [TS], Revision 18, Page 3, Para. 6.1.4.

KA 194001K104 [3.3/3.5]

Both RO and SRO

194001K104 ..(KA's)

ANSWER: 007 (1.00)

d.

REFERENCE:

Response Procedures RP-04 and RP-05.

KA 194001K104 [3.3/3.5]

SRO only

194001K104 ..(KA's)

ANSWER: 008 (1.00)

b.

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REFERENCE:

OMP 2-9, Rev. 13, Page 16, Para. 10.1

KA 194001K105 [3.1/3.4]

SRO only

194001K105 ..(KA's)

ANSWER: 009 (1.00)

a.

REFERENCE:

SD 2.11.12, Rev. 0

KA 194001K109 [3.4/3.4]

Both RO and SRO

194001K109 ..(KA's)

ANSWER: 010 (1.00)

c.

REFERENCE:

OMP 2-21, Rev. 11, Page 7, Para. 11.14.

KA 194001A104 [3.0/3.2]

SRO only

194001A104 ..(KA's)

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ANSWER: 011 (1.00)

a.

REFERENCE:

OMP 2-17, Rev. 23, Page 2, Para. 6.1.C.

KA 194001A106 [3.4/3.4]

Both RO and SRO

194001A106 ..(KA's)

ANSWER: 012 (1.00)

c.

REFERENCE:

OMP 2-10, Rev. 2, Page 6, Para. 8.5.A&B.

KA 194001A107 [2.5/3.2]

Both RO and SRO

194001A107 ..(KA's)

ANSWER: 013 (1.00)

a.

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REFERENCE:

OMP 2-11, Rev. 16, Page 2, Para. 4.4 and Page 3, Para. 6.1.

KA 194001A109 [2.7/3.9]

Both RO and SRO

194001A109 ..(KA's)

ANSWER: 014 (1.00)

d.

REFERENCE:

OMP 2-16, Rev. 12, Page 4, Para. 6.0.H.

KA 194001A109 [2.7/3.9]

Both RO and SRO

194001A109 ..(KA's)

ANSWER: 015 (1.00)

c.

REFERENCE:

OMP 1-8, Rev. 18, Page 11, Para. 10.1.
CN-OP-ADM-OMP, Rev. 09/03-23-92/SWH, Page 23, Para. f.2.

KA 194001A111 [2.8/4.1]

Both RO and SRO

194001A111 ..(KA's)

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ANSWER: 016 (1.00)

b.

REFERENCE:

RP/0/A/5000/06, Change 5 to Retype #6,, Page 1, Para. 2.1.

KA 194001A116 [3.1/3.4]

SRO only

194001A116 ..(KA's)

ANSWER: 017 (1.00)

c.

REFERENCE:

RP/0/A/5000/10, Page 1, Para. 1.1.

KA 194001A116 [3.1/4.4]

SRO only

194001A116 ..(KA's)

ANSWER: 018 (1.00)

c.

MASTER COPY

REFERENCE:

OP-CN-IC-IRE, Rev. 07/03-16-92/GFW, Page 19, Para. 8.d.

KA 001000K103 [3.4/3.6]

Both RO and SRO

001000K103 ..(KA's)

ANSWER: 019 (1.00)

d.

REFERENCE:

OP-CN-IC-IRE, Rev. 07/03-16-92/GFW, Page 10, Para. C.1.

KA 001000K558 [2.7/3.2]

Both RO and SRO

001000K558 ..(KA's)

ANSWER: 020 (1.00)

d.

REFERENCE:

Technical Specification, page B 3/4 1-4.

KA 001000G006 [2.9/3.8]

SRO only

001000G006 ..(KA's)

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ANSWER: 021 (1.00)

b.

REFERENCE:

OP-CN-CNT-CNT, Rev. 10/06-02-92/JWH, Page 28, Para. 2.4.B.2
Catawba Exam Bank Question NCP-13

KA 003000K201 [3.1/3.1]

Both RO and SRO

003000K201 ..(KA's)

ANSWER: 022 (1.00)

a.

REFERENCE:

Technical Specification Bases, Page B 3/4 4-1

KA 003000G006 [2.7/3.8]

Both RO and SRO

003000G006 ..(KA's)

ANSWER: 023 (1.00)

c.

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REFERENCE:

OP-CN-PSS-KC, Rev. 1° 03-03-92/GFW, Page 9, Para. B.3.a.
OP-CN-PS-NV, Rev. 04/04-10-92/PEV, Page 25, Para. B.14.0.3.

KA 004000A401 [3.8/3 9]

Both RO and SRO

004000A401 ..(KA's)

ANSWER: 024 (1.00)

d.

REFERENCE:

OP-CN-PS-NV, Rev. 04/04-10-92/PEV, Page 26, Para. 5.c
Catawba Examination Bank Question NV-89

KA 004010A205 [4.1/4.3]

Both RO and SRO

004010A205 ..(KA's)

ANSWER: 025 (1.00)

b.

REFERENCE:

OP-CN-ECCS-ISE, Rev. 10/03-11-92/CTK, Page 16, Para. 2.d.

KA 013000A105 [3.4/3.6]

Both RO and SRO

013000A105 ..(KA's)

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ANSWER: 026 (1.00)

a.

REFERENCE:

Catawba Examination Bank Question EDA-15

KA 014000G008 [2.9/3.1]

Both RO and SRO

014000G008 ..(KA's)

ANSWER: 027 (1.00)

b.

REFERENCE:

OP-CN-IC-ENB, DWG CN-IC-ENB-3

KA 015000A303 [3.9/3.9]

Both RO and SRO

015000A303 ..(KA's)

ANSWER: 028 (1.00)

d.

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REFERENCE.

OP-CN-IC-ENB, Rev. 09/03-19-92/JLY, Page 11, Para. H.8.

KA 015000K604 [3.1/3.2]

Both RO and SRO

015000K604 ..(KA's)

ANSWER: 029 (1.00)

a.

REFERENCE:

OP-CN-IC-ENB, Rev. 09/03-19-92/JLY, Page 7, Para. C.5.b.

KA 015000K406 [3.9/4.2]

Both RO and SRO

015000K406 ..(KA's)

ANSWER: 030 (1.00)

b.

REFERENCE:

OP-CN-IC-ENA, Rev. 05/08-05-90/GFW, Page 10, Para. 14.h.

KA 017000K101 [3.2/3.2]

Both RO and SRO

017020K101 ..(KA's)

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ANSWER: 031 (1.00)

d.

REFERENCE:

Catawba Examination Bank Question CNT-VV-9

KA 022000A404 [3.1/3.2]

Both RO and SRO

022000A404 ..(KA's)

ANSWER: 032 (1.00)

a.

REFERENCE:

Catawba Technical Specifications, Page B 3/4 6-5.

KA 025000K301 [3.8/3.8]

Both RO and SRO

025000K301 ..(KA's)

ANSWER: 033 (1.00)

c.

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REFERENCE:

Technical Specification 3.6.2 and 3.0.3.

KA 026000G005 [3.3/3.9]

SRO only

026000G005 ..(KA's)

ANSWER: 034 (1.00)

a.

REFERENCE:

Catawaba Examination Bank Question CA-31

KA 061000A202 [3.2/3.6]

Both RO and SRO

061000A202 ..(KA's)

ANSWER: 035 (1.00)

c.

REFERENCE:

OP/0/B/6350/07, Page 1, Para. 2.4

KA 063000G010 [3.1/3.2]

Both RO and SRO

063000G010 ..(KA's)

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ANSWER: 036 (1.00)

b.

REFERENCE:

OP-CN-WE-EMF, Rev. 09/12-11-91/CTK, Page 12, Para. 2.c.

KA 072000G007 [2.6/2.9]

Both RO and SRO

072000G007 ..(KA's)

ANSWER: 037 (1.00)

b.

REFERENCE:

OP-CN-PS-NC, Rev. 08/02-25-92/GFW, Page 27, Para. 5.b.3.c. and 5.b.4.c.

KA 002000K603 [3.1/3.6]

Both RO and SRO

002000K603 ..(KA's)

ANSWER: 038 (1.00)

a.

MASTER COPY

REFERENCE:

OP-CN-PS-NC, Rev. 08/02-25-92/GFW, Page 30, Para. 2.

KA 002000K403 [2.9/3.2]

SRO only

002000K403 ..(KA's)

ANSWER: 039 (2.00)

a. 1. 4.

2. 8.

b. 1. 2.

2. 5. [0.5 each] [order not specific]

REFERENCE:

Drawing CN-ECCS-NI-7.

KA 006000K409 [3.8/4.1]

SRO only

006000K409 ..(KA's)

ANSWER: 040 (1.00)

c.

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REFERENCE:

Technical Specification Bases, Page B3/4 5-1.

KA 006000G006 [2.9/4.0]

SRO only

006000G006 ..(KA's)

ANSWER: 041 (1.00)

d.

REFERENCE:

OP-CN-PS-IPE, Rev. 04/10-03-90/GFW, Page 17, Para. 2.3.A.

KA 010000K201 [3.0/3.4]

Both RO and SRO

010000K201 ..(KA's)

ANSWER: 042 (1.00)

c.

REFERENCE:

OP-CN-PS-IPE, Rev. 04/10-03-90/GFW, Page 13, Para. 8.C.2

KA 010000A403 [4.0/3.8]

Both RO and SRO

010000A403 ..(KA's)

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ANSWER: 043 (1.00)

a.

REFERENCE:

Catawba Examination Bank Question ILE-26

KA 011000A211 [3.4/3.6]

Both RO and SRO

011000A211 ..(KA's)

ANSWER: 044 (1.00)

b.

REFERENCE:

Catawba Examination Bank Question IPX-30

KA 012000K501 [3.3/3.8]

Both RO and SRO

012000K501 ..(KA's)

ANSWER: 045 (1.00)

a.

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REFERENCE:

Drawing CN-PS-NC-5

KA 016000K101 [3.4/3.4]

Both RO and SRO

016000K101 ..(KA's)

ANSWER: 046 (1.00)

d.

REFERENCE:

OP-CN-CF-IFE, Rev. 06/03-09-92/GFW, Drawing CF-IFE-3

KA 016000A301 [2.9/2.9]

SRO only

016000A301 ..(KA's)

ANSWER: 047 (1.00)

b.

REFERENCE:

O-CN-CNT-VX, Rev. 06/03-10-92/PEV, Page 8, Para. 2.2.C.1

KA 028000A101 [3.4/3.8]

SRO only

028000A101 ..(KA's)

ANSWER: 048 (1.00)

a.

MASTER COPY

REFERENCE:

OP-CN-FH-KF, Rev. 06/11-28-90/GFW, Page 18, Para B.1.b.

KA 033000K303 [3.0/3.3]

Both RO and SRO

033000K303 ..(KA's)

ANSWER: 049 (1.00)

c.

REFERENCE:

OP-CN-STM-SM, Rev. 09/02-06-92/RJF, Page 15, Para 2.a. & b.

KA 039000A302 [3.1/3.5]

Both RO and SRO

039000A302 ..(KA's)

ANSWER: 050 (1.00)

d.

REFERENCE:

OP-CN-DG-EQG, Drawing CN-DG-EQG-12

KA 064000K411 [3.5/4.0]

Both RO and SRO

064000K411 ..(KA's)

ANSWER: 051 (1.00)

c.

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REFERENCE:

OP-CN-SS-RFY, Rev. 02/12-11-89/SMD, Page 22, Para 11.

KA 086000K406 [3.0/3.3]

Both RO and SRO

086000K406 ..(KA's)

ANSWER: 052 (1.00)

a.

REFERENCE:

OP-CN-PS-ND, Rev. 09/02-27-92/GFW, Page 13, Para D.2.d.

KA 005000G007 [3.3/3.4]

SRO only

005000G007 ..(KA's)

ANSWER: 053 (1.00)

b.

REFERENCE:

OP-CN-PSS-KC, Rev. 13/03-03-92/GFW, pages 10 & 11, Para B.3.c.4.

KA 008000K102 [3.3/3.4]

Both RO and SRO

008000K102 ..(KA's)

ANSWER: 054 (1.00)

d.

MASTER COPY

REFERENCE:

OP-CN-PSS-KC, Rev. 13/03-03-92/GFW. Page 10, Para B.3.c.4.a. & b.

KA 008030A304 [3.6/3.7]

Both RO and SRO

008030A304 ..(KA's)

ANSWER: 055 (1.00)

d.

REFERENCE:

Catawba Examination Bank Question VP-6

KA 029000K302 [2.9/3.5]

Both RO and SRO

029000K302 ..(KA's)

ANSWER: 056 (1.00)

c.

REFERENCE:

OP-CN-STM-IDE, Rev. 05/02-25-92/DPM, Page 16, Para 5.5.B.

KA 041020K417 [3.7/3.9]

Both RO and SRO

041020K417 ..(KA's)

ANSWER: 057 (1.00)

a.

MASTER COPY

REFERENCE:

OP-CN-IC-IRE, Rev. 07/03-16-92/GFW, Page 26, Para B.5

KA 000001G007 [3.1/3.3]

SRO only

000001G007 ..(KA's)

ANSWER: 058 (1.00)

d.

REFERENCE:

OP-CN-IC-IRE, Rev. 07/03-16-92/GFW, Page 28, Para 2.6.A.

KA 000001G008 [3.2/3.8]

Both RO and SRO

000001G008 ..(KA's)

ANSWER: 059 (1.00)

c.

REFERENCE:

Catabwa Examination Bank Question IRE-20

KA 000003G005 [3.6/3.6]

SRO only

000003G005 ..(KA's)

ANSWER: 060 (1.00)

d.

MASTER COPY

REFERENCE:

Catabwa Examination bank Question IRE-19

KA 000003G010 [3.9/3.8]

SRO only

000003G010 ..(KA's)

ANSWER: 061 (1.00)

a.

REFERENCE:

Catabwa Examination Bank Question IRE-75

KA 000005G005 [3.1/3.3]

Both RO and SRO

000005G005 ..(KA's)

ANSWER: 062 (1.00)

a.

REFERENCE:

Catabwa Examination Bank Question CSF-42

KA 000011A104 [4.4/4.4]

SRO only

000011A104 ..(KA's)

ANSWER: 063 (1.00)

b.

MASTER COPY

REFERENCE:

Catabwa Examination Bank Question NI-8

KA 000011A111 [4.1/4.2]

SRO only

000011A111 ..(KA's)

ANSWER: 064 (1.00)

b.

REFERENCE:

Catawba Examination Bank Question EP1-45

KA 000011G010 [4.5/4.5]

SRO only

000011G010 ..(KA's)

ANSWER: 065 (1.00)

b.

REFERENCE:

OP-CN-PS-NCP, Rev. 04/09-18-90/GFW, Page 39, Para 2.

KA 000015K207 [2.9/2.9]

Both RO and SRO

000015K207 ..(KA's)

ANSWER: 066 (1.00)

c.

MASTER COPY

REFERENCE:

AP/1/A/5500/04, Retype #7, Page 2, Para C.2

KA 000015G010 [3.4/3.4]

Both RO and SRO

000015G010 ..(KA's)

ANSWER: 067 (1.00)

a.

REFERENCE:

Catawba Examination Bank Question KC-3

KA 000026A105 [3.1/3.1]

Both RO and SRO

000026A105 ..(KA's)

ANSWER: 068 (1.00)

c.

REFERENCE:

OP-CN-EP-CSF, Rev. 11/05-27-92/DPM, Page 11, Para 2.e.3.

KA 000029K312 [4.4/4.7]

Both RO and SRO

000029K312 ..(KA's)

ANSWER: 069 (1.00)

a.

MASTER COPY

REFERENCE:

EP/2/A/5000/01, Retype #13, page 4, Para 3

KA 000029G011 [4.4/4.6]

Both RO and SRO

000029G011 ..(KA's)

ANSWER: 070 (1.00)

d.

REFERENCE:

Catawba Examination Bank Question CSF-60

KA 000040G012 [3.8/4.1]

Both RO and SRO

000040G012 ..(KA's)

ANSWER: 071 (1.00)

b.

REFERENCE:

AP/1/A/5500/23, Retype #6, Page 7, Para 8.b.
OP-CN-MT-MT-1, Rev. 04/12-11-90/GFW, Page 28, Para 5.3.F.

KA 000051A202 [3.9/4.1]

Both RO and SRO

000051A202 ..(KA's)

ANSWER: 072 (1.00)

c.

MASTER COPY

REFERENCE:

OP-CN-EL-EPL, Rev. 04/01-27-92/CWN, Page 16, Para 2.1.G.2

KA 000057A101 [3.7/3.7]

Both RO and SRO

000057A101 ..(KA's)

ANSWER: 073 (1.00)

d.

REFERENCE:

Catawba Examination Bank Question EMF-20

KA 000059A102 [3.3/3.4]

Both RO and SRO

000059A102 ..(KA's)

ANSWER: 074 (1.00)

b.

REFERENCE:

OP-CN-SS-RFY, Rev. 02/12-11-89/SMD, Page 20, Para 2.2.M.2

KA 000067A203 [3.3/3.5]

Both RO and SRO

000067A203 ..(KA's)

ANSWER: 075 (1.00)

d.

MASTER COPY

REFERENCE:

OP-CN-SS-RFY, Rev. 02/12-11-89/SMD, Page 26, Para 2.3.C.3

KA 000067G012 [3.4/3.4]

Both RO and SRO

000067G012 ..(KA's)

ANSWER: 076 (1.00)

b.

REFERENCE:

OP-CN-EP-CSF, Rev. 11/05/27/92/DPM, Page 18, Para k. & m.

KA 000074K103 [4.5/4.9]

Both RO and SRO

000074K103 ..(KA's)

ANSWER: 077 (1.00)

a.

REFERENCE:

OP-CN-EP-CSF, Rev. 11/05-27-92/DPM, Page 17, Para e.

KA 000074K304 [3.9/4.2]

Both RO and SRO

000074K304 ..(KA's)

ANSWER: 078 (1.00)

a.

MASTER COPY

REFERENCE:

OP-CN-EP-CSF, Rev. 11 6-27-92/DPM, Page 17, Para d.

KA 000074K311 [4.0/4.4]

Both RO and SRO

000074K311 ..(KA's)

ANSWER: 079 (1.00)

a.

REFERENCE:

OP-CN-PS-NC, Rev. 08/02-25-92/GFW, Page 33, Para 2.3.A.8.

KA 000076G012 [2.9/3.1]

Both RO and SRO

000076G012 ..(KA's)

ANSWER: 080 (1.00)

c.

REFERENCE:

OP-CN-EP-EP1, Rev. 17/03-30-92/RJK, Page 38, Para ee.
EP/1/A/5000/1A1, Retype #9, Page 18, Para C.1.C.

KA 000007A103 [4.2/4.1]

SRO only

000007A103 ..(KA's)

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ANSWER: 081 (1.00)

d.

REFERENCE:

EP/1/A/5000/01, Retype #13, Page 5, Step 3

KA 000007G010 [4.2/4.1]

Both RO and SRO

000007G010 ..(KA's)

ANSWER: 082 (1.00)

b.

REFERENCE:

OP-CN-PS-NC, Rev. 08/02-25-92/GFW, Page 22, Para 2.2.A.17.

KA 000008K101 [3.2/3.7]

Both RO and SRO

000008K101 ..(KA's)

ANSWER: 083 (1.00)

a.

REFERENCE:

EP/1/A/5000/1A1, Retype #9, Page 6, Step 11

KA 000009A237 [4.2/4.5]

Both RO and SRO

000009A237 ..(KA's)

ANSWER: 084 (1.00)

d.

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REFERENCE:

Catawba Examination Bank Question EP1-53

KA 000011A103 [4.0/4.0]

Both RO and SRO

000011A103 ..(KA's)

ANSWER: 085 (1.00)

c.

REFERENCE:

AP/1/A/5500/12, Retype #5, Page 1 Para B.

KA 000022A102 [3.0/2.9]

SRO only

000022A102 ..(KA's)

ANSWER: 086 (1.00)

a.

REFERENCE:

OP-CN-PS-NCP, Rev. 04/09-18-90, Page 26, Para 2.4.B

KA 000022A109 [3.2/3.3]

SRO only

000022A109 ..(KA's)

ANSWER: 087 (1.00)

b.

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REFERENCE:

AP/1/A/5500/19, Retype #19, Page 17, Para C.1 & 2.
OP-CN-PS-ND, Rev. 09/02-27-92/GFW, Page 24, Para 2.3.J.2

KA 000025G011 [3.6/3.9]

Both RO and SRO

000025G011 ..(KA's)

ANSWER: 088 (1.00)

a.

REFERENCE:

OP-CN-PS-IPE, Rev. 04/10-03-90/GFW, Page 23, Para 2.6.D.2.

KA 000027A218 [3.4/3.5]

Both RO and SRO

000027A218 ..(KA's)

ANSWER: 089 (1.00)

c.

REFERENCE:

OP-CN-[illegible]-ENB, Rev. 09/03-19-92/JLY, Page 7, Para 2.1.C.5.b.

ka 000032G008 [2.8/3.3]

SRO only

000032G008 ..(KA's)

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ANSWER: 090 (1.00)

d.

REFERENCE:

OP-CN-IC-ENB, Rev. 09/03-19-92/JLY, Page 9, Para 2.1.E.2.

KA 000033A202 [3.3/3.6]

Both RO and SRO

000033A202 ..(KA's)

ANSWER: 091 (1.00)

a.

REFERENCE:

OP-CN-EP-EP4, Rev. 11/12-12-91/PEV, Page 12, Para 2.1.B.4

KA 000038K302 [4.4/4.5]

Both RO and SRO

000038K302 ..(KA's)

ANSWER: 092 (1.00)

d.

REFERENCE:

AP/1/A/5500/06, Retype #10, Page 12, Para 2.a.

KA 000054G012 [3.2/3.2]

Both RO and SRO

000054G012 ..(KA's)

ANSWER: 093 (1.00)

c.

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REFERENCE:

Catawba Examination Bank Question EPF-1

KA 000058A101 [3.3/3.5]

Both RO and SRO

000058A101 ..(KA's)

ANSWER: 094 (1.00)

b.

REFERENCE:

OP-CN-SS-VI, Rev. 10/05-21-92/GFW, Page 12, Para 2.1.M.3.c.2.

KA 000065A201 [2.9/3.2]

Both RO and SRO

000065A201 ..(KA's)

ANSWER: 095 (1.00)

d.

REFERENCE:

Catabwa Examination Bank Question VI-55

KA 000065A103 [2.9/3.1]

SRO only

000065A103 ..(KA's)

ANSWER: 096 (1.00)

a.

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REFERENCE:

OP-CN-SS-VI, Rev. 10/05-21-92/GFW, Page 21, Para 2.1.M.3.b.

KA 000065G010 [3.2/3.3]

Both RO and SRO

000065G010 ..(KA's)

ANSWER: 097 (1.00)

c.

REFERENCE:

OP-CN-PS-ILE, Rev. 05/03-23-92/RJK, Page 15, para 2.6.D.1.d.

KA 000028A202 [3.4/3.8]

SRO only

000028A202 ..(KA's)

ANSWER: 098 (1.00)

c.

REFERENCE:

OP-CN-EP-EP5, Rev. 08/07-22-91/CWN, page 19, para 2.3.A

KA 000056K302 [4.4/4.7]

SRO only

000056K302 ..(KA's)

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ANSWER: 099 (1.00)

b.

REFERENCE:

OP-CN-EP-EP5, Rev. 08/07-22-91/CWN, Page 10, Para 2.1.B.3 & 4.

KA 000056G010 [3.7/3.9]

SRO only

000056G010 ..(KA's)

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(********** END OF EXAMINATION **********)

A N S W E R K E Y

MULTIPLE CHOICE

001 b
002 d
003 a
004 b
005 a
006 d
007 d
008 b
009 a
010 c
011 a
012 c
013 a
014 d
015 c
016 b
017 c
018 c
019 d
020 d
021 b
022 a
023 c
024 d
025 b
026 a
027 b
028 d
029 a
030 b
031 d
032 a
033 c
034 a
035 c
036 b
037 b
038 a
039 MATCHING

a 4
2 8
b 2
2 5

MULTIPLE CHOICE

040 c

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A N S W E R K E Y

041	d	064	b
042	c	065	b
043	a	066	c
044	b	067	a
045	a	068	c
046	d	069	a
047	b	070	d
048	a	071	b
049	c	072	c
050	d	073	d
051	c	074	b
052	a	075	d
053	b	076	b
054	d	077	a
055	d	078	a
056	c	079	a
057	a	080	c
058	d	081	d
059	c	082	b
060	d	083	a
061	a	084	d
062	a	085	c
063	b	086	a

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A N S W E R K E Y

087 b

088 a

089 c

090 d

091 a

092 d

093 c

094 b

095 d

096 a

097 c

098 c

099 b

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(********** END OF EXAMINATION **********)

SRO Exam PWR Reactor

Organized by Question Number

QUESTION	VALUE	REFERENCE
001	1.00	9000251
002	1.00	9000252
003	1.00	9000253
004	1.00	9000254
005	1.00	9000255
006	1.00	9000256
007	1.00	9000257
008	1.00	9000258
009	1.00	9000259
010	1.00	9000261
011	1.00	9000262
012	1.00	9000264
013	1.00	9000265
014	1.00	9000266
015	1.00	9000267
016	1.00	9000268
017	1.00	9000269
018	1.00	9000270
019	1.00	9000272
020	1.00	9000274
021	1.00	9000275
022	1.00	9000277
023	1.00	9000278
024	1.00	9000279
025	1.00	9000280
026	1.00	9000282
027	1.00	9000283
028	1.00	9000284
029	1.00	9000285
030	1.00	9000286
031	1.00	9000287
032	1.00	9000288
033	1.00	9000289
034	1.00	9000292
035	1.00	9000294
036	1.00	9000296
037	1.00	9000298
038	1.00	9000299
039	2.00	9000301
040	1.00	9000302
041	1.00	9000303
042	1.00	9000304
043	1.00	9000305
044	1.00	9000306
045	1.00	9000308
046	1.00	9000310
047	1.00	9000311
048	1.00	9000313
049	1.00	9000314

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S R O E x a m P W R R e a c t o r

O r g a n i z e d b y Q u e s t i o n N u m b e r

QUESTION	VALUE	REFERENCE
050	1.00	9000316
051	1.00	9000317
052	1.00	9000319
053	1.00	9000321
054	1.00	9000322
055	1.00	9000324
056	1.00	9000326
057	1.00	9000328
058	1.00	9000329
059	1.00	9000330
060	1.00	9000331
061	1.00	9000332
062	1.00	9000333
063	1.00	9000334
064	1.00	9000335
065	1.00	9000336
066	1.00	9000337
067	1.00	9000338
068	1.00	9000339
069	1.00	9000340
070	1.00	9000341
071	1.00	9000342
072	1.00	9000345
073	1.00	9000346
074	1.00	9000347
075	1.00	9000348
076	1.00	9000349
077	1.00	9000350
078	1.00	9000351
079	1.00	9000352
080	1.00	9000355
081	1.00	9000356
082	1.00	9000357
083	1.00	9000358
084	1.00	9000359
085	1.00	9000361
086	1.00	9000362
087	1.00	9000363
088	1.00	9000364
089	1.00	9000366
090	1.00	9000367
091	1.00	9000368
092	1.00	9000369
093	1.00	9000370
094	1.00	9000371
095	1.00	9000372
096	1.00	9000373
097	1.00	9000374
098	1.00	9000375

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S R O E x a m P W R R e a c t o r

O r g a n i z e d b y Q u e s t i o n N u m b e r

QUESTION	VALUE	REFERENCE
099	1.00	9000377
	100.00	
	100.00	

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S R O E x a m P W R R e a c t o r

O r g a n i z e d b y K A G r o u p

PLANT WIDE GENERICS

QUESTION	VALUE	KA
010	1.00	194001A104
011	1.00	194001A106
012	1.00	194001A107
013	1.00	194001A109
014	1.00	194001A109
015	1.00	194001A111
016	1.00	194001A116
017	1.00	194001A116
002	1.00	194001K101
001	1.00	194001K101
003	1.00	194001K102
004	1.00	194001K103
005	1.00	194001K104
006	1.00	194001K104
007	1.00	194001K104
008	1.00	194001K105
009	1.00	194001K109
PWG Total	17.00	

PLANT SYSTEMS

Group I

QUESTION	VALUE	KA
020	1.00	001000G006
018	1.00	001000K103
019	1.00	001000K558
022	1.00	003000G006
021	1.00	003000K201
023	1.00	004000A401
024	1.00	004010A205
025	1.00	013000A105
026	1.00	014000G008
027	1.00	015000A303
029	1.00	015000K406
028	1.00	015000K604
030	1.00	017020K101
031	1.00	022000A404
032	1.00	025000K301
033	1.00	026000G005
034	1.00	061000A202
035	1.00	063000G010
036	1.00	072000G007

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S R O E x a m P W R R e a c t o r

O r g a n i z e d b y K A G r o u p

PLANT SYSTEMS

Group I

QUESTION	VALUE	KA
PS-I Total	19.00	

Group II

QUESTION	VALUE	KA
038	1.00	002000K403
037	1.00	002000K603
040	1.00	006000G006
039	2.00	006000K409
042	1.00	010000A403
041	1.00	010000K201
043	1.00	011000A211
044	1.00	012000K501
046	1.00	016000A301
045	1.00	016000K101
047	1.00	028000A101
055	1.00	029000K302
048	1.00	033000K303
049	1.00	039000A302
050	1.00	064000K411
051	1.00	086000K406
PS-II Total	17.00	

Group III

QUESTION	VALUE	KA
052	1.00	005000G007
053	1.00	008000K102
054	1.00	008030A304
056	1.00	041020K417
PS-III Total	4.00	
PS Total	40.00	

EMERGENCY PLANT EVOLUTIONS

Group I

QUESTION	VALUE	KA

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S R O E x a m P W R R e a c t o r

O r g a n i z e d b y K A G r o u p

EMERGENCY PLANT EVOLUTIONS

Group I

QUESTION	VALUE	KA
057	1.00	000001G007
058	1.00	000001G008
059	1.00	000003G005
060	1.00	000003G010
061	1.00	000005G005
084	1.00	000011A103
062	1.00	000011A104
063	1.00	000011A111
064	1.00	000011G010
066	1.00	000015G010
065	1.00	000015K207
067	1.00	000026A105
069	1.00	000029G011
068	1.00	000029K312
070	1.00	000040G012
071	1.00	000051A202
072	1.00	000057A101
073	1.00	000059A102
074	1.00	000067A203
075	1.00	000067G012
076	1.00	000074K103
077	1.00	000074K304
078	1.00	000074K311
079	1.00	000076G012
EPE-I Total	24.00	

Group II

QUESTION	VALUE	KA
080	1.00	000007A103
081	1.00	000007G010
082	1.00	000008K101
083	1.00	000009A237
085	1.00	000022A102
086	1.00	000022A109
087	1.00	000025G011
088	1.00	000027A218
089	1.00	000032G008
090	1.00	000033A202
091	1.00	000038K302
092	1.00	000054G012
093	1.00	000058A101
095	1.00	000065A103

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S R O E x a m P W R R e a c t o r

O r g a n i z e d b y K A G r o u p

EMERGENCY PLANT EVOLUTIONS

Group II

QUESTION	VALUE	KA
094	1.00	000065A201
096	1.00	000065G010
EPE-II Total	16.00	

Group III

QUESTION	VALUE	KA
097	1.00	000028A202
099	1.00	000056G010
098	1.00	000056K302
EPE-III Total	3.00	
EPE Total	43.00	
Test Total	100.00	

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3/4.4.8 SPECIFIC ACTIVITY

LIMITING CONDITION FOR OPERATION

3.4.8 The specific activity of the reactor coolant shall be limited to:

a. Less than or equal to 1 microCurie per gram DOSE EQUIVALENT I-131, and

b. Less than or equal to 100/$\bar{E}$ microCuries per gram of gross specific activity.

APPLICABILITY: MODES 1, 2, 3, 4, and 5.

ACTION:

MODES 1, 2 and 3*:

a. With the specific activity of the reactor coolant greater than 1 microCurie per gram DOSE EQUIVALENT I-131 for more than 48 hours during one continuous time interval or exceeding the limit line shown on Figure 3.4-1, be in at least HOT STANDBY with T_{avg} less than 500°F within 6 hours;

b. With the gross specific activity of the reactor coolant greater than 100/$\bar{E}$ microCuries per gram of gross radioactivity, be in at least HOT STANDBY with T_{avg} less than 500°F within 6 hours; and

c. The provisions of Specification 3.0.4 are not applicable.

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*With T_{avg} greater than or equal to 500°F.

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

MODES 1, 2, 3, 4, and 5:

With the specific activity of the reactor coolant greater than 1 microCurie per gram DOSE EQUIVALENT I-131 or greater than 100/$\bar{E}$ microcuries per gram, perform the sampling and analysis requirements of Item 4.a) of Table 4.4-4 until the specific activity of the reactor coolant is restored to within its limits.

SURVEILLANCE REQUIREMENTS

4.4.8 The specific activity of the reactor coolant shall be determined to be within the limits by performance of the sampling and analysis program of Table 4.4-4.

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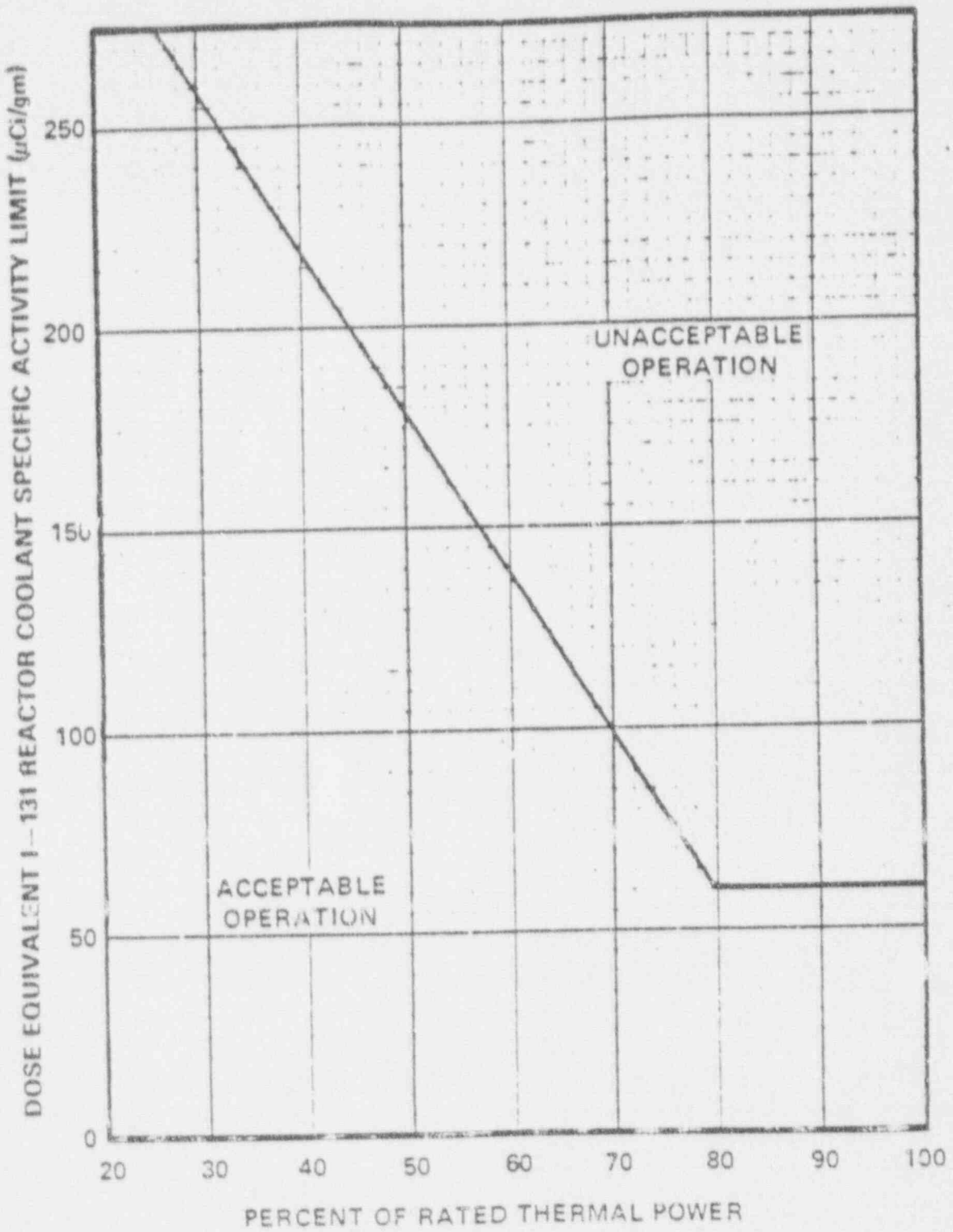

FIGURE 3.4-1

DOSE EQUIVALENT I-131 REACTOR COOLANT SPECIFIC ACTIVITY LIMIT VERSUS PERCENT OF RATED THERMAL POWER WITH THE REACTOR COOLANT SPECIFIC ACTIVITY > 1 μCi/gram DOSE EQUIVALENT I-131

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TABLE 4.4-4

REACTOR COOLANT SPECIFIC ACTIVITY SAMPLE AND ANALYSIS PROGRAM

TYPE OF MEASUREMENT AND ANALYSIS	SAMPLE AND ANALYSIS FREQUENCY	MODES IN WHICH SAMPLE AND ANALYSIS REQUIRED
1. Gross Radioactivity Determination**	At least once per 72 hours	1, 2, 3, 4
2. Isotopic Analysis for DOSE EQUIVALENT I-131 Concentration	1 per 14 days	1
3. Radiochemical for $\bar{E}$ Determination***	1 per 6 months*	1
4. Isotopic Analysis for Iodine Including I-131, I-133, and I-135	a) Once per 4 hours, whenever the specific activity exceeds 1 μCi/gram DOSE EQUIVALENT I-131 or 100/$\bar{E}$ μCi/gram of gross radioactivity, and	1#, 2#, 3#, 4#, 5#
	b) One sample between 2 and 6 hours following a THERMAL POWER change exceeding 15% of the RATED THERMAL POWER within a 1-hour period.	1, 2, 3

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TABLE 4.4-4 (Continued)

TABLE NOTATIONS

#Until the specific activity of the Reactor Coolant System is restored within its limits.

*Sample to be taken after a minimum of 2 EFPD and 20 days of POWER OPERATION have elapsed since reactor was last subcritical for 48 hours or longer.

**A gross radioactivity analysis shall consist of the quantitative measurement of the total specific activity of the reactor coolant except for radionuclides with half-lives less than 10 minutes and all radioiodines. The total specific activity shall be the sum of the degassed beta-gamma activity and the total of all identified gaseous activities in the sample within 2 hours after the sample is taken and extrapolated back to when the sample was taken. Determination of the contributors to the gross specific activity shall be based upon those energy peaks identifiable with a 95% confidence level. The latest available data may be used for pure beta-emitting radionuclides.

***A radiochemical analysis for $\bar{E}$ shall consist of the quantitative measurement of the specific activity for each radionuclide, except for radionuclides with half-lives less than 10 minutes and all radioiodines, which is identified in the reactor coolant. The specific activities for these individual radionuclides shall be used in the determination of $\bar{E}$ for the reactor coolant sample. Determination of the contributors to $\bar{E}$ shall be based upon those energy peaks identifiable with a 95% confidence level.

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A. **PURPOSE**

- To verify proper response to a loss of feedwater supply to the S/Gs
- To verify proper response to a loss of normal supply of auxiliary feedwater.

B. **SYMPTOMS**

Case I. Loss Of CF Supply To S/Gs

- CFPT A and B - TRIPPED
- S/G A (B,C,D) LO LEVEL ALERT alarm(s) (1AD-4) - LIT
- S/G A (B,C,D) FLOW MISMATCH LO CF FLOW alarm(s) (1AD-4) - LIT.

CASE II. Loss Of Normal CA Supply

- "CACST LO LEVEL" alarm (1AD-5, H-4) - LIT.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. OPERATOR ACTIONS

IMMEDIATE ACTIONS

None

SUBSEQUENT ACTIONS

__ 1. Verify Reactor power - LESS THAN 5%.

Perform the following:

__ a. Manually trip Reactor.

__ b. GO TO EP/1/A/5000/01, Reactor Trip or Safety Injection.

2. Verify Feedwater Isolation as indicated by following status lights (1SI-5) - LIT:

__ o "S/G A CF CONT ISOL VLVS CLSD"
__ o "S/G B CF CONT ISOL VLVS CLSD"
__ o "S/G C CF CONT ISOL VLVS CLSD"
__ o "S/G D CF CONT ISOL VLVS CLSD."

Manually initiate Feedwater Isolation:

__ o TRN A
__ o TRN B.

__ 3. Verify total CA flow - GREATER THAN 450 GPM.

Perform the following:

__ a. Manually start CA pumps.

__ b. IF CA flow cannot be established, THEN GO TO EP/1/A/5000/2C1, Loss of Secondary Heat Sink.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4. Control S/G levels:

__ a. Verify S/G N/R levels - AT 38%.

__ a. Maintain total feed flow greater than or equal to 450 gpm.

b. **WHEN** N/R level increasing in at least one S/G, **THEN** depress CA System valve control "RESET" pushbuttons:

__ o TRN A
__ o TRN B.

__ c. Throttle feed flow to maintain S/G N/R levels at 38%.

5. Verify CA supply - ADEQUATE:

a. Ensure the following valves - OPEN:

__ o 1CA-4 (CA Pmps Suct From UST)

__ o 1CA-6 (CA Pmps Suct From CA CST).

__ b. Verify "CACST LO LEVEL" alarm (1AD-5, H-4) - DARK.

b. Perform the following:

__ 1) Ensure 1CA-6 (CA Pmps Suct From CA CST) - CLOSED.

__ 2) **REFER TO** Case II, Loss of Normal CA Supply and perform applicable steps concurrently with remainder of this case.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

6. Determine required notifications:

   __ o **REFER TO** RP/0/A/5000/01, Classification of Emergency

   __ o **REFER TO** RP/0/B/5000/13, NRC Notification Requirements.

__ 7. Determine and correct cause of loss of CF supply.

__ 8. Determine long term plant status.
RETURN TO procedure in effect.

END

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. OPERATOR ACTIONS

IMMEDIATE ACTIONS

None

SUBSEQUENT ACTIONS

NOTE - Closing 1CS-69 will isolate the CACST from the Unit 1 and Unit 2 CA Pumps.

__ 1. Ensure 1CA-6 (CA Pmps Suct From CACST) - CLOSED.

__ Dispatch operator to unlock and close 1CS-69 (CACST To Unit 1 and Unit 2 CA Supplies) (SB 619, T-26).

2. Initiate makeup to UST:

__ o Pump CST to UST with CST Pumps 1A and 1B.

__ o Open 1YM-100 (UST M/U CTRL).

__ 3. Verify at least one hotwell pump is available for makeup to the UST.

__ GO TO Step 11.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4. Makeup to UST from hotwell:

a. Dispatch operator to:

__ 1) Open 1CM-35 (Hotwell Hi Lvl Ctrl Byp), (TB-575, 1L-25).

2) Ensure the following valves - CLOSED:

__ o 1CS-24 (Normal Hotwell Makeup Control Inlet) (TB-595, 1G-30)

__ o 1CS-60 (Normal Hotwell Makeup Control Bypass) (TB-596, 1G-30)

__ o 1CS-32 (Hotwell Recirc Makeup Valve Inlet) (TB-573, 1G-29)

__ o 1CS-35 (Hotwell Recirc Makeup Valves Bypass) (TB-578, 1G-29).

b. **IF** all hotwell pumps are off, **THEN**:

__ 1) Notify Chemistry to ensure all CM polishing demineralizers isolated.

2) Ensure the following valves - CLOSED:

__ o Polish Demin Byp Ctrl

__ o 1CM-83 (Gen Load Reject Bypass).

__ c. Start and stop hotwell pump(s) as required to makeup from hotwell.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE
- If the CA pumps are taking a suction on the hotwell with the UST depleted and the CA auto start circuitry is actuated, then the CA pump suction will automatically align to the RN assured makeup source.
- If CA has been reset and CA pump suction is aligned to the hotwell with the UST depleted, then the CA pumps will trip on low suction pressure.

5. Verify UST level - ADEQUATE:

__ o "CACST/UST LO LEVELS" alarm (1AD-5, H-6) - DARK.

__ o Break condenser vacuum.

__ 6. IF hotwell level greater than 0.5 ft, THEN RETURN TO Step 4.c.

__ 7. WHEN hotwell level less than 0.5 ft AND "CACST/UST LO LEVELS" alarm (1AD-5, H-6) lit, THEN close 1CA-4 (CA Pmps Suct From UST).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

8. **Ensure CA pumps suction aligned to RN:**

   o TRN A valves - OPEN:

   __ o 1RN-250A (RN Hdr A To CA Pmp Suct Isol)

   __ o 1CA-116A (CA Pump #1 Suct Frm RN Hdr A)

   __ o 1CA-15A (CA Pump 1A Suct Frm RN Isol).

   o TRN B valves - OPEN:

   __ o 1CA-85B (CA Pump #1 Suct Frm RN Hdr B)

   __ o 1CA-18B (CA Pump 1B Suct From RN Isol)

   __ o 1RN-310B (RN Hdr B To CA Pmp Suct Isol).

9. **IF "SEF CA XFER TO RC" alarm (1AD-5, G-4) lit, THEN ensure CA Pump #1 uction aligned to RC:**

   __ o 1CA-178 (RC Supply To CA Pump Isol) - OPEN

   __ o 1CA-174 (RC To CA Suct Isol) - OPEN

   __ o 1CA-175 (RC To CA Suct Isol) - OPEN.

10. **Determine long term plant status:**

    __ o Continue monitoring CA pump status.

    __ o **RETURN TO** procedure in effect.

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ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED

NOTE The CA pumps will trip on low suction pressure with CA reset and CA pump suction aligned to the hotwell when the UST is depleted.

11. Establish operator control of CA System:

__ a. **IF** CA Pump #1 is needed, **THEN** place CA Pump #1 switch in "ON".

b. Depress CA System valve control "RESET" pushbuttons:

__ o TRN A
__ o TRN B.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

12. Maintain all S/G N/R levels at 38% by using one CA pump at a time:

- o **IF** one motor driven CA pump available, **THEN** dispatch operator to open the following valves:

  __ o 1CA-111 (CA Pump 1A & 1B Disch Xover To S/G Isol) (AB-552, BB-50, Rm 250)

  __ o 1CA-112 (CA Pump 1A & 1B Disch Xover To S/G Isol) (AB-552, BB-50, Rm 250).

  OR

- o **IF** CA Pump #1 available, **THEN** open the following valves:

  __ o 1CA-66B (CA Pump 1 Disch To S/G 1A Isol)

  __ o 1CA-38A (CA Pump 1 Disch To S/G 1D Isol).

NOTE The CA pump trip on low suction pressure is being defeated in the following step so that the hotwell can be used as a CA suction source.

__ **13. Initiate SWR 10403 to have IAE defeat the CA pump trip on low suction pressure on all 3 CA pumps.**

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14. Defeat the automatic swap of CA pump suction to the RC assured makeup source by dispatching operator to open the following breakers at the SSF (Elev. 611):

   __ a) SDSP1 Bkr #4

   __ b) SDSD-F01D (RC Supply To Aux Feedwater Isol Valve 1CA-174)

   __ c) SDSD-F02C (RC Supply To Aux Feedwater Isol Valve 1CA-175).

__ 15. Continuously monitor the parameters given on Enclosure 1 and perform any required actions.

__ 16. Determine long term plant status. RETURN TO procedure in effect.

END

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ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED

CONTINUOUS MONITORING OF CA PUMP PARAMETERS

NOTE If the CA pumps are taking a suction on the hotwell with the UST depleted and the CA auto start circuitry is actuated, then the CA pump suction will automatically align to the RN assured makeup source.

NOTE The preferred method of determining CA pump suction pressure is to compare hotwell level and CA pump flowrate (Enclosure 2).

1. **Continuously monitor CA pump suction pressure using any of the following methods:**

   __ o Hotwell level and CA pump flowrate, REFER TO Enclosure 2

   OR

   __ o Pressure gauges on 1MC-4

   OR

   __ o Local pressure gauges in the CA pump room.

2. **IF CA pump suction pressure drops to less than or equal to 8.2 psig, THEN perform the following:**

   __ a. Stop all CA pumps.

   __ b. Close 1CA-4 (CA Pmps Suct From UST).

   __ b. Dispatch operator to unlock and close 1CS-19 (CA Pumps Supply From UST) (TB-620, 1D-30).

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ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED

2. (Continued)

c. IF RN available, THEN align CA pump suction to the RN assured makeup sources:

1) Alig A TRN RN supply by opening the following valves:

__ o 1RN-250A (RN Hdr A To CA Pmp Suct Isol)

__ o 1CA-116A (CA Pump #1 Suct Frm RN Hdr A)

__ o 1CA-15A (CA Pump 1A Suct Frm RN Isol).

2) Align B TRN RN supply by opening the following valves:

__ o 1CA-85B (CA Pump #1 Suct Frm RN Hdr B)

__ o 1CA ..; (CA Pump 1B Suct Frm RN Isol)

__ o 1RN-310B (RN Hdr B To CA Pmp Suct Isol).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. (Continued)

d. Restore the automatic swap of CA pump suction to the RC assured makeup source by dispatching operator to close the following breakers at the SSF (Elev. 611):

__ 1) SDSP1 Bkr #4

__ 2) SDSD-F01D (RC Supply To Aux Feedwater Isol Valve 1CA-174)

__ 3) SDSD-F02C (RC Supply To Aux Feedwater Isol Valve 1CA-175.

__ e. Start CA pump(s) as necessary to maintain S/G N/R levels at 38%.

__ 3. **WHEN the "CACST/UST LO LEVELS" alarm (1AD-5, H-6) is lit, THEN break Condenser vacuum.**

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4. **WHEN hotwell level is less than or equal to 0.5 ft, THEN perform the following:**

__ a. Stop all CA pumps.

__ b. Close 1CA-4 (CA Pmps Suct From UST).

__ b. Dispatch operator to unlock and close 1CS-19 (CA Pumps Supply From UST) (TB-620, 1D-30).

c. **IF** RN available, **THEN** align CA pump suction to the RN assured makeup sources:

1) Align A TRN RN supply by opening the following valves:

__ o 1RN-250A (RN Hdr A To CA Pmp Suct Isol)

__ o 1CA-116A (CA Pump #1 Suct Frm RN Hdr A)

__ o 1CA-15A (CA Pump 1A Suct Frm RN Isol).

2) Align B TRN RN supply by opening the following valves:

__ o 1CA-85B (CA Pump #1 Suct Frm RN Hdr B)

__ o 1CA-18B (CA Pump 1B Suct Frm RN Isol)

__ o 1RN-310B (RN Hdr B To CA Pmp Suct Isol).

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ACTUATED RESPONSE

RESPONSE NOT OBTAINED

4. (Continued)

d. Restore the automatic swap of CA pump suction to the RC assured makeup source by dispatching operator to close the following breakers at the SSF (Elev. 611):

__ 1) SDSP1 Bkr #4

__ 2) SDSD-F01D (RC Supply To Aux Feedwater Isol Valve 1CA-174)

__ 3) SDSD-F02C (RC Supply To Aux Feedwater Isol Valve 1CA-175.

__ e. Start CA pump(s) as necessary to maintain S/G N/R levels at 38%.

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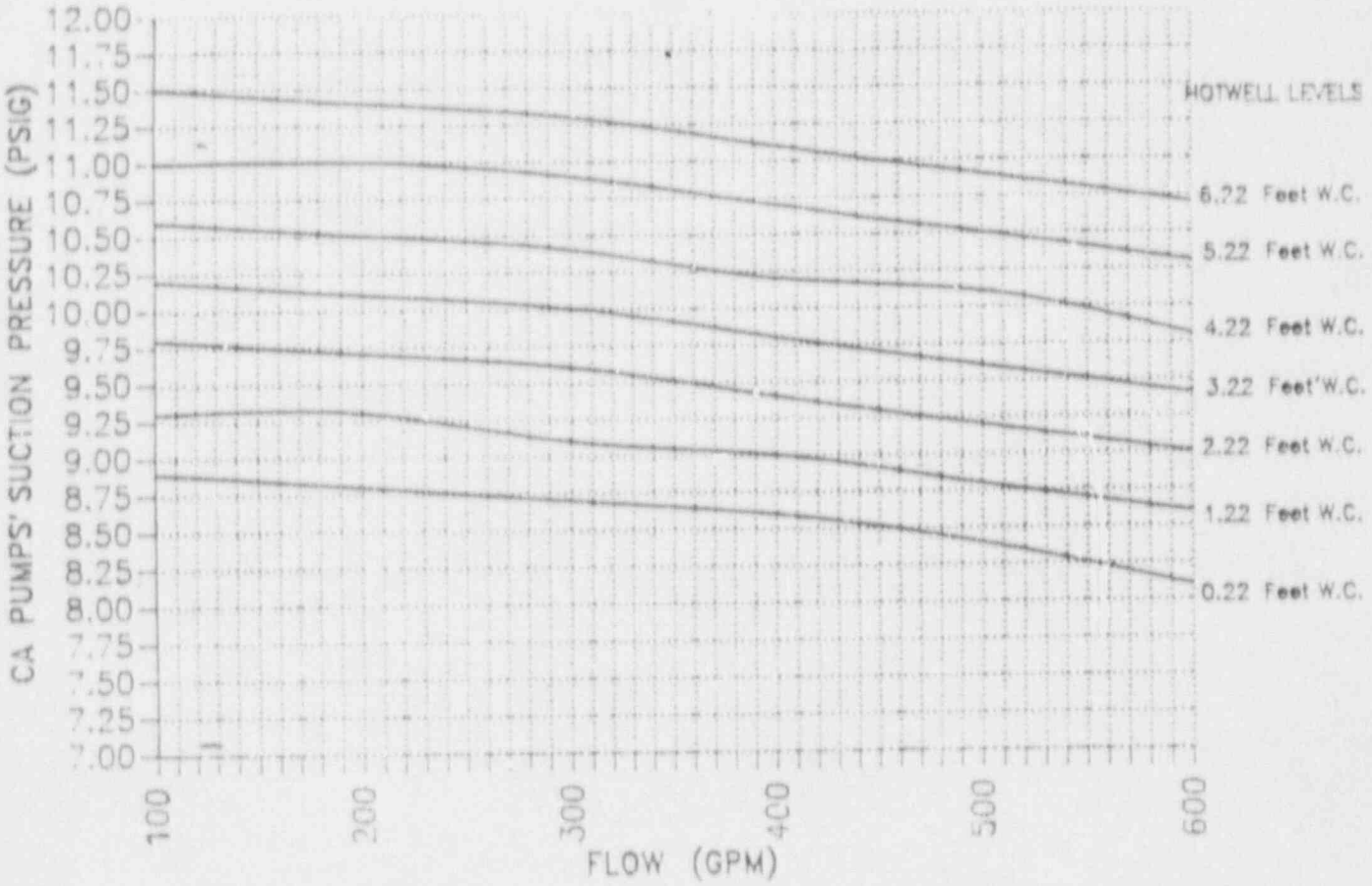
CA PUMP SUCTION PRESSURE BASED ON HOTWELL LEVEL AND FLOWRATE



NOTE

- This graph assumes that the CA pumps are aligned to the hotwell and that the CACST and UST are depleted.
- This graph is valid for either one or two CA pumps taking a suction on the hotwell with the UST depleted.

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3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE with RESPONSE TIMES as shown in Table 3.3-2.

APPLICABILITY: As shown in Table 3.3-1.

ACTION:

As shown in Table 3.3-1.

SURVEILLANCE REQUIREMENTS

4.3.1.1 Each Reactor Trip System instrumentation channel and interlock and the automatic trip logic shall be demonstrated OPERABLE by the performance of the Reactor Trip System Instrumentation Surveillance Requirements specified in Table 4.3-1.

4.3.1.2 The REACTOR TRIP SYSTEM RESPONSE TIME of each Reactor trip function shall be demonstrated to be within its limit at least once per 18 months.* Each test shall include at least one train such that both trains are tested at least once per 36 months and one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-1. The response time of RTDs associated with the Reactor Trip System shall be demonstrated to be within their limits at least once per 18 months.

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*This surveillance need not be performed for the primary RTD response time testing portion of items 7 and 8 from Table 3.3-2 for Unit 2 until prior to entering STARTUP following the Unit 2 first refueling.

TABLE 3.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION	
1. Manual Reactor Trip	2	1	2	1, 2	1	
	2	1	2	3*, 4*, 5*	10	
2. Power Range, Neutron Flux						
a. High Setpoint	4	2	3	1, 2	2	
b. Low Setpoint	4	2	3	1###, 2	2	
3. Power Range, Neutron Flux High Positive Rate	4	2	3	1, 2	2	
4. Power Range, Neuiron Flux, High Negative Rate	4	2	3	1, 2	2	
5. Intermediate Range, Neutron Flux	2	1	2	1###, 2	3	
6. Source Range, Neutron Flux						
a. Startup	2	1	2	2##	4	
b. Shutdown	2	1	2	3*, 4*, 5*	10	
7. Overtemperature ΔT Four Loop Operation	4	2	3	1, 2	6	
8. Overpower ΔT Four Loop Operation	4	2	3	1, 2	6	
9. Pressurizer Pressure-Low	4	2	3	1	6**	

CATAWBA UNITS 1 & 2

3/4 3-2

Amendment No. 48 (Unit 1)
Amendment No. 41 (Unit 2)

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TABLE 3.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION	
10. Pressurizer Pressure-High	4	2	3	1, 2	6**	|
11. Pressurizer Water Level-High	3	2	2	1	6	|
12. Reactor Coolant Flow-Low						
a. Single Loop (Above P-8)	3/loop	2/loop in any operating loop	2/loop in each operating loop	1	6	|
b. Two Loops (Above P-7 and below P-8)	3/loop	2/loop in two operating loops	2/loop in each operating loop	1	6	|
13. Steam Generator Water Level--Low-Low	4/stm gen	2/stm gen in any operating stm gen	3/stm gen each operating stm gen	1, 2	6**	|
14. Undervoltage-Reactor Coolant Pumps (Above P-7)	4-1/bus	2	3	1	6	|
15. Underfrequency-Reactor Coolant Pumps (Above P-7)	4-1/bus	2	3	1	6	|
16. Turbine Trip						
a. Stop Valve EH Pressure - Low	4	2	3	1####	6	|
b. Turbine Stop Valve Closure	4	4	1	1####	11	|
17. Safety Injection Input from ESF	2	1	2	1, 2	9	

Amendment No. 41 (Unit 2)
Amendment No. 28 (Unit 1)

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TABLE 3.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
18. Reactor Trip System Interlocks					
a. Intermediate Range Neutron Flux, P-6	2	1	2	2##	8
b. Low Power Reactor Trips Block, P-7					
P-10 Input	4	2	3	1	8
or					
P-13 Input	2	1	2	1	8
c. Power Range Neutron Flux, P-8	4	2	3	1	8
d. Power Range Neutron Flux, P-9	4	2	3	1	8
e. Power Range Neutron Flux, P-10	4	2	3	1	8
f. Power Range Neutron Flux, Not P-10	4	3	4	1, 2	8
g. Turbine Impulse Chamber Pressure, P-13	2	1	2	1	8
19. Reactor Trip Breakers	2	1	2	1, 2	9
	2	1	2	3*, 4*, 5*	10
20. Automatic Trip and Interlock Logic	2	1	2	1, 2	9
	2	1	2	3*, 4*, 5*	10

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TABLE NOTATIONS

*Only if the Reactor Trip System breakers happen to be in the closed position and the Control Rod Drive System is capable of rod withdrawal.
**Comply with the provisions of Specification 3.3.2, for any portion of the channel required to be OPERABLE by Specification 3.3.2.

##Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.
###Below the P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.
####Above the P-9 (Reactor Trip on Turbine Trip Interlock) Setpoint.

ACTION STATEMENTS

ACTION 1 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours.

ACTION 2 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours,

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1, and

c. Either, THERMAL POWER is restricted to less than or equal to 75% of RATED THERMAL POWER and the Power Range Neutron Flux trip setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER within 4 hours; or, the QUADRANT POWER TILT RATIO is monitored at least once per 12 hours per Specification 4.2.4.2.

ACTION 3 - With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:

a. Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above the P-6 Setpoint; or

b. Above the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint but below 10% of RATED THERMAL POWER, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above 10% of RATED THERMAL POWER.

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TABLE 3.3-1 (Continued)

ACTION STATEMENTS (Continued)

ACTION 4 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, suspend all operations involving positive reactivity changes.

ACTION 5 - Delete

ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours, and

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.

ACTION 7 - Delete

ACTION 8 - With less than the Minimum Number of Channels OPERABLE, within 1 hour determine by observation of the associated permissive status light(s) that the interlock is in its required state for the existing plant condition, or apply Specification 3.0.3.

ACTION 9 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, be in at least HOT STANDBY within 6 hours; however, one channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.1.1, provided the other channel is OPERABLE.

ACTION 10 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or open the Reactor trip breakers within the next hour.

ACTION 11 - With the number of OPERABLE channels less than the Total Number of Channels, operation may continue provided the inoperable channels are placed in the tripped condition within 6 hours.

ACTION 12- With one of the diverse trip features (Undervoltage or shunt trip attachment) inoperable, restore it to OPERABLE status within 48 hours or declare the breaker inoperable and apply ACTION 9. The breaker shall not be bypassed while one of the diverse trip features is inoperable except for the time required for performing maintenance to restore the breaker to OPERABLE status. With the breaker bypassed, apply ACTION 9.

ACTION 13- With any reactor trip bypass breaker inoperable, restore the bypass breaker to OPERABLE status prior to placing it in service.

TABLE 3.3-2

REACTOR TRIP SYSTEM INSTRUMENTATION RESPONSE TIMES

FUNCTIONAL UNIT		RESPONSE TIME
1.	Manual Reactor Trip	N.A.
2.	Power Range, Neutron Flux	≤ 0.5 second*
3.	Power Range, Neutron Flux, High Positive Rate	N.A.
4.	Power Range, Neutron Flux, High Negative Rate	≤ 0.5 second*
5.	Intermediate Range, Neutron Flux	N.A.
6.	Source Range, Neutron Flux	N.A.
7.	Overtemperature ΔT	≤ 4(8#) seconds*
8.	Overpower ΔT	≤ 4(8#) seconds
9.	Pressurizer Pressure-Low	≤ 2 seconds
10.	Pressurizer Pressure-High	≤ 2 seconds
11.	Pressurizer Water Level-High	N.A.

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*Neutron detectors are exempt from response time testing. Response time of the neutron flux signal portion of the channel shall be measured from detector output or input of first electronic component in channel.
#Applicable upon deletion of RTD Bypass System.

TABLE 3.3-2 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION RESPONSE TIMES

FUNCTIONAL UNIT	RESPONSE TIME
12. Low Reactor Coolant Flow	
a. Single Loop (Above P-8)	≤ 1 second
b. Two Loops (Above P-7 and below P-8)	≤ 1 second
13. Steam Generator Water Level-Low-Low	
a. Unit 1	≤ 3.5 seconds
b. Unit 2	≤ 2.0 seconds
14. Undervoltage-Reactor Coolant Pumps	≤ 1.5 seconds
15. Underfrequency-Reactor Coolant Pumps	≤ 0.6 second
16. Turbine Trip	
a. Stop Valve EH Pressure-Low	N.A.
b. Turbine Stop Valve Closure	N.A.
17. Safety Injection Input from ESF	N.A.
18. Reactor Trip System Interlocks	N.A.
19. Reactor Trip Breakers	N.A.
20. Automatic Trip and Interlock Logic	N.A.

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TABLE 4.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	ANALOG CHANNEL OPERATIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	ACTUATION LOGIC TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
1. Manual Reactor Trip	N.A.	N.A.	N.A.	R(14)	N.A.	1, 2, 3*, 4*, 5*
2. Power Range, Neutron Flux a. High Setpoint	S	D(2, 4), M(3, 4), Q(4, 6), R(4, 5)	M	N.A.	N.A.	1, 2
b. Low Setpoint	S	R(4)	M	N.A.	N.A.	1###, 2
3. Power Range, Neutron Flux, High Positive Rate	N.A.	R(4)	M	N.A.	N.A.	1, 2
4. Power Range, Neutron Flux, High Negative Rate	N.A.	R(4)	M	N.A.	N.A.	1, 2
5. Intermediate Range, Neutron Flux	S	R(4, 5)	S/U(1),M	N.A.	N.A.	1###, 2
6. Source Range, Neutron Flux	S	R(4, 5)	S/U(1),M(9)	N.A.	N.A.	2##, 3, 4,
7. Overtemperature ΔT	S	R	M	N.A.	N.A.	1, 2
8 Overpower ΔT	S	R	M	N.A.	N.A.	1, 2
9. Pressurizer Pressure-Low	S	R	M	N.A.	N.A.	1
10. Pressurizer Pressure-High	S	R	M	N.A.	N.A.	1, 2
11. Pressurizer Water Level-High	S	R	M	N.A.	N.A.	1
12. Reactor Coolant Flow-Low	S	R	M	N.A.	N.A.	1

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TABLE 4.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	ANALOG CHANNEL OPERATIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	ACTUATION LOGIC TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
13. Steam Generator Water Level-Low-Low	S	R(13)	M	N.A.	N.A.	1, 2
14. Undervoltage - Reactor Coolant Pumps	N.A.	R	N.A.	M	N.A.	1
15. Underfrequency - Reactor Coolant Pumps	N.A.	R	N.A.	M	N.A.	1
16. Turbine Trip						
a. Stop Valve EH Pressure - Low	N.A.	R	N.A.	S/U(1, 10)	N.A.	1#
b. Turbine Stop Valve Closure	N.A.	R	N.A.	S/U(1, 10)	N.A.	1#
17. Safety Injection Input from ESF	N.A.	N.A.	N.A.	R**	N.A.	1, 2
18. Reactor Trip System Interlocks						
a. Intermediate Range Neutron Flux, P-6	N.A.	R(4)	M	N.A.	N.A.	2##
b. Low Power Reactor Trips Block, P-7	N.A.	R(4)	M(8)	N.A.	N.A.	1
c. Power Range Neutron Flux, P-8	N.A.	R(4)	M(8)	N.A.	N.A.	1
d. Low Power Range Neutron Flux, P-9	N.A.	R(4)	M(8)	N.A.	N.A.	1

** This surveillance need not be performed until prior to entering STARTUP following the Unit 1 first refueling.

Amendment No. 35 (Unit 1)
Amendment No. 26 (Unit 2)

TABLE 4.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	ANALOG CHANNEL OPERATIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	ACTUATION LOGIC TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
18. Reactor Trip System Interlocks (Continued)						
e. Power Range Neutron Flux, P-10	N.A.	R(4)	M(8)	N.A.	N.A.	1
f. Power Range Neutron Flux, Not P-10	N.A.	R(4)	M(8)	N.A.	N.A.	1, 2
g. Turbine Impulse Chamber Pressure, P-13	N.A.	R	M(8)	N.A.	N.A.	1
19. Reactor Trip Breaker	N.A.	N.A.	N.A.	M(7, 11)	N.A.	1, 2, 3*, 4*, 5*
20. Automatic Trip and Interlock Logic	N.A.	N.A.	N.A.	N.A.	M(7)	1, 2, 3*, 4*, 5*
21. Reactor Trip Bypass Breakers	N.A.	N.A.	N.A	M(7,15)R(16)	N.A	1, 2, 3*, 4*, 5*

Amendment No. 63 (Unit 1)
Amendment No. 57 (Unit 2)

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TABLE 4.3-1 (Continued)

TABLE NOTATIONS

* Only if the Reactor Trip System breakers happen to be closed and the Control Rod Drive System is capable of rod withdrawal.

\# Above P-9 (Reactor Trip on Turbine Trip Interlock) Setpoint.

\## Below P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.

\### Below P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.

(1) If not performed in previous 7 days.

(2) Comparison of calorimetric to excore power indication above 15% of RATED THERMAL POWER. Adjust excore channel gains consistent with calorimetric power if absolute difference is greater than 2%. The provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(3) Single point comparison of incore to excore axial flux difference above 15% of RATED THERMAL POWER. Recalibrate if the absolute difference is greater than or equal to 3%. The provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(4) Neutron detectors may be excluded from CHANNEL CALIBRATION.

(5) Detector plateau curves shall be obtained, evaluated and compared to manufacturer's data. For the Intermediate Range and Power Range Neutron Flux channels the provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(6) Incore - Excore Calibration, above 75% of RATED THERMAL POWER. The provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(7) Each train shall be tested at least every 62 days on a STAGGERED TEST BASIS.

(8) With power greater than or equal to the interlock setpoint the required ANALOG CHANNEL OPERATIONAL TEST shall consist of verifying that the interlock is in the required state by observing the permissive status light.

(9) Monthly surveillance in MODES 3*, 4*, and 5* shall also include verification that permissives P-6 and P-10 are in their required state for existing plant conditions by observation of the permissive status light.

(10) Setpoint verification is not applicable.

(11) The TRIP ACTUATING DEVICE OPERATIONAL TEST shall include independent verification of the operability of the Undervoltage and Shunt trips.

(12) Deleted

(13) For Unit 1, CHANNEL CALIBRATION shall ensure that the filter time constant associated with Steam Generator Water Level Low-Low is adjusted to a value less than or equal to 1.5 seconds.

(14) The TRIP ACTUATING DEVICE OPERATIONAL TEST shall independently verify the OPERABILITY of the undervoltage and shunt trip circuits for the Manual Reactor Trip Function. The test shall also verify the OPERABILITY of the Bypass Breaker trip circuit(s).

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TABLE 4.3-1 (Continued)

TABLE NOTATIONS

(15) A local manual shunt trip on the bypass breakers shall be performed prior to placing breaker in service.

(16) The automatic undervoltage trip capability shall be verified OPERABLE.

3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

CONTAINMENT SPRAY SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.2 Two independent Containment Spray Systems shall be OPERABLE with each Spray System capable of taking suction from the refueling water storage tank and transferring suction to the containment sump.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With one Containment Spray System inoperable, restore the inoperable Spray System to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours; restore the inoperable Spray System to OPERABLE status within the next 48 hours or be in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.2 Each Containment Spray System shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position;

b. By verifying, that on recirculation flow, each pump develops a differential pressure of greater than or equal to 185 psid when tested pursuant to Specification 4.0.5;

c. At least once per 18 months during shutdown,** by:

1) Verifying that each automatic valve in the flow path actuates to its correct position on a Phase "B" Isolation test signal, and

2) Verifying that each spray pump starts automatically on a Phase "B" Isolation test signal.

3) Verifying that each spray pump is prevented from starting by the Containment Pressure Control System when the containment atmosphere pressure is less than or equal to 0.25 psid, and is allowed to start at greater than or equal to 0.45 psid relative to the outside atmosphere,

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**This surveillance need not be performed until prior to entering HOT SHUTDOWN following the Unit 2 first refueling.

SURVEILLANCE REQUIREMENTS (Continued)

4) Verifying that each spray pump discharge valve closes or is prevented from opening by the Containment Pressure Control System when the containment atmosphere pressure is less than or equal to 0.25 psid and is allowed to open at greater than or equal to 0.45 psid relative to the outside atmosphere, and

5) Verifying that each spray pump is automatically deenergized by the Containment Pressure Control System when the containment atmosphere pressure is less than or equal to 0.25 psid relative to the outside atmosphere.

d. At least once per 5 years by performing an air or smoke flow test through each spray header and verifying each spray nozzle is unobstructed.

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3/4.1.3 MOVABLE CONTROL ASSEMBLIES

GROUP HEIGHT

LIMITING CONDITION FOR OPERATION

3.1.3.1 All full-length shutdown and control rods shall be OPERABLE and positioned within ±12 steps (indicated position) of their group step counter demand position.

APPLICABILITY: MODES 1* and 2*.

ACTION:

a. With one or more full-length rods inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour and be in HOT STANDBY within 6 hours.

b. With more than one full-length rod misaligned from the group step counter demand position by more than ±12 steps (indicated position), be in HOT STANDBY within 6 hours.

c. With one full-length rod trippable but inoperable due to causes other than addressed by ACTION a., above, or misaligned from its group step counter demand height by more than ±12 steps (indicated position), POWER OPERATION may continue provided that within 1 hour:

1. The rod is restored to OPERABLE status within the above alignment requirements, or

2. The rod is declared inoperable and the remainder of the rods in the group with the inoperable rod are aligned to within ± 12 steps of the inoperable rod while maintaining the rod sequence and insertion limits of Specification 3.1.3.6. The THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, or

3. The rod is declared inoperable and the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied. POWER OPERATION may then continue provided that:

a) A reevaluation of each accident analysis of Table 3.1-1 is performed within 5 days; this reevaluation shall confirm that the previously analyzed results of these accidents remain valid for the duration of operation under these conditions;

b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours;

*See Special Test Exceptions Specifications 3.10.2 and 3.10.3.

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LIMITING CONDITION FOR OPERATION

ACTION (Continued)

c) A power distribution map is obtained from the movable incore detectors and $F_Q(Z)$ and $F^N_{\Delta H}$ are verified to be within their limits within 72 hours; and

d) The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within the next hour and within the following 4 hours the High Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER.

d. With more than one full-length rod trippable but inoperable due to causes other than addressed by ACTION a above, POWER OPERATION may continue provided that:

1. Within 1 hour, the remainder of the rods in the bank(s) with the inoperable rods are aligned to within ±12 steps of the inoperable rods while maintaining the rod sequence and insertion limits of Specification 3.1.3.6. The THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, and

2. The inoperable rods are restored to OPERABLE status within 72 hours.

SURVEILLANCE REQUIREMENTS

4.1.3.1.1 The position of each full-length rod shall be determined to be within the group demand limit by verifying the individual rod positions at least once per 12 hours except during time intervals when the Rod Position Deviation Monitor is inoperable, then verify the group positions at least once per 4 hours.

4.1.3.1.2 Each full-length rod not fully inserted in the core shall be determined to be OPERABLE by movement of at least 10 steps in any one direction at least once per 31 days.

TABLE 3.1-1

ACCIDENT ANALYSES REQUIRING REEVALUATION
IN THE EVENT OF AN INOPERABLE FULL-LENGTH ROD

Rod Cluster Control Assembly Insertion Characteristics

Rod Cluster Control Assembly Misalignment

Loss of Reactor Coolant from Small Ruptured Pipes or from Cracks in Large Pipes Which Actuates the Emergency Core Cooling System

Single Rod Cluster Control Assembly Withdrawal at Full Power

Major Reactor Coolant System Pipe Ruptures (Loss of Coolant Accident)

Major Secondary Coolant System Pipe Rupture

Rupture of a Control Rod Drive Mechanism Housing (Rod Cluster Control Assembly Ejection)

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3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} >200°

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.3% Δk/k for four loop operation.

APPLICABILITY: MODES 1, 2*, 3, and 4.

ACTION:

With the SHUTDOWN MARGIN less than 1.3% Δk/k, immediately initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7000 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1.3% Δk/k:

a. Within 1 hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s);

b. When in MODE 1 or MODE 2 with K_{eff} greater than or equal to 1 at least once per 12 hours by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6;

c. When in MODE 2 with K_{eff} less than 1, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits of Specification 3.1.3.6;

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of Specification 4.1.1.1.1e. below, with the control banks at the maximum inservice limit of Specification 3.1.3.6; and

*See Special Test Exceptions Specification 3.10.1.

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SURVEILLANCE REQUIREMENTS (Continued)

e. When in MODE 3 or 4, at least once per 24 hours by consideration of the following factors:

1) Reactor Coolant System boron concentration,

2) Control rod position,

3) Reactor Coolant System average temperature,

4) Fuel burnup based on gross thermal energy generation,

5) Xenon concentration, and

6) Samarium concentration.

4.1.1.1.2 The overall core reactivity balance shall be compared to predicted values to demonstrate agreement within ± 1% Δk/k at least once per 31 Effective Full Power Days (EFPD). This comparison shall consider at least those factors stated in Specification 4.1.1.1.1e., above. The predicted reactivity values shall be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 EFPD after each fuel loading.

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CONTROL BANK INSERTION LIMITS

LIMITING CONDITION FOR OPERATION

3.1.3.6 The control banks shall be limited in physical insertion as shown in Figure 3.1-1.

APPLICABILITY: MODES 1* and 2*#.

ACTION:

With the control banks inserted beyond the above insertion limits, except for surveillance testing pursuant to Specification 4.1.3.1.2:

a. Restore the control banks to within the limits within 2 hours, or

b. Reduce THERMAL POWER within 2 hours to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the bank position using the above figure, or

c. Be in at least HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

4.1.3.6 The position of each control bank shall be determined to be within the insertion limits at least once per 12 hours except during time intervals when the Rod Insertion Limit Monitor is inoperable, then verify the individual rod positions at least once per 4 hours.

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*See Special Test Exceptions Specifications 3.10.2 and 3.10.3.
#With K_{eff} greater than or equal to 1.

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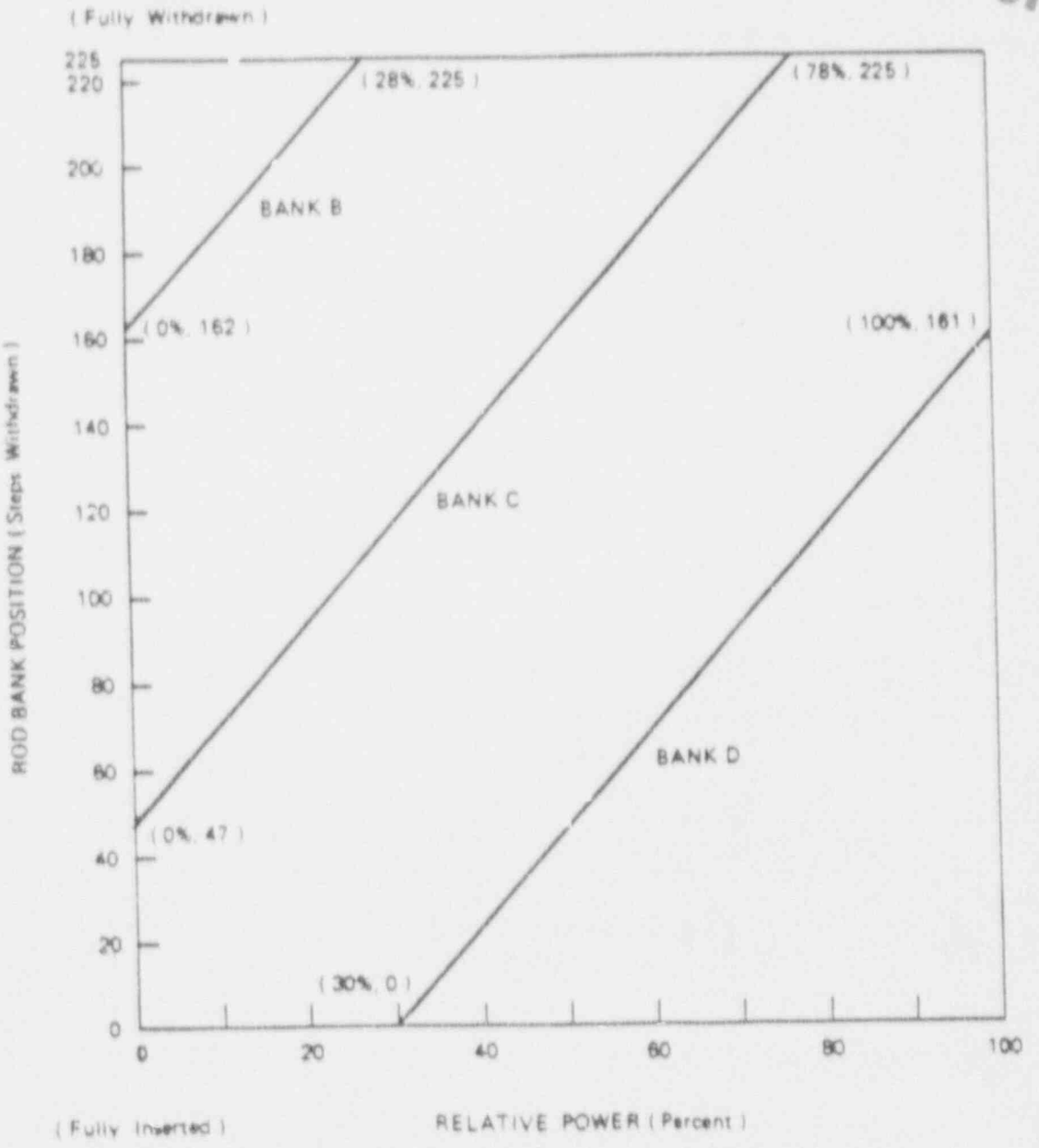

FIGURE 3.1–1
ROD BANK INSERTION LIMITS VERSUS THERMAL POWER
FOUR LOOP OPERATION

Amendment No. 71 (Unit 1)
Amendment No. 65 (Unit 2)

Facility: Catawba 1 & 2 Exam Date: 1992/10/16

Catawba
RO Master
92-302

Knowledge and Ability Record Form
COUNT MATRIX

Summarizing Counts by K/A Group
for
PWR - Reactor Operator

	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	SG	Total
Plant Wide Generics												13
Plant Systems I	2	1	1	2	1	1	1	3	1	5	5	23
Plant Systems II	3	1	2	3	1	1	0	1	1	1	5	19
Plant Systems III	1	0	0	3	0	0	0	1	1	0	1	7
Emergency/Abn I	1	1	3	.....			2	4	.....		5	16
Emergency/Abn II	1	0	3	.....			4	3	.....		0	17
Emergency/Abn III	0	0	0	.....			0	2	.....		1	3
Totals	8	3	9	8	2	2	7	14	3	6	23	=====
Model Total												98

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Knowledge and Ability Record Form
PLANT-WIDE GENERIC RESPONSIBILITIES

PWR - Reactor Operator Target: 13 % Actual: 13.3 %

K/A	Rep	Topic	Rating R/S
194001A106	2	Ability to maintain accurate, clear and concise logs, records, status boards and reports	3.4/3.4
194001A107		Ability to obtain and interpret station electrical and mechanical drawings	2.5/3.2
194001A109	2	Ability to coordinate personnel activities inside the control room	2.7/3.9
194001A111		Ability to direct personnel activities inside the control room	2.8/4.1
194001K101	2	Knowledge of how to conduct and verify valve lineups	3.6/3.7
194001K103		Knowledge of 10 CFR 20 and related facility radiation control requirements	2.8/3.4
194001K104	2	Knowledge of facility ALARA program	3.3/3.5
194001K109		Knowledge of safety procedures related to high pressure	3.4/3.4
194001K114		Knowledge of safety procedures related to confined spaces	3.3/3.6

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Knowledge and Ability Record Form
PLANT SYSTEMS
PWR - Reactor Operator - 51 %

Group I Plant Systems Target: 23 % Actual: 23.5 %

001 Control Rod Drive	017 In-Core Temperature	061 Aux./Emer. Feedwater
003 Reactor Coolant Pump	022 Containment Cooling	068 Liquid Radwaste
004 Chemical & Volume	025 Ice Condenser	071 Wast Gas Disposal
013 E. Saftey Actuation	056 Condensate System	072 Area Radiation Mon.
015 Nuclear Instrument.	059 Main Feedwater System	

K/A	Rep	Topic	Rating R/S
001000G010		Ability to explain and apply all system limits and precautions	3.3/3.5
001000K103		CRDM	3.4/3.6
001000K407		Rod stops	3.7/3.8
001000K558		Reason for overlap of control banks	2.7/3.2
003000A401		Seal injection	3.3/3.2
003000G006		Knowledge of bases in technical specifications for limiting conditions for operations and safety limits	2.7/3.8
003000K201		RCPS	3.1/3.1
004000A401		Boron and control rod reactivity effects	3.8/3.9
004010A205		CIAS, SIAS	4.1/4.3
013000A105		Main steam pressure	3.4/3.6
013000A403		ESFAS initiation	4.5/4.7
015000A303		Verification of proper functioning/operability	3.9/3.9
015000K406		Reactor trip bypasses	3.9/4.2
015000K604		Bistables and logic circuits	3.1/3.2
017020K101		Plant computer (COLSS)	3.2/3.2
022000A404		Valves in the CCS	3.1/3.2
025000K301		Containment	3.8/3.8
059000A411		Recovery from automatic feedwater isolation	3.1/3.3
059000G010		Ability to explain and apply all system limits and precautions	2.9/2.9
061000A202		Loss of air to steam supply valve	3.2/3.6
061000G002		Knowledge of system status criteria which require the notification of plant personnel	3.0/3.8
072000A202		Detector failure	2.8/2.9
072000G007		Knowledge of purpose and function of major system components and controls	2.6/2.9

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Knowledge and Ability Record Form
PLANT SYSTEMS
PWR - Reactor Operator - 51 %

Group II Plant Systems Target: 20 % Actual: 19.4 %

002 RCS	011 PZRLCS	016 NNIS	033 SFPCS	055 CARS	064 ED/G	079 SAS
006 ECCS	012 RPS	026 CSS	035 S/GS	062 AC	073 PRM	086 [illegible]PS
010 PZRPRS	014 RPIS	029 CPS	039 MRSS	063 DC	075 CIRC	

K/A	Rep	Topic	Rating R/S
002000K109		PZR	4.1/4.1
002000K603		Reactor vessel level indication	3.1/3.6
006000K409		Safety injection valve interlocks	3.8/4.1
010000A403		PORV and block valves	4.0/3.8
0[illegible]		PZR heaters	3.0/3.4
0[illegible]		Failure of PZR level instrument-low	3.4/3.6
012000		DNB	3.3/3.8
[illegible]	2	Knowledge of the annunciator alarms and indications, and use of the response instructions	2.9/3.1
		RCS	3.4/3.4
		AFW system	3.6/3.5
[illegible]		Ability to locate and operate components, including local controls	3.6/3.6
029000K302		Containment entry	2.9/3.5
033000K303		Spent fuel temperature	3.0/3.3
039000A302		Isolation of the MRSS	3.1/3.5
062000G009		Ability to locate and operate components, including local controls	3.2/3.3
063000G010		Ability to explain and apply all system limits and precautions	3.1/3.2
064000K411		Automatic load sequencer: safeguards	3.5/4.0
086000K406		CO}	3.0/3.3

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Knowledge and Ability Record Form
PLANT SYSTEMS
PWR - Reactor Operator - 51 %

Group III Plant Systems Target: 8 % Actual: 7.1 %

005 RHRS 008 CCWSS 028 HRPS 041 SDS 076 SWS 103 Containment
007 PRTS 027 CIRS 034 FHES 045 MT/G 078 IAS

K/A	Rep	Topic	Rating R/S
005000K407		System protection logics, including high-pressure interlock, reset controls, and valve interlocks	3.2/3.5
007000K401		Quench tank cooling	2.6/2.9
008000K102		Loads cooled by CCWS	3.3/3.4
008030A304		Automatic actions associated with the CCWS that occur as a result of a safety injection signal	3.6/3.7
034000A201		Dropped fuel element	3.6/4.4
041020K417		Reactor trip	3.7/3.9
076000G010		Ability to explain and apply all system limits and precautions	2.7/2.9

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Knowledge and Ability Record Form
EMERGENCY PLANT EVOLUTIONS
PWR - Reactor Operator - 36 %

Group I Emergency and Abnormal Plant Evolutions Target: 16 % Actual: 16.3 %

000005 Inoperable/Stuck Rod	000040 Steam Line Rupture	000067 Plant Fire Onsite
000015 RCP Motor Malfunction	000051 Loss of Vacuum	000068 CR Evacuation
000024 Emergency Boration	000055 Blackout	000069 Loss Containment
000026 Loss of CCW	000057 Loss of AC Elec	000074 Inadeq. Core Cool
000027 PZR PCS Malfunction	Instrument Bus	000076 High RCS Activity

K/A	Rep	Topic	Rating R/S
000005G005		Knowledge of the annunciator alarms and indications, and use of the response instructions	3.1/3.3
000015G010		Ability to perform without reference to procedures those actions that require immediate operation of system components or controls	3.4/3.4
000015K207		RCP seals	2.9/2.9
000026A105		The CCWS surge tank, including level control and level alarms, and radiation alarm	3.1/3.1
000027A218		Operable control channel	3.4/3.5
000040G012		Ability to utilize symptom based procedures	3.8/4.1
000051A202		Conditions requiring reactor and/or turbine trip	3.9/4.1
000055A203		Actions necessary to restore power	3.9/4.7
000055K302		Actions contained in EOP for loss of offsite and onsite power	4.3/4.6
000057A101		Manual inverter swapping	3.7/3.7
000067A203		Fire alarm	3.3/3.5
000067G012		Ability to utilize symptom based procedures	3.4/3.4
000074K103		Processes for removing decay heat from the core	4.5/4.9
000074K304		Tripping RCPs	3.9/4.2
000074K311		Guidance contained in EOP for Inadequate Core Cooling	4.0/4.4
000076G012		Ability to utilize symptom based procedures	2.9/3.1

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Knowledge and Ability Record Form
EMERGENCY PLANT EVOLUTIONS
PWR - Reactor Operator - 36 %

Group II Emergency and Abnormal Plant Evolutions Target: 17 % Actual: 17.4 %

000001 CRW	000022 Loss of RCS Makeup	000038 SG Tube Rupture
000003 Dropped Control Rod	000025 Loss of RHR	000054 Loss of MFW
000007 Reactor Trip	000029 ATWS	000058 Loss of DC
000008 Stuck Relief Valve	000032 Loss of SRNI	000059 Loss Release
000009 Small Break LOCA	000033 Loss of IRNI	000060 GRW Release
000011 Large Break LOCA	000037 SG Tube Leak	000061 ARMS Alarm

K/A	Rep	Topic	Rating R/S
000001G008		Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications	3.2/3.8
000001G010		Ability to perform without reference to procedures those actions that require immediate operation of system components or controls	3.9/4.0
000003A201		Rod position indication to actual rod position	3.7/3.9
000007G010		Ability to perform without reference to procedures those actions that require immediate operation of system components or controls	4.2/4.1
000008K101		Thermodynamics and flow characteristics of open or leaking valves	3.2/3.7
000009A237		Existence of adequate natural circulation	4.2/4.5
000011A103		Securing of RCPs	4.0/4.0
000011A105		Manual and/or automatic transfer of suction of charging pumps to borated source	4.3/3.9
000025G011		Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures	3.6/3.9
000029G011		Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures	4.4/4.6
000029K301		Verifying a reactor trip; methods	4.2/4.5
000029K312		Actions contained in EOP for ATWS	4.4/4.7
000033A202		Indications of unreliable intermediate-range channel operation	3.3/3.6
000038K302		Prevention of secondary PORV cycling	4.4/4.5
000054G012		Ability to utilize symptom based procedures	3.2/3.2
000058A101		Crosstie of the affected dc bus with the alternate supply	3.4/3.5
000059A102		ARM system	3.3/3.4

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Knowledge and Ability Record Form
EMERGENCY PLANT EVOLUTIONS
PWR - Reactor Operator - 36 %

Group III Emergency and Abnormal Plant Evolutions Target: 3 % Actual: 3.1 %

000028 Pressure Level Malfunction
000036 Fuel Handling Accident
000056 Loss of OffSite Power
000065 Loss of Instrument Air

K/A	Rep	Topic	Rating R/S
000056A214		Operational status of ED/Gs (A nd B)	4.4/4.6
000065A201		Cause and effect of low-pressu instrument air alarm	2.9/3.2
000065G010		Ability to perform without ref ence to procedures those actions that require im diate operation of system components or controls	3.2/3.3

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U. S. NUCLEAR REGULATORY COMMISSION
SITE SPECIFIC EXAMINATION
REACTOR OPERATOR LICENSE
REGION 2

CANDIDATE'S NAME: _____

FACILITY: Catawba 1 & 2

REACTOR TYPE: PWR-WEC4

DATE ADMINISTERED: 92/10/16

INSTRUCTIONS TO CANDIDATE:

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires a final grade of at least 80%. Examination papers will be picked up four (4) hours after the examination starts.

TEST VALUE	CANDIDATE'S SCORE	%	
100.00		%	TOTALS
	FINAL GRADE		

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

_____
Candidate's Signature

MASTER
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A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

If you change your answer, write your selection in the blank.

MULTIPLE CHOICE

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036 a b c d ___
037 a b c d ___
038 a b c d ___
039 MATCHING
a ___
b ___
c ___

MULTIPLE CHOICE

040 a b c d ___

MASTER COPY

A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

If you change your answer, write your selection in the blank.

041 MATCHING

a ___

b ___

c ___

MULTIPLE CHOICE

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A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

If you change your answer, write your selection in the blank.

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(********** END OF EXAMINATION **********)

NRC RULES AND GUIDELINES FOR LICENSE EXAMINATIONS

During the administration of this examination the following rules apply:

1. Cheating on the examination means an automatic denial of your applicatio and could result in more severe penalties.

2. After the examination has been completed, you must sign the statement on the cover sheet indicating that the work is your own and you have not received or given assistance in completing the examination. This must be done after you complete the examination.

3. Restroom trips are to be limited and only one applicant at a time may leave. You must avoid all contacts with anyone outside the examination room to avoid even the appearance or possibility of cheating.

4. Use black ink or dark pencil ONLY to facilitate legible reproductions.

5. Print your name in the blank provided in the upper right-hand corner of the examination cover sheet and each answer sheet.

6. Mark your answers on the answer sheet provided. USE ONLY THE PAPER PROVIDED AND DO NOT WRITE ON THE BACK SIDE OF THE PAGE.

7. Before you turn in your examination, consecutively number each answer sheet, including any additional pages inserted when writing your answers on the examination question page.

8. Use abbreviations only if they are commonly used in facility literature. Avoid using symbols such as < or > signs to avoid a simple transposition error resulting in an incorrect answer. Write it out.

9. The point value for each question is indicated in parentheses after the question.

10. Show all calculations, methods, or assumptions used to obtain an answer to any short answer questions.

11. Partial credit may be given except on multiple choice questions. Therefore, ANSWER ALL PARTS OF THE QUESTION AND DO NOT LEAVE ANY ANSWER BLANK.

12. Proportional grading will be applied. Any additional wrong information that is provided may count against you. For example, if a question is worth one point and asks for four responses, each of which is worth 0.25 points, and you give five responses, each of your responses will be worth 0.20 points. If one of your five responses is incorrect, 0.20 will be deducted and your total credit for that question will be 0.80 instead of 1.00 even though you got the four correct answers.

13. If the intent of a question is unclear, ask questions of the examiner only.

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14. When turning in your examination, assemble the completed examination with examination questions, examination aids and answer sheets. In addition, turn in all scrap paper.

15. Ensure all information you wish to have evaluated as part of your answer is on your answer sheet. Scrap paper will be disposed of immediately following the examination.

16. To pass the examination, you must achieve a grade of 80% or greater.

17. There is a time limit of four (4) hours for completion of the examination.

18. When you are done and have turned in your examination, leave the examination area (EXAMINER WILL DEFINE THE AREA). If you are found in this area while the examination is still in progress, your license may be denied or revoked.

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QUESTION: 001 (1.00)

If a valve is found out of position during independent verification of its position, which ONE [1] of the following actions must be taken or performed?

a. Immediately notify the operator at the controls [OATC] and reposition the valve with the OATC's permission.

b. Immediately notify the shift supervisor [SS] and reposition the valve with the SS's permission.

c. Immediately reposition the valve, then notify the OATC.

d. Immediately reposition the valve, then notify SS.

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QUESTION: 002 (1.00)

Which ONE [1] of the following statements describes the PURPOSE [as defined in OMP 2-18 "Tagout Removal and Restoration [R&R] Procedure"] of the Venting Restoration Sheet?

a. Explain how to vent equipment prior to maintenance.

b. Describe how to vent infrequently operated equipment prior to operation of the equipment.

c. Record equipment placed in an "OUT OF NORMAL" condition and to insure the equipment is returned to its normal condition.

d. Document independent verification of vent valves.

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QUESTION: 003 (1.00)

Which ONE [1] of the following radiation exposures describes a Duke Power Company administrative radiation exposure limit?

a. 3000 mRems/quarter gamma exposure to the whole body.

b. 6000 mRems/quarter gamma exposure to the skin.

c. 52 MPC-hours internal radiation exposure in any seven days.

d. 1500 MPC-hours internal radiation exposure per quarter.

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QUESTION: 004 (1.00)

Which ONE [1] of the following statements describes how operators are identified by the use of color coded identification tape while in the Lower Containment during outages?

a. Yellow tape worn on the upper portion of the arm.

b. Red tape worn on the shoulder.

c. Magenta and yellow tape worn on the chest.

d. Green tape worn on the upper part of the body.

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QUESTION: 005 (1.00)

If all factors are equal, which ONE [1] of the following volunteers should be selected for a Planned Emergency Exposure?

a. 20 year old man.

b. 30 year old woman.

c. 40 year old man.

d. 50 year old woman.

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QUESTION: 006 (1.00)

The following plant conditions exist:

- The plant is in MODE 4.
- Personnel must work in the main steam doghouse.

Which ONE [1] of the following positions must be notified of personnel working in the main steam doghouse?

a. Operator at the controls and Shift Supervisor.

b. Operator at the controls and Balance of Plant Operator.

c. Individual's work supervisor and Protected Area First Aid Staff.

d. Individuals's work supervisor and Security Medical Emergency Response Team [MERT].

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QUESTION: 007 (1.00)

Which ONE [1] of the following must grant approval prior to entry into areas posted as Confined Spaces?

a. Radiation Protection.

b. Control Room.

c. Safety Section.

d. Security.

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QUESTION: 008 (1.00)

Which ONE [1] of the following conditions or items should have an entry in the Open Item Summary of the Control Room Logbook?

a. Any Control Room equipment placed in an "Out of Normal" position and not R&R'd.

b. Any OPERABLE automatic valve in an abnormal position and R&R'd.

c. Initiation of Shutdown Requests.

d. Temporary Modifications [Brown Tags].

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QUESTION: 009 (1.00)

Which ONE [1] of the following positions is responsible for maintaining the Control Room Annunciator Status Log?

a. Balance of Plant Operator.

b. Operator at the Controls.

c. Shift Supervisor.

d. Unit Supervisor.

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QUESTION: C10 (1.00)

Which ONE [1] of the following statements describes how revisions are designated on the C ntrol Room copy of electrical elementary diagrams [CNEE]?

a. The diagram will be red-marked to show the details of the modification and stamped "OPS INTERIM".

b. The diagram will be red-marked to show the details of the modification and stamped "AS-BUILT".

c. The revised area will be outlined in red ink and the diagram will be stamped "SEE INTERIM AS-BUILT".

d. The revised area will be blacked out and the diagram stamped "SEE OPS INTERIM IN THE DRAWING SUPPLEMENT FILE."

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QUESTION: 011 (1.00)

If the Charlotte Dispatcher notifies Catawba Nuclear Station that the Unit Interface Controller [UIC] operating limits require resetting, which ONE [1] of the following positions is responsible for resetting the UIC operating limits?

a. Nuclear Control Operator or Shift Support Technician.

b. Operator at the Controls or Shift Technical Advisor.

c. Shift Operations Manager or Unit Operations Manager.

d. Maintenance Engineering Services or Protective Relay Engineering Group.

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QUESTION: 012 (1.00)

Which ONE [1] of the following individual[s] is authorized to adjust the sound level of annunciators in the Control Room?

a. Operator at the Controls.

b. Shift Support Technician.

c. Nuclear Control Operator.

d. I&E personnel.

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QUESTION: 013 (1.00)

A non-licensed operator [NLO] who is NOT in an approved license training class is doing Control Room observation. Which ONE [1] of the following Control Room equipment or operations may the NLO operate or perform under the direct observation of an actively licensed RO or SRO?

a. Boration of Reactor Coolant System.

b. Startup of Residual Heat Removal System.

c. Reactor Coolant Pump.

d. Turbine Generator.

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QUESTION: 014 (1.00)

Which ONE [1] of the following descriptions explains why 125 Vdc and 70 Vdc power supplies are used in the DC Hold Cabinet?

a. The 70 Vdc is used to latch the grippers and the 125 Vdc is used to hold the grippers.

b. The grippers are latched by adding the 125 Vdc and 70 Vdc then the 125 Vdc is used to hold the grippers.

c. 125 Vdc is used to latch the grippers and 70 Vdc is used to hold the grippers.

d. 125 Vdc is used to latch the grippers and as an alternate hold voltage; and 70 Vdc is used to hold the grippers and as an alternate latch voltage.

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QUESTION: 015 (1.00)

Which ONE [1] of the following statements describes a feature of the "Intermediate Range [IR] High Flux Rod Stop"?

a. Blocked by IR Hi flux trip block pushbutton.

b. Affects only automatic withdrawal.

c. Setpoint is the current equivalent to 20% power on 2/2 channels.

d. Prevents automatic rod withdrawal when less than 15% power.

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QUESTION: 016 (1.00)

Which ONE [1] of the following reasons explains why the control banks are overlapped?

a. Permits the use of a lower rod insertion limit.

b. Reduces the number of required Control Rod Drive Mechanisms.

c. Reduces the consequences of a continuous rod withdrawal accident.

d. Gives a more uniform reactivity addition per rod step.

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QUESTION: 017 (1.00)

Which ONE [1] of the following reasons explains WHY the Urgent Failure Alarm Reset pushbutton should not be depressed for greater than one [1] second?

a. CRDM coils could overheat and fail.

b. Supervisory Memory Buffer Circuit could saturate and cause bank overlap to occur prematurely.

c. Multiplexing thyristors and sampling resistors may be damaged from excessive cycling.

d. Urgent Failure Alarm may NOT actuate due to overheating of pushbutton contacts.

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QUESTION: 018 (1.00)

Which ONE [1] of the following statements explains WHY each reactor coolant pump [NCP] has a safety breaker installed in series with its 6900 V supply breaker?

a. Prevent damage to the high voltage supply.

b. To prevent a mechanical failure of the electrical penetration assembly due to fault current if one protective device fails.

c. To prevent damage to the high voltage [6900 V] supply breaker in the event of an NCP sheared shaft.

d. To prevent damage to the high voltage [6900 V] supply breaker in the event of an NCP locked rotor.

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QUESTION: 019 (1.00)

Which ONE [1] of the following statements explains how an operator determines that the water supply to a Reactor Coolant Pump [NCP] #2 seal is adequate?

a. Observing #1 seal leakoff of 3 gpm.

b. Observing NCP seal injection flow of 8 gpm.

c. Observing NCDT pressure of 15 psig.

d. Observing VCT pressure of 20 psig.

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QUESTION: 020 (1.00)

If NC [Reactor Coolant] System cold leg temperature is 265 degrees F, which ONE [1] of the following statements explains why secondary water temperature must be less than 315 degrees F prior to starting the NC Pumps?

a. Protect against NC System overpressure caused by energy additions from the secondary.

b. Protect against a loss of shutdown margin caused by energy loss to the secondary.

c. Prevent excessive NC System cooldown rates.

d. Prevent loss of pressurizer level due to excessive NC System cooldown.

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QUESTION: 021 (1.00)

The following plant conditions exist:

- The plant is operating at 100% power at BOL.
- All systems are operable.
- Control Bank "D" starts stepping in slowly, but at a noticeable rate.

Which ONE [1] of the following events will cause this response?

a. A leak has developed in the Regenerative Heat Exchanger.

b. A leak has developed in the Letdown Heat Exchanger.

c. A leak has developed in the tube bundle of the Seal Water Heat Exchanger.

d. A leak in the Excess Letdown Heat Exchanger.

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QUESTION: 022 (1.00)

The following plant conditions exist:

- Boric Acid Transfer Pump 1A running following an auto start demand from the Reactor Makeup system
- A spurious Ss signal was received

Which ONE [1] of the following operations must be performed to shutdown Boric Acid Transfer Pump 1A following reset of the Ss [Safety Injection] sequencer?

a. Select "OFF" on the pump control switch.

b. Start the other Boric Acid Transfer Pump.

c. Verify that the VCT level is above the auto makeup setpoint and select "OFF" on the pump control switch.

d. Reset the Boric Acid Transfer Pump and select "OFF" on the pump control switch.

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QUESTION: 023 (1.00)

If a steam leak on Unit 2 is causing steamline pressure to decrease at a constant rate, which ONE [1] of the following statements explains the plant's response to the steam leak?

a. A steamline low pressure safety injection [SI] will occur at an indicated pressure less than the setpoint.

b. A steamline low pressure SI will occur at an indicated pressure greater than the setpoint.

c. Since the steamline low pressure SI circuit is rate sensitive, the rate of decrease is multiplied by 10 and an SI will occur when the rate of decrease reaches 100 psi/sec.

d. Since the steamline low pressure SI circuit is rate sensitive, the constant rate of change is multiplied by 10 and an SI will occur at an indicated pressure less than the setpoint or the rate of decrease is greater than 100 psi/sec.

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QUESTION: 024 (1.00)

If an operator initiates a manual feed water isolation by pushing the Train A RESET pushbutton in error [rather than the Train A INITIATE pushbutton] and then pushes the Train B INITIATE pushbutton, which ONE [1] of the following statements describes the plant response?

a. Both Trains will isolate.

b. Neither Train will isolate.

c. Only Train A will isolate.

d. Only Train B will isolate.

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QUESTION: 025 (1.00)

The following plant conditions exist:

- Unit 2 at 43% power.
- The Digital Rod Display System "NON-URGENT" Annunciator is in alarm.
- No other alarms have been received.

Which ONE [1] of the following conditions caused the alarm?

a. Data B failure.

b. All three control units failed.

c. Data A rod position is 180 steps and Data B rod position is 192 steps.

d. A rod is stuck.

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QUESTION: 026 (1.00)

The following readings were noted on the Power Range and Intermediate Range Channels:

N-35 @ 5 x 10E-5
N-36 @ 8 x 10E-6
N-41 @ 8.5%
N-42 @ 9%
N-43 @ 8.5%
N-44 @ 9%

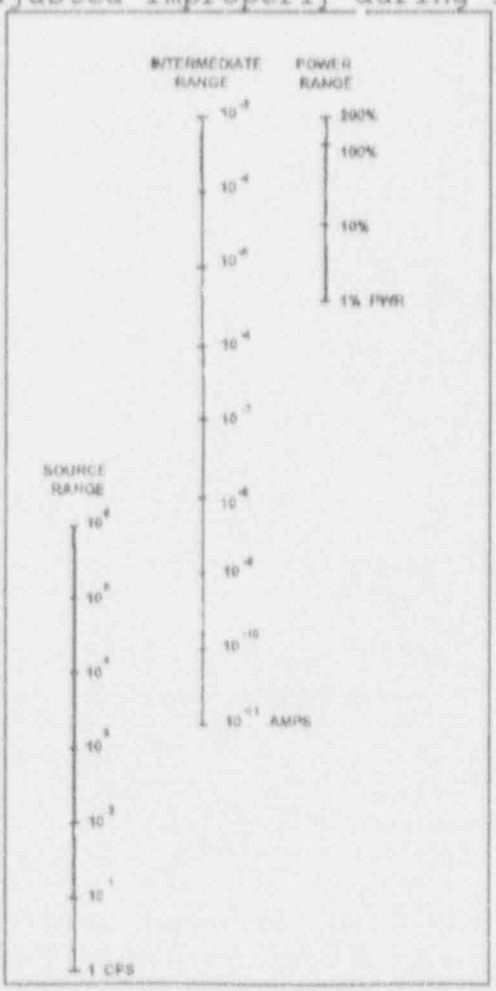
Which ONE [1] of the following describes the problem indicated by these readings? [See figure below]

a. N-35 reading high for current conditions.

b. N-36 reading low for current conditions.

c. N-41 and N-43 adjusted improperly during last calorimetric.

d. N-42 and N-44 adjusted improperly during last calorimetric.



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QUESTION: 027 (1.00)

The reactor is operating at 13% power when Intermediate Range Nuclear Instrument N-35 fails LOW. Which ONE [1] of the following responses will occur.

a. Reactor Trips on Source Range High Flux Level Trip.

b. Intermediate Range [IR] High Flux Rod Stop [C-1] comes in.

c. Power Above Permission P-10 status light for N-35 goes out.

d. Power Above Permissive P-6 status light for N-35 goes out.

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QUESTION: 028 (1.00)

If a Containment entry is made during reactor startup with the Intermediate Range reading less than 10 E-10 amps, which ONE [1] of the following reasons explains why the Containment Evacuation Alarm cannot be used to warn personnel to evacuate containment?

a. High Flux at Shutdown Alarm is blocked.

b. High Flux at Shutdown Alarm only sounds the annunciator in the Control Room.

c. Source Range High Level Reactor Trip is blocked.

d. Alarm actuation may initiate magnetic interference that could cause a spurious reactor trip.

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QUESTION: 029 (1.00)

Which ONE [1] of the following statements explains how Control Room operators can recognize that an incore thermocouple is being monitored at the Incore Thermocouple Panel?

a. The plant computer thermocouple temperature will be indicated by a yellow reading.

b. The plant computer will show an alarm because the signal to the computer will be disconnected.

c. The local control annunciator will alarm.

d. The thermocouple temperature reading will flash on the plant computer screen.

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QUESTION: 030 (1.00)

If the Lower Containment Ventilation units are shifted to HIGH speed, which ONE [1] of the following statements describes how the Containment Ventilation [VV] System responds?

a. Both the thermostat valve and the cooling water bypass fail closed.

b. The thermostat valve fails closed and the cooling water bypass is throttled to control temperature.

c. Both the cooling water bypass valve and thermostatically controlled valve fail open.

d. The cooling water bypass fails open to allow the thermostat valve to control on temperature.

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QUESTION: 031 (1.00)

According to Technical Specification Bases, which ONE (1) of the following statements describes the effect of operation with the Ice Condenser Doors open?

a. In the event of a LOCA, the containment peak pressure transient may exceed 14.7 psig.

b. In the event of a LOCA, the containment peak pressure transient will be less than 14.7 psig.

c. During a LOCA the released Reactor Coolant System Fluid may be diverted away from the ice condenser bays.

d. Inadequate sublimation of the ice bed may not occur because of warm air intrusion.

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QUESTION: G37 (1.00)

The following plant conditions exist:

- Unit 2 at 54% power
- P-14 [Hi Hi S/G Level] came in momentarily on the Unit 2 "C" S/G and then cleared.

Which ONE [1] of the following statements describe how the Feedwater [CF] System on Unit 2 responds to these conditions?

a. Feedwater isolation occurs because a turbine trip and reactor trip will be generated.

b. The CF Bypass to CA Nozzle valves start to close and then reopen.

c. The CF Pump Discharge valves go closed and remain closed.

d. The Containment Isolation Bypass valves go open and then close.

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QUESTION: 033 (1.00)

Which ONE [1] of the following statements explain why the Feedwater [CF] Pump discharge valve is opened last and shut first when starting and stopping a CF pump?

a. Prevent pump overspeed.

b. Prevent suction line overpressure.

c. Prevent pump runout.

d. Prevent pump cavitation.

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QUESTION: 034 (1.00)

Which ONE [1] of the following statements concerning the Auxiliary Feedwater System describes the operation of the Turbine Driven Pump [TDCA]?

a. If instrument air pressure is lost, the steam isolation valves fail open to start the TDCA.

b. If either of the Motor Driven Pump's [MDCA] flow exceeds 780 gpm after a valid start signal, the TDCA will auto start.

c. The TDCA pump will auto start upon loss of both Main Feedwater pumps.

d. The TDCA will automatically start upon an undervoltage signal on one [1] NCP bus.

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QUESTION: 035 (1.00)

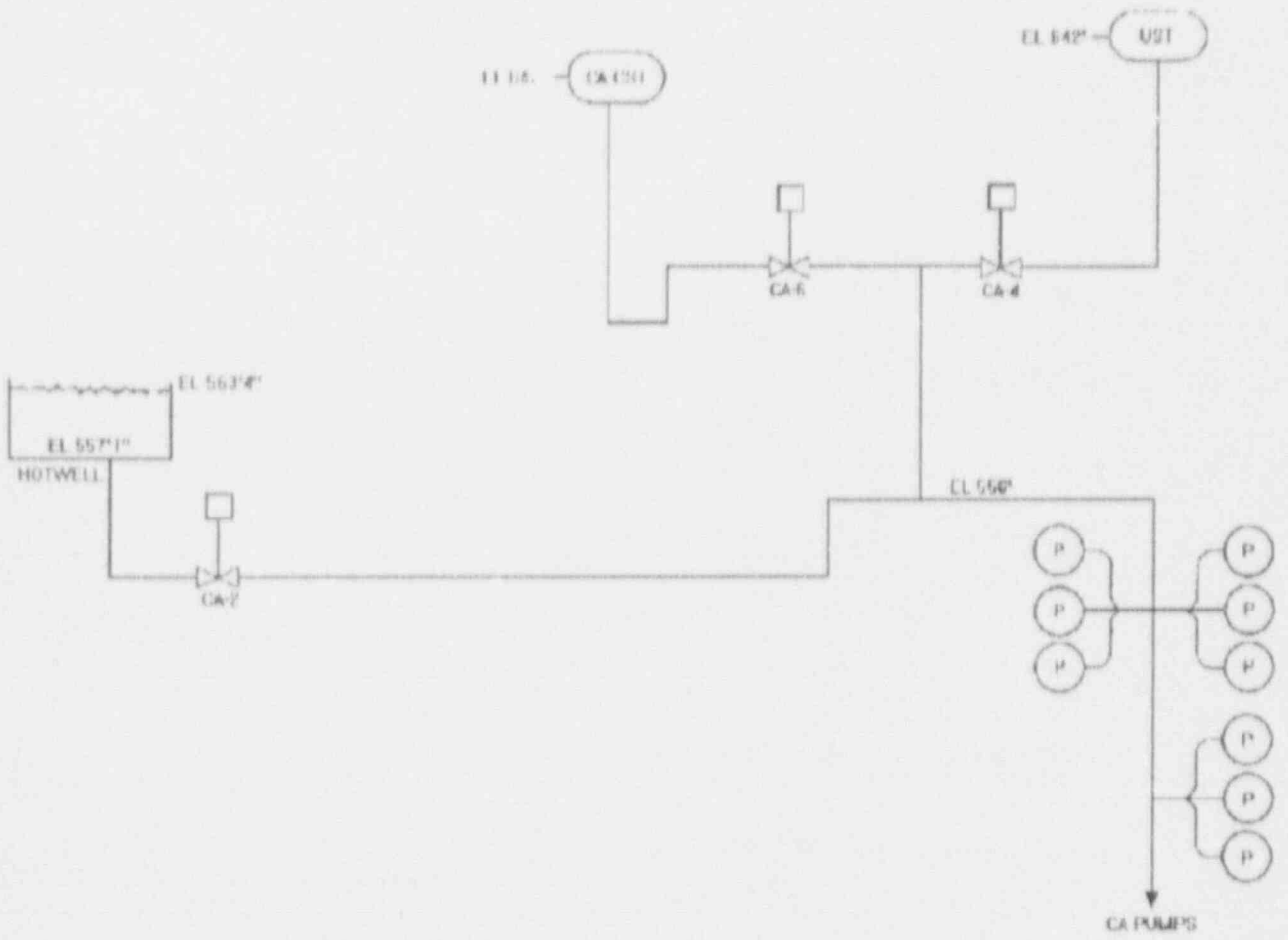
Which ONE [1] of the following statements describes the control placed on CA-6? [See Drawing CN-CF-CA-2 below]

a. CA-6 must remain open to allow overflow to the UST [Upper Surge Tank].

b. CA-6 must remain open to prevent overflow of the Auxiliary Feedwater Condensate Storage tank.

c. CA-6 cannot be closed unless the UST is less than 90%.

d. CA-6 cannot be closed without management approval.



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QUESTION: 036 (1.00)

Which ONE [1] of the following reasons explains why the AC input breaker must be closed first when placing a battery charger in service?

a. To prevent exceeding the auctioneering Diode Assembly peak voltage limit when closing the output breaker.

b. To ensure charging rectifiers are not exposed to an overvoltage condition when closing circuit breakers.

c. To protect the output breakers from heavy surge currents.

d. To limit charging current to minimize battery explosion potential.

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QUESTION: 037 (1.00)

Refer to the RP 30A Module shown below:

- The TRIP 2 light is off
- The TRIP 1 light is off
- The OPERATE light is off

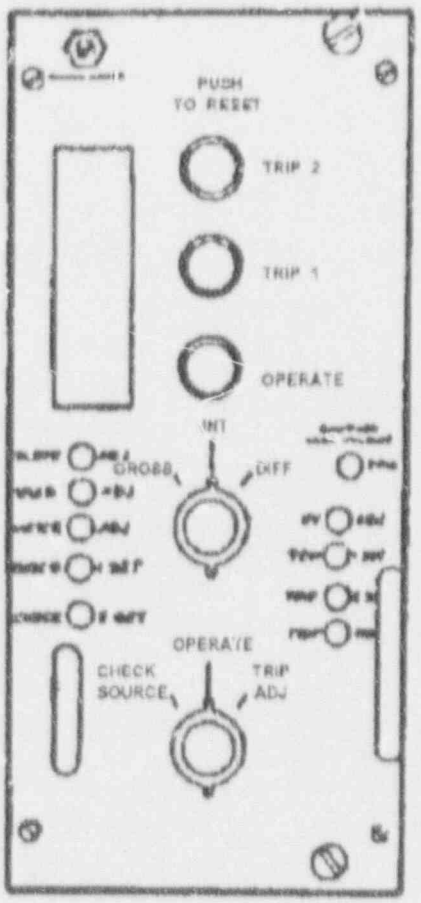
Which ONE (1) of the following reasons explains why the OPERATE light is off?

a. The INT position is selected so all pulses less than the preset threshold are ignored.

b. The signal has been lost due to detector failure.

c. The TRIP 1 signal has cleared but has not been reset.

d. The TRIP 2 signal has cleared but has not been reset.



RP 30A MODULE

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QUESTION: 038 (1.00)

Which ONE [1] of the following statements describe the use of installed sources in Area Radiation Monitors [EMF]?

a. NC filters area EMF uses an installed source to verify alarms.

b. Steam line EMF use an installed source to prevent spurious alarms.

c. Reactor Building Refueling Bridge EMF uses an installed source to prevent spurious alarms.

d. Check sources have been removed from Area Radiation Monitors for ALARA concerns.

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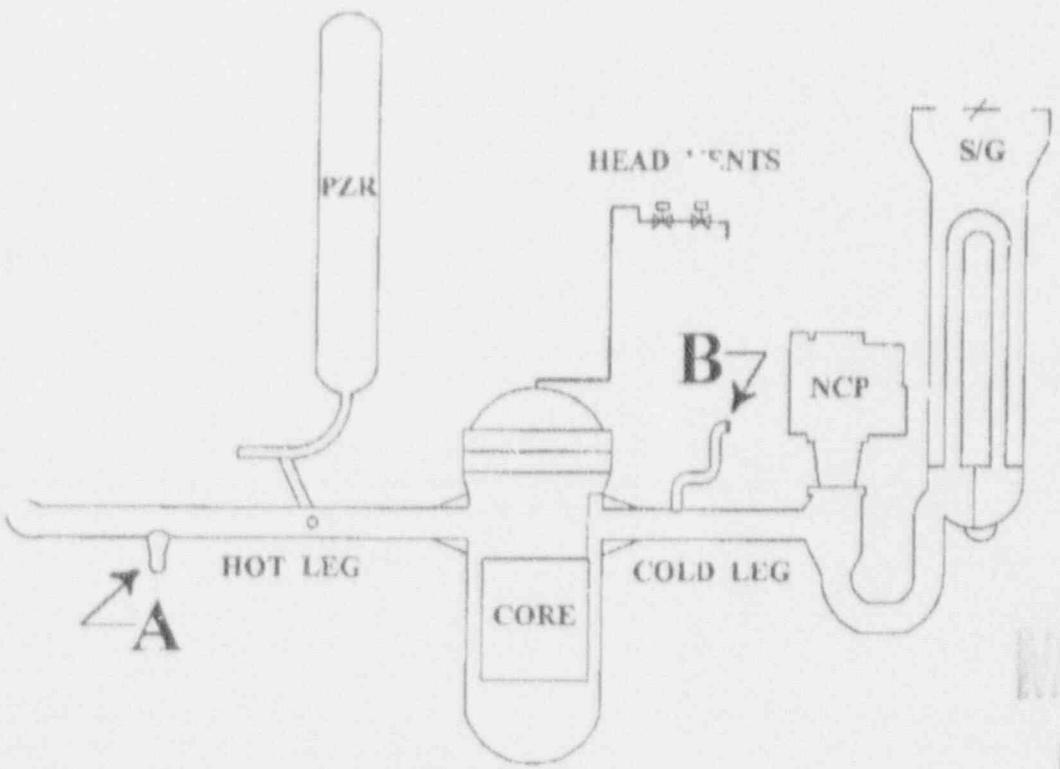
QUESTION: 039 (1.50)

For the drawing below, match the Reactor Coolant [NC] loop or system from Column B with the connections in Column A. [NOTE: Items in Column B can only be used once, and only a single answer may occupy one answer space.]

Column A [CONNECTION]		Column B [LOOP/SYSTEM]
-----	a. Pressurizer [PZR]	1. Loop A
-----	b. Loop B Hot Leg Connection "A"	2. Loop B
-----	c. Loop C Cold Leg Connection "B"	3. Loop C
		4. Loop D
		5. ND pump "A" Suction
		6. Normal Charging
		7. NI Discharge [Injection Phase]
		8. Pressurizer Spray



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QUESTION: 040 (1.00)

If all Reactor Coolant [NC] Pumps are off, which ONE [1] of the following Reactor Vessel Level Indicating System [RVLIS] indications is/are valid?

a. Train A upper range and Train B D/P Range.

b. Train A upper range and Train B lower range.

c. Train A D/P range and Train B upper range.

d. Train A D/P range and Train A lower range.

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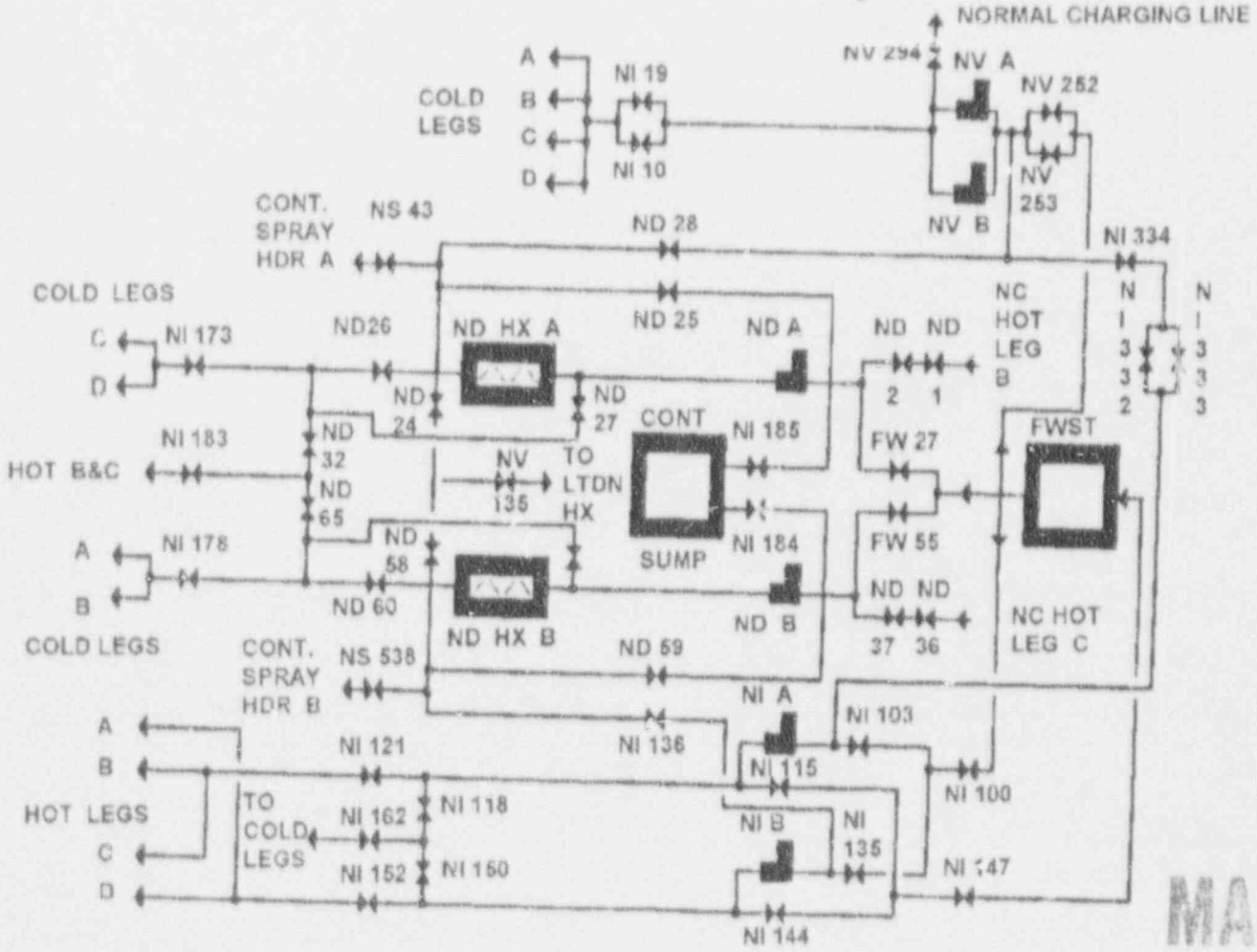
QUESTION: 041 (1.50)

For the ECCS drawing below match the interlock condition from Column B that is required to open the valves in Column A. [NOTE: Items in Column B can only be used once, and only a single answer may occupy one answer space.]

Column A [VALVES]		Column B [INTERLOCK CONDITION]
_____	a. NI 136 and NI 184	1. NC pressure less than 385 psig
		2. FW 27 closed
_____	b. ND 28 and NI 185	3. FW 55 closed
		4. ND 28 closed
_____	c. NI 147 and FW 55	5. ND 1 or 2 closed
		6. ND 36 or 37 closed
		7. NI 136 closed
		8. NI 147 open
		9. NI 185 open



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QUESTION: 042 (1.00)

Which ONE [1] of the following identifies the power supplies for Pressurizer Heater Group A?

a. LXD and CDB.

b. LXH and CDB.

c. LXH and CDA.

d. LXI and CDA.

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QUESTION: 043 (1.00)

The following plant conditions exist:

- Pressurizer PORV isolation valve NC-31B is shut to isolate leaking PORV NC-32B
- PORV isolation valve NC-33A is open and PORV NC-34A is shut.
- PORV isolation valve NC-35B remained open when its control switch was placed in close to isolate a leaking PORV NC-36B

Which ONE [1] of the following actions should be taken to SHUT PORV isolation valve NC-35B?

a. Manually close NC-35B circuit breaker on CDB.

b. Manually close NC-35B circuit breaker on EMXC.

c. Position NC-35B Control Switch to "OVERRIDE" position.

d. Position NC-35B Control Switch at the ASP to "CLOSE".

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QUESTION: 044 (1.00)

The following plant conditions exist:

- Unit 1 is at 100% power.
- All control systems are in automatic.
- Pressurizer Level Control Switch is in position 1-2.
- Pressurizer Level Channel II fails LOW.

Without operator intervention, which ONE (1) of the following plant responses will occur?

a. Letdown isolates, Pressurizer Heaters shut off.

b. No effect on charging flow, no Letdown Isolation, Pressurizer Heaters shut off.

c. Charging flow to maximum, no Letdown Isolation, all Pressurizer Heaters shut off.

d. Charging flow to maximum, Letdown Isolates, Pressurizer Heaters shut off.

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QUESTION: 045 (1.00)

The following plant conditions exist:

- Delta T is 100%
- Over Temperature [OT] Delta T setpoint is 138%
- Pressurizer pressure is decreasing due to a small Reactor Coolant System leak

Which ONE [1] of the following responses describes the OT Delta T setpoint relationship to Actual Delta T?

a. Setpoint increases causing the difference between the setpoint and actual Delta T to increase

b. Setpoint decreases causing the difference between the setpoint and actual Delta T to decrease.

c. Actual Delta T increases and the setpoint decrease causing the difference between setpoint and actual Delta T to increase.

d. Actual Delta T decreases and the setpoint increases causing the difference between setpoint and actual Delta T to decrease.

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QUESTION: 046 (1.00)

If an Urgent Alarm has been received because DRPI has been unable to calculate the position of a particular control rod, how will the position indication of that rod be affected?

a. It will be unaffected as long as the rod is not moved.

b. All position LEDs and the GW LED will be flashing.

c. All LEDs will be out except the GW [flashing] and the ROD BOTTOM LED.

d. All LEDs will be out except the GW LED [flashing].

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QUESTION: 047 (1.00)

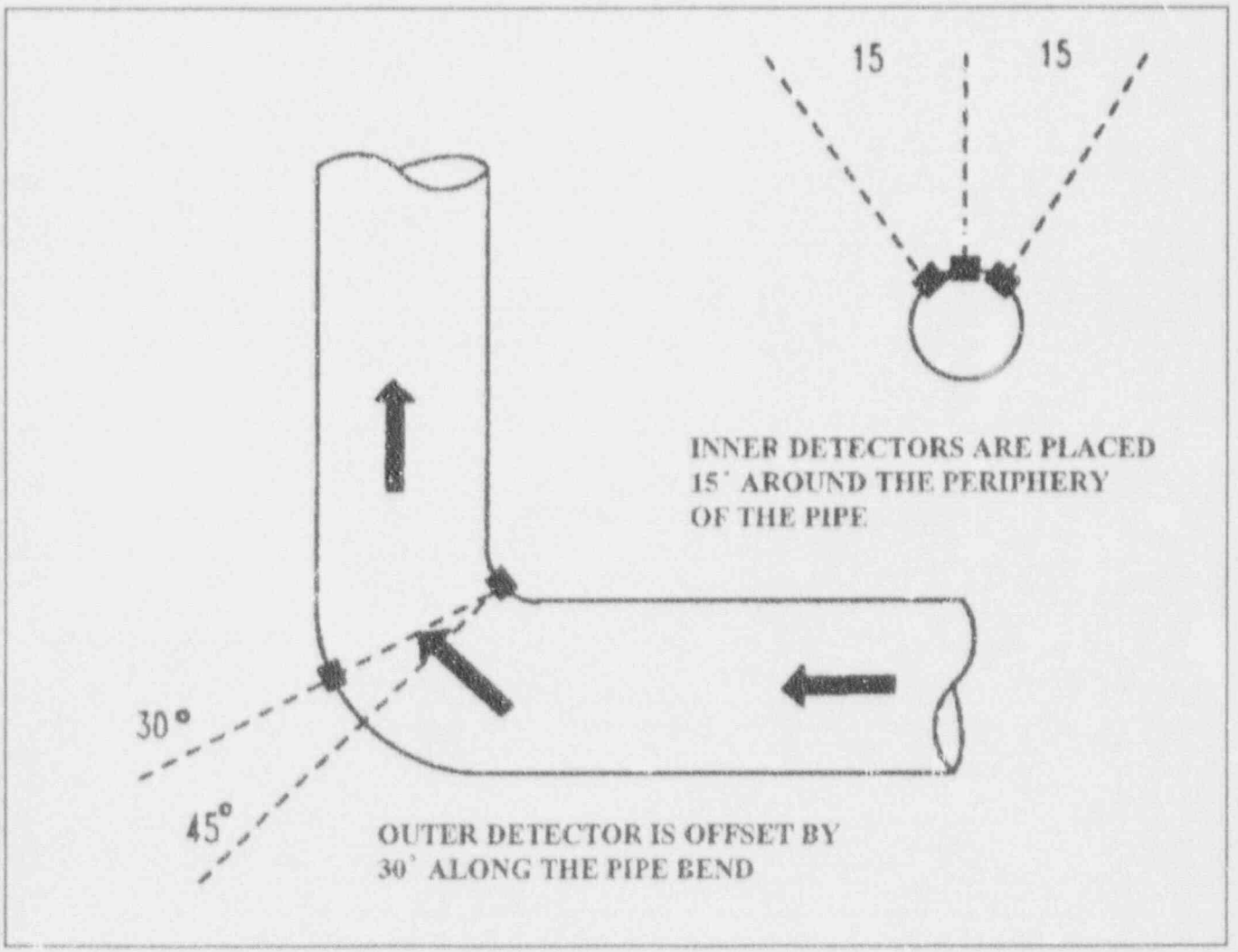
Which ONE [1] of the following statements explains why the outer Reactor Coolant Flow Detector is offset by 30 degrees along the pipe bend? [See the Reactor Coolant Flow Detector below]

a. To minimize detector output for reverse flow conditions.

b. To maximize detector output for normal flow conditions.

c. To minimize detector damage by flow erosion.

d. To maximize detector output during natural circulation.



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QUESTION: 048 (1.00)

During a power decrease on Unit 2, which ONE [1] of the following signals must be present to receive the White Swap enable light for the CA Nozzle?

a. CF to CA Bypass Valve is open.

b. CM-839 [Reverse Purge Condenser 1A Isolation] closed.

c. CF-100 [Tempering Flow Isolation] Open.

d. The associated Steam Generator's CF Containment Isolation Valve is closed.

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QUESTION: 049 (1.00)

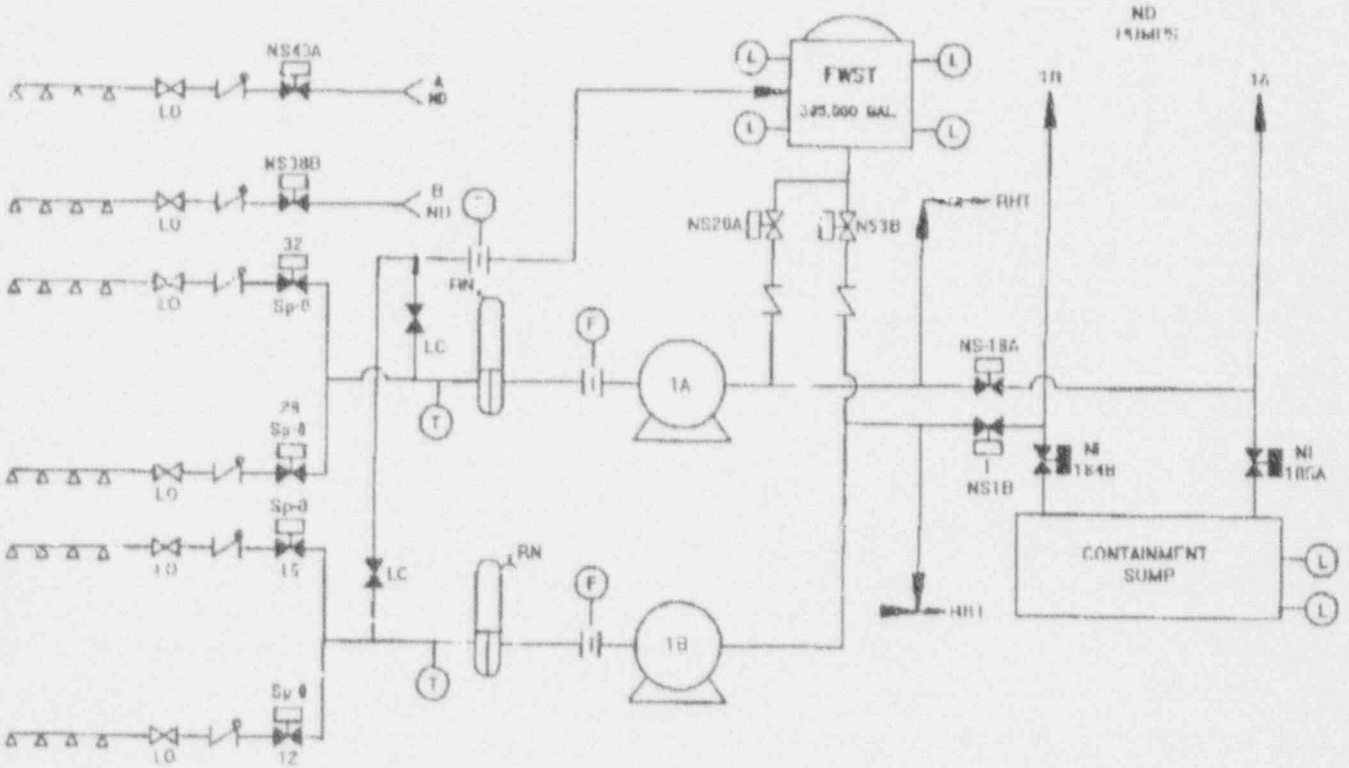
Which ONE [1] of the following sets of conditions MUST be satisfied to cool the FWST using the 1A Containment Spray [NS] Pump and cooler? [NS Drawing provided below]

a. Close NS53B and open NS1B and NI184B.

b. Close NS20A and open NA18A and NI185A.

c. Place CPCS [Containment Pressure Control System] in TEST and adjust the TEST SIGNAL to obtain the CPCS Permissive Signal.

d. Open the locked closed recirc valve and close the NS1A pump breaker at the ETB switchgear.



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QUESTION: 050 (1.00)

Which ONE [1] of the following statements describes the response of the Spent Fuel Pool Cooling System [KF] following a Blackout? [NOTE: Assume NO operator action is taken]

a. Spent Fuel Pool level and temperature will increase.

b. Spent Fuel Cooling Pumps restart automatically but the KF Skimmer Pump must be manually restarted.

c. Makeup to the Spent Fuel Pool from the Fueling Water Storage Tank [FWST] will be isolated.

d. Spent Fuel Pool level will increase because the KF makeup valves [KF-101B and KF-103A] automatically open.

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QUESTION: 051 (1.00)

If the Main Steam Isolation Valves [MSIVs] on Unit 2 are opened before pressure is completely equalized, which ONE [1] of the following responses may occur?

a. Reactor Trip due to High Pressurizer Level.

b. Safety Injection due to Steam Generator swell.

c. Main Steam Line Isolation due to high steam line pressure rate.

d. Steam Generator PORVs lifting due to moisture in the Main Steam Lines flashing to steam.

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QUESTION: 052 (1.00)

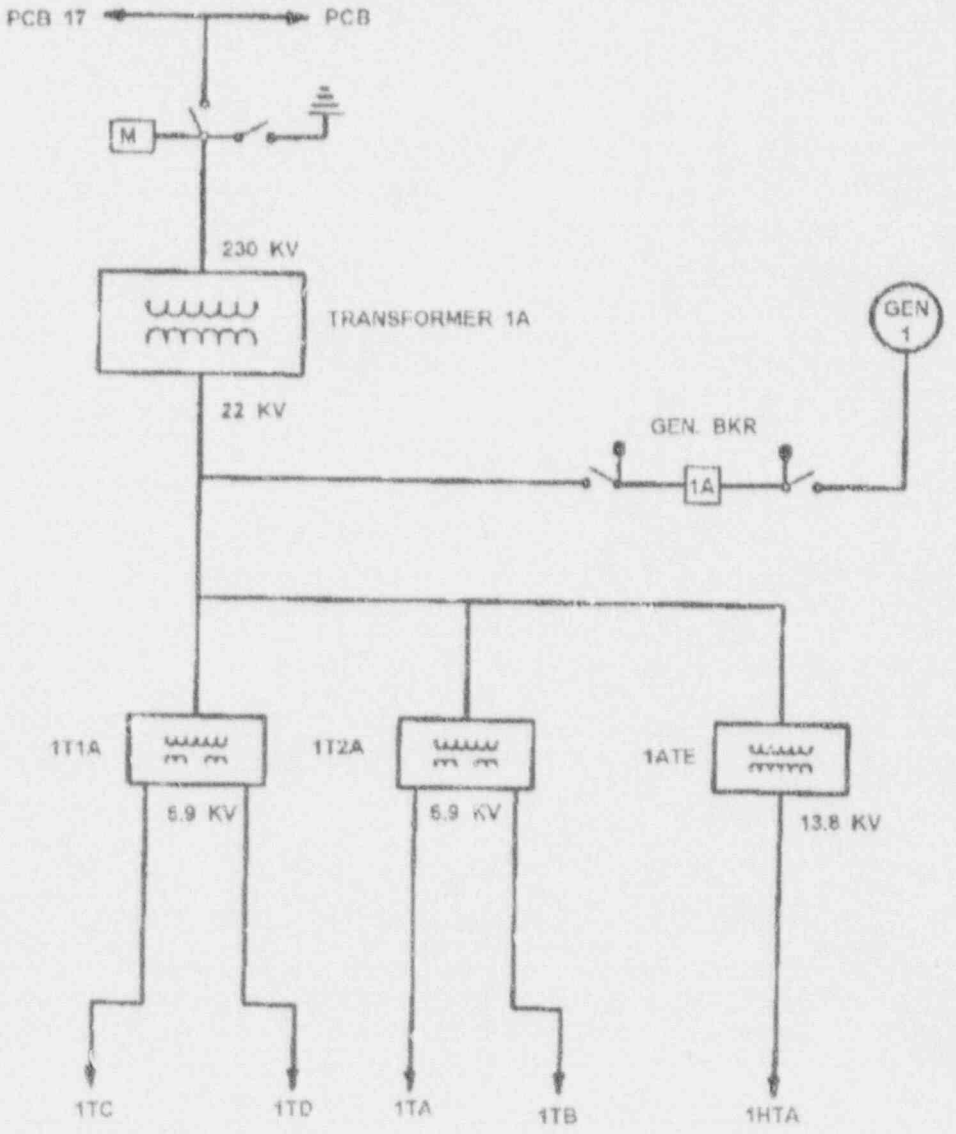
Which ONE [1] of the following statements describes how to remove Pneumatic Circuit Breaker PCB 17 from service? [See figure below]

a. Place the Control Room control switch in "TRIP" and pull to lockout; close disconnects.

b. Place the Relay House control switch in "TRIP" and pull to lockout; open disconnects.

c. Place the local control switch in "TRIP" and pull to lockout; open disconnects.

d. Install grounding device; open disconnects; rack out.



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QUESTION: 053 (1.00)

The following plant conditions exist:

- A Blackout has occurred.
- A LOCA occurs 13 seconds after the Blackout.

Which ONE [1] of the following statements describes the Emergency Diesel Generator Sequencer operation?

a. Sequencer resets; sheds all loads; and then initiates the LOCA sequence.

b. Sheds all loads; starts the accelerated sequence followed by the committed sequence.

c. Sheds non-LOCA loads and continues starting LOCA loads in the LOCA sequence.

d. Sequencer resets; sheds non LOCA loads; starts the accelerated sequence and the committed sequence.

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QUESTION: 054 (1.00)

Which ONE [1] of the following statements explains how CO2 pressure is maintained in the Diesel Generator Low Pressure CO2 storage tank?

a. The refrigeration package is manually started at 295 psig tank pressure to maintain the CO2 in a liquid state.

b. The refrigeration package is manually started at 295 psig tank pressure to maintain the CO2 in a gaseous state.

c. The refrigeration package is automatically started at 305 psig tank pressure to maintain the CO2 in a liquid state.

d. The refrigeration package is automatically started at 305 psig tank pressure to maintain the CO2 in a gaseous state.

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QUESTION: 055 (1.00)

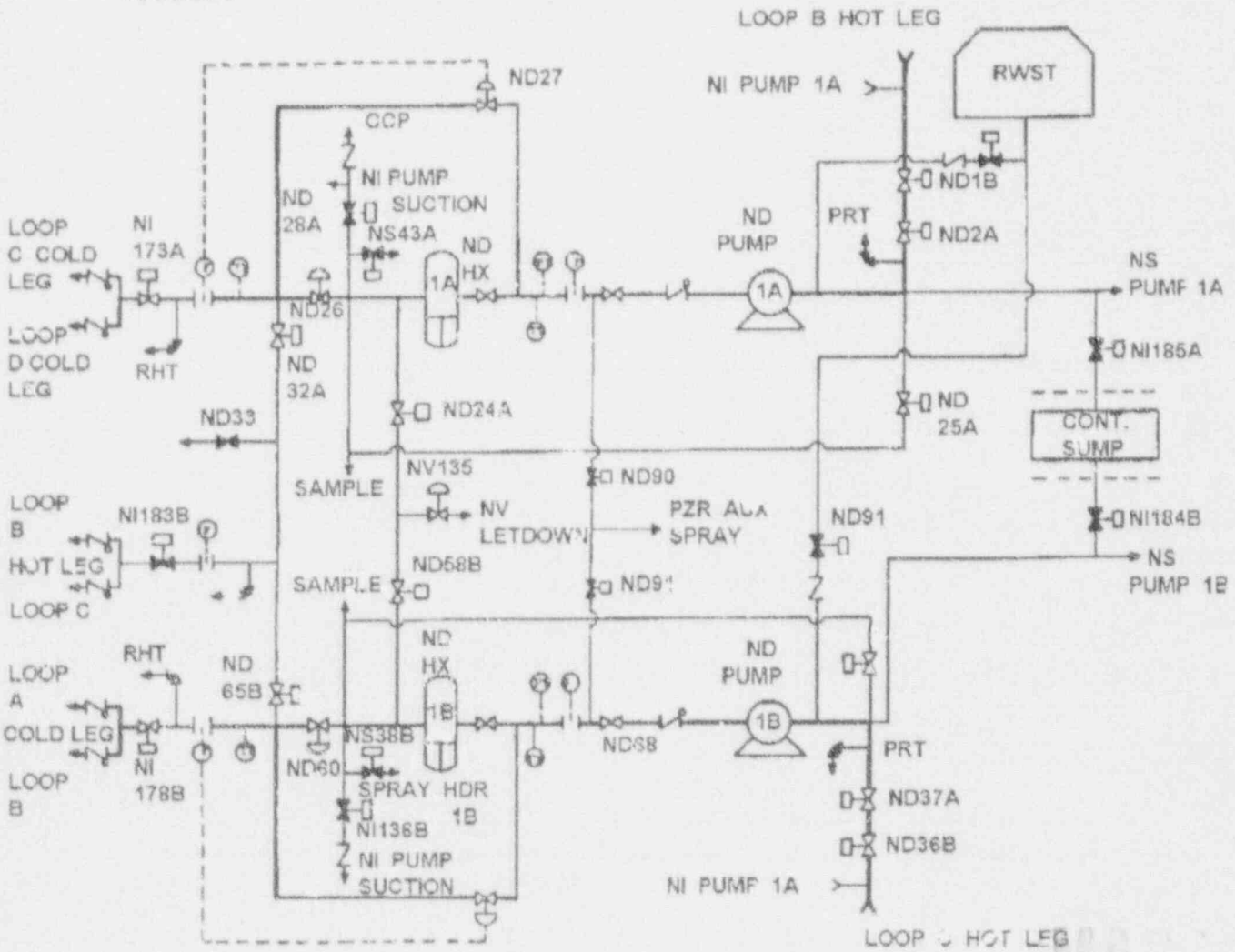
Containment Sump Isolation valves NI-184B and NI-185A automatically OPEN following a Ss [Safety Injection] with 2/4 FWST [Low Fueling Water Storage Tank] level [37%]. Which ONE [1] of the following conditions will require operator manual action to open the valves? [See ND system drawing below]

a. ECCS is reset.

b. ECCS has not been reset.

c. C-Leg Recirc FWST To CONT SUMP SWAP ENABLE light not lit.

d. NS-43A [38B], NS-18A[1B], NI-185A [184B] and ND-28A [NI-136B] closed.



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QUESTION: 056 (1.00)

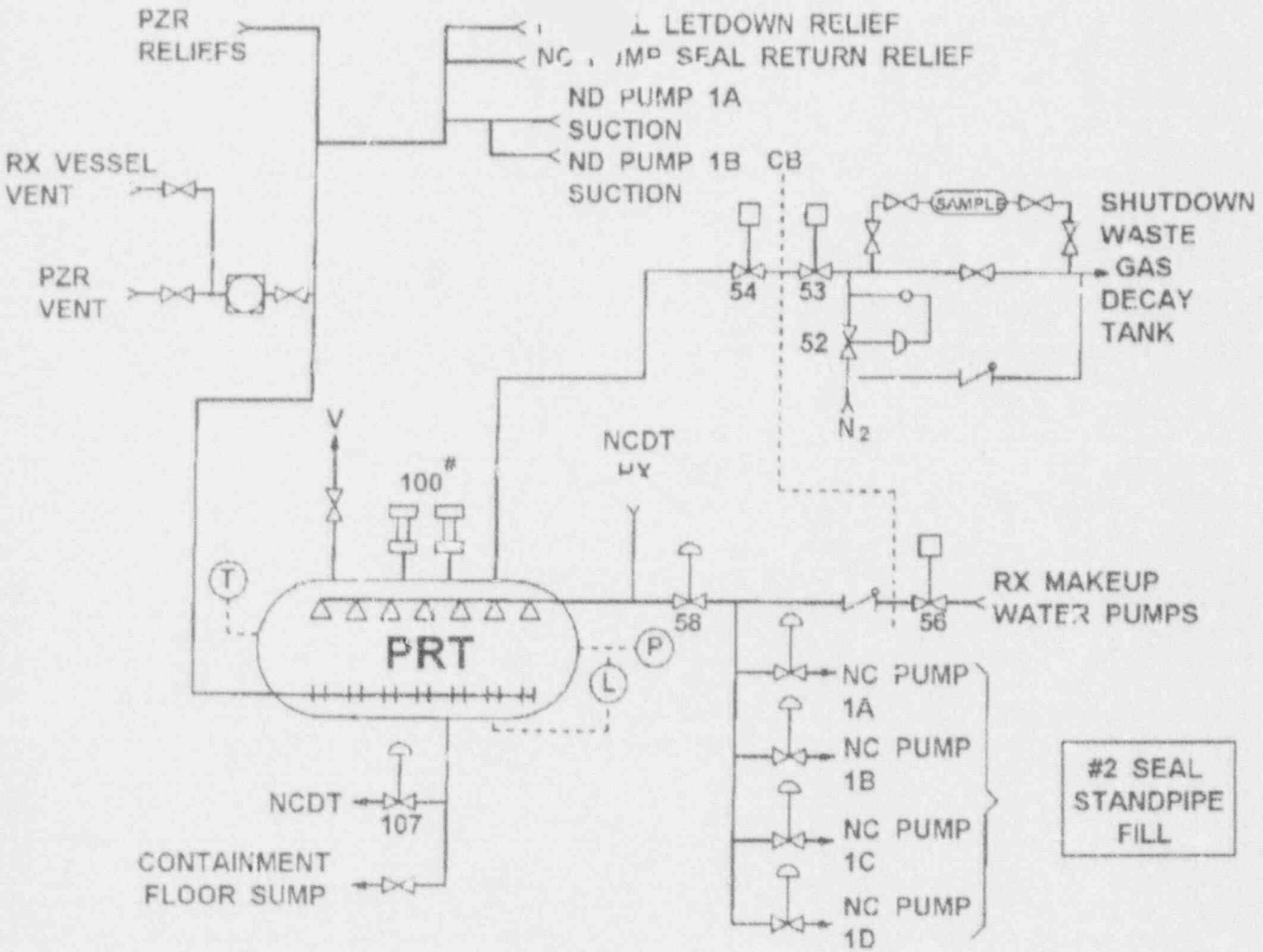
Which ONE [1] of the following methods is used to cool the PRT [Pressurizer Relief Tank]? [Refer to PRT drawing below]

a. NCDT Recirc and Spray from the RMWST.

b. NCDT Recirc and ND Recirc.

c. Spray from the RMWST and ND Recirc.

d. Spray from the RMWST and venting to Waste Gas Decay Tank.



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QUESTION: 057 (1.00)

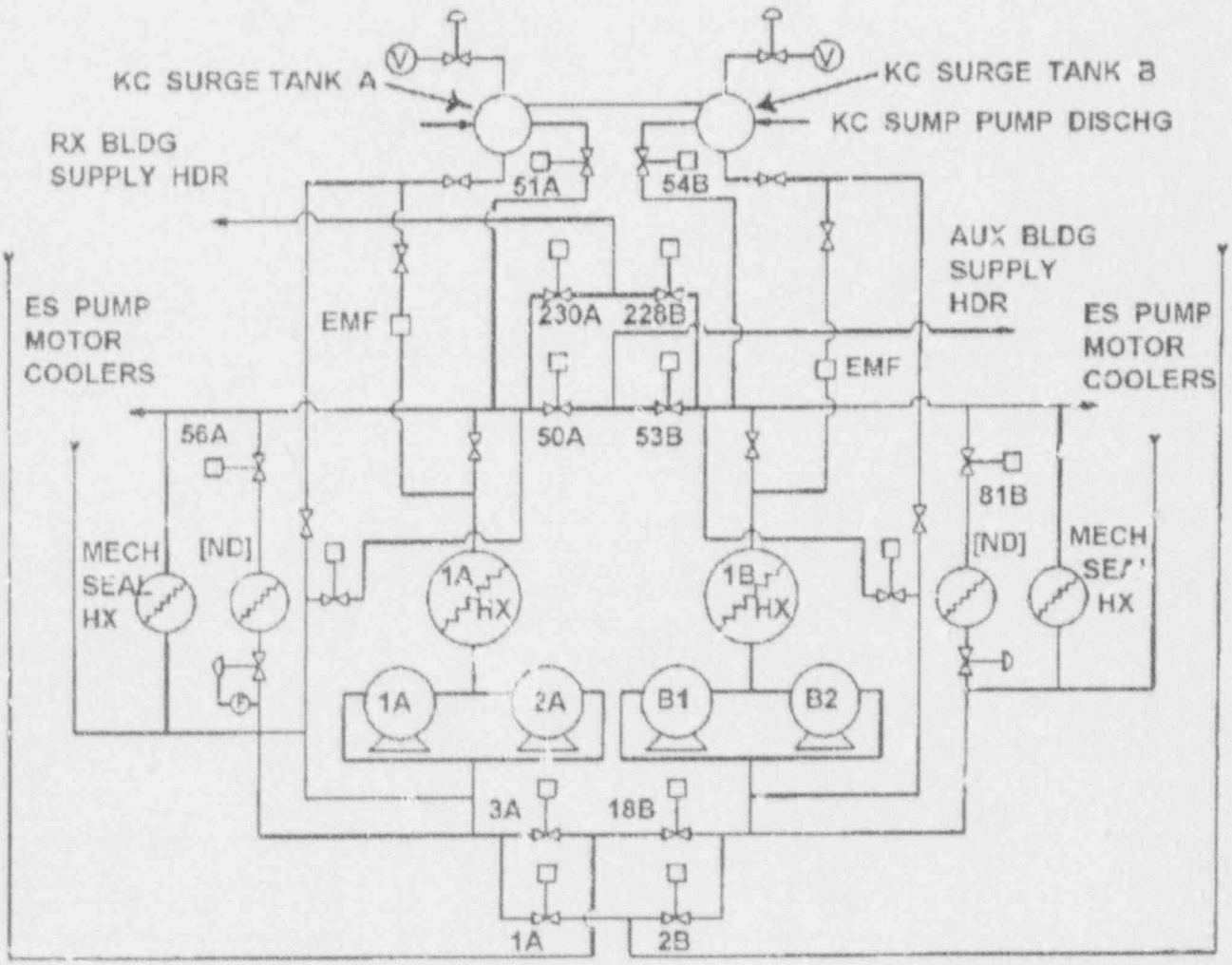
Which ONE [1] of the following reasons explains why Component Cooling [KC] valves 56A and 81B [ND Heat Exchanger Inlets] open on Lo FWST level following Ss [Safety Injection]? [Refer To KC drawing below]

a. Prevent ND pump runout in the event of loss of one train.

b. Prevent KC pump runout in the event of loss of one train.

c. Prevent water hammer in the ND System.

d. Prevent water hammer in the KC system.



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QUESTION: 058 (1.00)

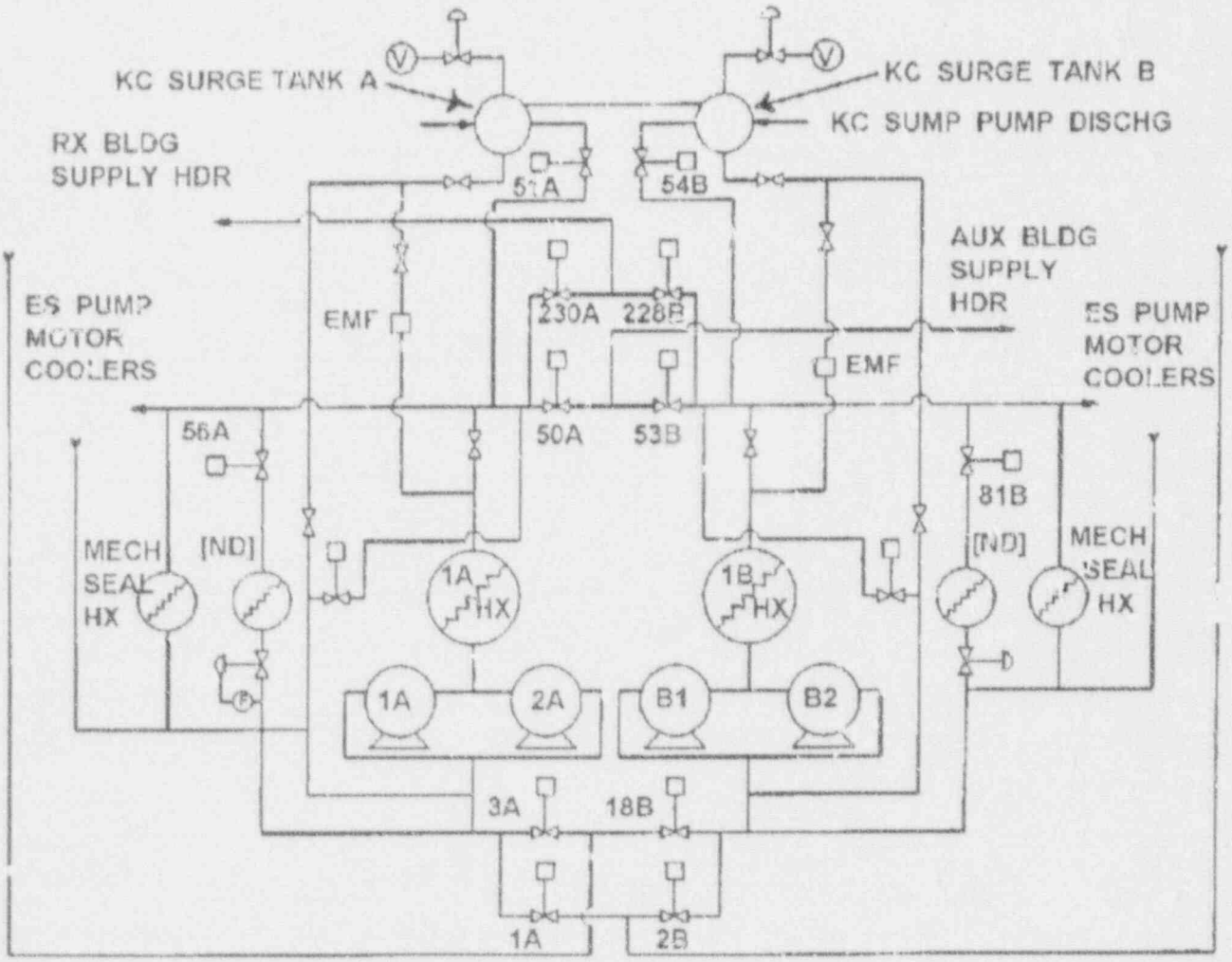
Which ONE [1] of the following statements describes how Component Cooling [KC] system valves align in response to an Sp [Phase B] signal following an Ss [Safety Injection] signal? [Refer to KC drawing below]

a. KC valves 1A, 3A, 50A and 230A open.

b. KC valves 2B, 53B open and 18B and 228B close.

c. KC valves 2B, 53B close and 3A and 230A open.

d. KC valves 2B, 18B, 53B and 228B close.



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QUESTION: 059 (1.00)

If only one Hydrogen Recombiner is available following a LOCA, which ONE [1] of the following Containment Hydrogen concentrations will NOT be exceeded?

a. 3% by weight.

b. 4% by volume.

c. 25 cc/kg.

d. 35 cc/kg.

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QUESTION: 060 (1.00)

Which ONE [1] of the following statements describes a purpose of the Containment Purge [VP] System?

a. Reduce Hydrogen concentration in Containment following a LOCA.

b. Decrease Containment humidity to within acceptable limits for proper operation of refueling instruments.

c. Provide additional cooling to upper Containment during refueling.

d. Reduce fission product concentrations in Containment atmosphere to acceptable limits for personnel access.

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QUESTION: 061 (1.00)

The following plant conditions exist:

- Refueling in progress on Unit 1.
- A spent fuel element is being moved from the reactor to the upender.
- The spent fuel element is dropped to the bottom of the canal.

Which ONE [1] of the following products released from the spent fuel element will present the most immediate hazard?

a. Hydrogen gas.

b. Alpha radiation from fission products.

c. Gamma radiation from fission and corrosion products.

d. Iodine and Krypton gases.

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QUESTION: 062 (1.00)

The following plant conditions exist:

- A reactor trip has occurred from 80% power on Unit 2.
- Reactor Trip Breaker "B" failed to open.

Which ONE [1] of the following statements describes how the Steam Dump Control System will respond?

	Plant Trip Controller	Load Rejection Controller	Condenser Dumps	Atmospheric Dumps
a.	Enabled	Enabled	Armed	Armed
b.	Enabled	Not Enabled	Not Armed	Armed
c.	Not Enabled	Enabled	Armed	Not Armed
d.	Not Enabled	Not Enabled	Not Armed	Not Armed

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QUESTION: 063 (1.00)

Which ONE [1] of the following reasons explain why the RN [Nuclear Service Water] System is aligned to the SNSWP [Standby Nuclear Service Water Pond] in cold weather?

a. Prevent severe ice accumulation on the surface of the pond.

b. Normally closed Pump House isolation valves [1RN3A and 1RN4B] from the SNSWP may fail to automatically reposition on a Pit Emergency Low Level due to ice accumulation.

c. Prevent a loss of RN due to ice formation in the source and intake section structures in Lake Wylie.

d. Prevent a loss of RN due to ice formation in discharge structures in Lake Wylie.

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QUESTION: 064 (1.00)

Control Rod F8 has been determined to be trippable but inoperable due to an open in the lift coil circuit but it is only two steps lower than the remaining rods in the group. Which ONE [1] of the following statements describes the action which must be taken? [TS 3.1.1.1 and 3.1.3.6 are attached]

a. Determine that the Shutdown Margin requirement of TS 3.1.1.1 is satisfied within 1 hour and be in Hot Standby within 6 hours.

b. Reduce turbine power to equal to or less than 75% of Rated Thermal Power within 1 hour and reduce the HI Neutron Flux Trip Setpoint to 85% within the following 4 hours.

c. Determine the Shutdown Margin of TS 3.1.1.1 at least once every 12 hours and that FN Delta H is within limits.

d. Maintain the remaining rods in the group within plus or minus 12 steps of F8 while maintaining the rod sequence and insertion limits of TS 3.1.3.6 during subsequent operation.

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QUESTION: 065 (1.00)

Which ONE [1] of the following responses would be an indication of a control bank failure to move during a power increase from 50% power to 100% power with rod control in automatic?

a. "ROD CONTROL SYS URGENT FAILURE" in alarm.

b. Increasing Tavg and possible "NC SYS HI/LO TAVG" in alarm.

c. High pressurizer level indication and possible alarm.

d. "ROD CONTROL SYS NON-URGENT FAILURE" in alarm.

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QUESTION: 066 (1.00)

AP/1/A/5500/08 "Malfunction of Reactor Coolant Pump" Immediate Action directs operators to trip an NC Pump if the Pump Lower Bearing Temperature is 225 degrees F or greater. Which ONE [1] of the following reasons explains why the NC pump is tripped if the Pump Bearing Temperature Limit is exceeded?

a. Minimize the risk of melting bearing babitted surfaces and impair NCP coastdown.

b. Reduce the possibility of seal leakoff flashing to steam and damaging the NCP seals.

c. Increased bearing friction may result in uncontrolled rise in bearing temperatures.

d. Minimize the risk of an NC Pump Lube Oil fire.

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QUESTION: 067 (1.00)

The following Unit 1 plant conditions exist:

- Operating in accordance with OP/1/A/6100/03 "Controlling Procedure For Unit Operation".
- Reactor power is 18% proceeding to 85%.
- NC [Reactor Coolant] Pump 1A was tripped when the 1B Pump Lower Bearing Temperature exceeded the alarm setpoint.
- The operator recognized that the wrong NC pump was tripped and tripped NC Pump 1A.

Which ONE [1] of the following actions is required to be performed?

a. Start NC Pump 1B in accordance with OP-6150/02A "NC Pump Operation".

b. Enter OP/1/A/6100/02 "Controlling Procedure For Unit Shutdown".

c. Ensure the reactor tripped and go to EP/1/A/5000/1 "Reactor Trip or Safety Injection".

d. Enter Technical Specification 3.0.3.

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QUESTION: 068 (1.00)

The following plant conditions exist:

- A normal plant cooldown is in progress.
- The computer alarm for the KC Surge Tank indicates a need for makeup from the demineralized water system.
- The water level in Surge Tank 1A is slowly DECREASING.
- Locally, there is no apparent cause for the decreasing surge tank level.
- The associated makeup valve to surge tank 1A is fully open.

Which ONE [1] of the following explanations is the cause of decreasing surge tank level?

a. There is a leak in the KC heat exchanger.

b. There is a leak in the Letdown heat exchanger.

c. There is a leak in the Reactor Coolant Pump Thermal barrier heat exchanger.

d. The plant cooldown rate is excessive.

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QUESTION: 069 (1.00)

When responding to an ATWS condition in accordance with EP/1/A/5000/2A1 "Nuclear Power Generation/ATWS", which ONE [1] of the following reasons explains why Pressurizer pressure is verified to be less than the PORV setpoint?

a. Ensures that a LOCA will not be created by a faulty PZR PORV.

b. Ensures that the PZR PORVs have shut after opening to reduce NC pressure following tripping the turbine.

c. Allows sufficient boration flow rate to the NC system.

d. Prevent reactor pressure from exceeding safety limits during an overpressure transient.

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QUESTION: 070 (1.00)

The following plant conditions exist on Unit 2:

- The plant is operating at 83% power.
- A control rod drops into the core.
- One Negative Rate Trip Bistable light is lit.
- About one minute later a second rod drops into the core in another quadrant.
- A second Negative Rate Trip Bistable light is actuated.
- Power and Tave have decreased slightly but otherwise operations are undisturbed.

Which ONE [1] of the following actions should be taken?

a. Trip the reactor and enter EP/2/A/5000/01 "Reactor Trip or Safety Injection".

b. Reduce power in accordance with OP/2/A/6100/03 "Controlling Procedure for Unit Operation" in preparation for entering OP/2/A/6100/02 "Controlling Procedure For Unit Shutdown".

c. Recover the dropped rods in accordance with AP/2/A/5500/14 "Control Rod Misalignment".

d. Reduce power and enter AP/2/A/5500/16 "Case IV, Power Range Malfunction".

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QUESTION: 071 (1.00)

The following plant conditions exist on Unit 1:

- The plant has experienced a main steamline rupture.
- EP/1/A/5000/2D1 "Imminent Pressurized Thermal Shock" has been entered.

Which ONE [1] of the following statements describes the major actions to be taken?

a. Maintain NC System cooldown rate; maintain NC System pressure.

b. Maintain NC System cooldown rate; depressurize NC System.

c. Stop NC System cooldown; maintain NC System pressure.

d. Stop NC System cooldown; depressurize NC System.

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QUESTION: 072 (1.00)

The following plant conditions exist:

- Unit 1 is at 35% power increasing to 100% power in accordance with OP/1/A/6100/03 "Controlling Procedure For Unit Operation".
- AP/1/A/5500/23 "Loss of Condenser Vacuum" was entered due to Condenser vacuum indication DECREASING.
- Condenser vacuum is currently stable at 24.5 inches of Hg.
- Exhaust Hood Temperature is 228 degrees F and decreasing slowly.

Which ONE [1] of the following actions should be taken?

a. Trip the turbine; trip the reactor; enter EP/1/A/5000/01 "Reactor Trip or Safety Injection".

b. Trip the turbine; enter AP/1/A/5500/02 "Turbine Generator Trip".

c. Stop the power increase and reduce power in accordance with OP/1/A/6100/03 "Controlling Procedure For Unit Operation" Enclosure 4.2 "Power Decrease".

d. Increase load per OP/1/B/6300/01 "Turbine Generator".

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QUESTION: 073 (1.00)

EP/1/A/5000/03 "Loss of All AC Power" includes the Immediate Action:

Verify Turbine Trip.

Which ONE [1] of the following reasons is the basis for "Verifying Turbine Trip"?

a. Limit CA Pump thrust due to operation near the runout condition.

b. Prevent an uncontrolled cooldown.

c. Limit depletion of steam generator inventory.

d. Prevent an unnecessary Safety Injection.

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QUESTION: 074 (1.00)

The following plant conditions exist:

- A loss of all AC power has occurred.
- EP/1/A/5000/03 "Loss of All AC Power" has been entered.
- Both D/Gs [Diesel Generators] are RUNNING but neither has automatically supplied its essential bus.

Which ONE [1] of the following actions is required to be performed immediately?

a. Reset the train related D/G load sequencers and auto load the D/Gs.

b. Manually load both D/Gs.

c. Stop and then manually start both D/Gs from the Control Room.

d. Stop both D/Gs.

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QUESTION: 075 (1.00)

Which ONE [1] of the following statements describes the result of taking Inverter 1EIB Manual Bypass Switch to the "BYPASS" position with the "IN SYNC" light not lit?

a. There is no power on the alternate source; therefore power would be lost to 1ERPB.

b. Since the "IN SYNC" light must be lit before the switch can be moved, the switch would not operate.

c. Since 1ERPB and 1VRD would momentarily be connected out of phase, the switch would probably be damaged.

d. The switch would operate; but the connection would not be transferred because the Kirk-key interlock has not been made.

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QUESTION: 076 (1.00)

During an authorized release of liquid waste, EMF-49 alarms. Which ONE (1) of the following statements describes the action to be taken by the operator?

a. Reset the alarm and wait to see if the alarm returns.

b. Write a work request to have the alarm checked by IAE.

c. Notify Operations Duty Engineer of the alarm condition.

d. Ensure automatic actions occurred.

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QUESTION: 077 (1.00)

Which ONE [1] of the following descriptions identifies the location of a fire which would automatically actuate a Halon Fire Protection System?

a. Operator's Storage Rooms.

b. Document Control Storage Area.

c. Cable Room Corridors on Units 1 & 2.

d. Steam Production Office Building.

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QUESTION: 078 (1.00)

Which ONE [1] of the following individuals becomes the Fire Captain when a fire is reported on-site?

a. Superintendent of Operations.

b. Safety Associate/Specialist, Fire Protection.

c. Shift Supervisor.

d. Assistant Shift Supervisor.

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QUESTION: 079 (1.00)

The following plant conditions exist:

- EP/1/A/5000/2C1 "Loss of Secondary Heat Sink" has been entered.
- Feedwater flow cannot be established.

Which ONE [1] of the following feed and bleed paths will be used?

a. Feeding to the Steam Generators [S/Gs] and using steam dump to bleed steam.

b. Feeding to NC [Reactor Coolant] System and using Pressurizer PORVs to bleed steam.

c. Feeding to NC System and using Normal Letdown to bleed the NC System.

d. Feeding to the S/Gs and using S/G PORVs to bleed steam.

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QUESTION: 080 (1.00)

If EP/1/A/5000/2C1 "Loss of Secondary Heat Sink" has been entered, which ONE [1] of the following reasons explains why NC [Reactor Coolant] Pumps are stopped in loops with Steam Generator wide range level less than 5%?

a. Stops adding unnecessary heat.

b. Prevent NC Pump seal damage due to steam formation in the Number 1 Seal.

c. Allows restoration of feed to the Steam Generator.

d. Allows cooling the associated loop by natural circulation.

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QUESTION: 081 (1.00)

When operating in accordance with EP/1/A/5000/2C1 "Loss Of Secondary Heat Sink", which ONE [1] of the following reasons explain why subcooling and CETs [Core Exit Thermocouples] are monitored throughout the procedure?

a. They provide the feed and bleed initiation criteria.

b. They provide the criteria for exiting from EP2C1.

c. They provide the criteria for securing the reactor coolant pumps.

d. They provide the criteria for feeding the steam generators from the RN System.

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QUESTION: 082 (1.00)

NC [Reactor Coolant] System activity has ranged from 1.1 microCuries per gram dose equivalent I-131 to 1.5 microCuries per gram dose equivalent I-131 for the last 48 continuous hours. Which ONE [1] of the following actions should be taken? [Technical Specification 3.4.8 is attached]

a. Shutdown the reactor to Hot Standby and notify the NRC.

b. Trip the reactor; enter EP/1/A/5000/1 "Reactor Trip or Safety Injection"; and notify the NRC.

c. Reduce reactor power to less than 75% and notify the NRC.

d. Reduce reactor power to 50% and notify the NRC if activity increases.

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QUESTION: 083 (1.00)

While in the Automatic mode of operation, which ONE [1] of the following IMMEDIATE ACTIONS should be taken in the event of continuous rod movement?

a. Select "Manual" on Rod Control and verify Manual Control by driving rods in then out.

b. Select "Manual" on Rod Control and verify all motion stops.

c. Select "Manual" on Rod Control; terminate boron concentration change; verify all motion stops.

d. Select "Manual" on Rod Control; terminate turbine load change and boron concentration changes; verify all motion stops.

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QUESTION: 084 (1.00)

Control Rod Group D is at 30 steps when the DRPI [Digital Rod Position Indication] suffers a Data "A" Failure Half Accuracy casualty. Which ONE [1] of the following describes the group indication following the casualty?

a. 18 steps.

b. 24 steps.

c. 30 steps.

d. 36 steps.

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QUESTION: 085 (1.00)

EP/1/A/5000/01 "Reactor Trip or Safety Injection" Step 3 Action/Expected Response reads:

Verify either 1ETA or 1ETB is energized.

Which ONE [1] of the following statements describes how 1ETA or 1ETB are verified energized?

a. ETA or ETB Line Voltage equal to or greater than 4160 volts.

b. Diesel Generator A and B Blackout Load Sequencer Actuated Status Lights are dark.

c. ETA and ETB Normal or Standby incoming breaker amps are greater than 0.

d. ETA and ETB X, Y, and Z Phase UV Status Lights are dark.

MASTER COPY

QUESTION: 036 (1.00)

The following plant conditions exist on Unit 1:

- Reactor is shutdown in Mode 3.
- Pressurizer level is 63%.
- NC [Reactor Coolant] System pressure is 1385 psig.
- PRT [Pressurizer Relief Tank] pressure is 6 psig.

If one pressurizer PORV is leaking slightly, which ONE [1] of the following temperatures will be indicated on the Relief Valve discharge RTD [1NCRD 5940]?

a. 247 degrees F.

b. 263 degrees F.

c. 275 degrees F.

d. 282 degrees F.

MASTER COPY

QUESTION: 087 (1.00)

EP/1/A/5000/1A1 "Natural Circulation Cooldown" Step 11 directs the operators to:

Monitor NC System cooldown

Which ONE [1] of the following sets of indications demonstrate existence of adequate natural circulation?

a. Core exit thermocouples decreasing; T-HOT decreasing; NC subcooling increasing.

b. Core exit thermocouples decreasing; T-HOT decreasing; NC subcooling decreasing.

c. T-HOT steady or increasing slowly; T-COLD decreasing; NC subcooling increasing.

d. Core exit thermocouples steady or increasing slowly; Steam Generator pressure decreasing; NC subcooling decreasing.

MASTER COPY

QUESTION: 088 (1.00)

The following Unit 1 conditions exist following a Ss [Safety Injection]:

- NCS pressure is 1050 psig.
- Tave is 557 degrees F.
- All ESF Monitor Panel lights are properly LIT.
- Containment Pressure is 2.8 psig.
- EMF53A [B] indicates 4 R/hr.
- NV/SI flow is 500 gpm.
- NCS boron is 500 ppm.
- Core Burnup is 200 EFPD.

Which ONE [1] of the following actions should be performed by the operator?

a. Borate the NCS to 850 ppm Boron for proper SDM prior to cooldown to less than 200 degrees F NC Wide Range Temperature.

b. Ensure NV-202 and NV-203 are open.

c. Secure NS pumps that are in service.

d. Secure all NC pumps.

MASTER COPY

QUESTION: 089 (1.00)

The following plant conditions exist on Unit 1:

- A LOCA has occurred and the plant is being recovered.
- NC pressure is 950 psig.
- Pressurizer level is 4%.
- All NC Pumps have been secured.
- Containment sump level is 11 feet.
- FWST level is 30%.
- Cold Leg Recirculation has been initiated.
- FWST [Fueling Water Storage Tank] suction valve [FW55B] is open and will not close.

Which ONE [1] of the following statements describes the action to be taken?

a. Dispatch an operator to close FW55B manually.

b. Let the pumps run until FWST level is 11% then shift to natural circulation cooldown.

c. Close sump valve NI184B and stop ND Pump B to prevent excessive FWST depletion.

d. Shift to Hot Leg Recirculation to minimize the depletion of the FWST until FW55B can be closed.

MASTER COPY

QUESTION: 090 (1.00)

The following Unit 1 plant conditions exist:

- Shutdown in Mode 4.
- Pressurizer level is decreasing slowly.
- NC [Reactor Coolant] pressure is decreasing slowly.
- ND [Residual Heat Removal] flow is high.
- "ND & NS ROOMS SUMP LEVEL EMERG HI" is in alarm.

Which ONE [1] of the following IMMEDIATE ACTIONS must be performed?

a. Secure operating ND pump[s] and SHUT ND System suction and discharge valves to the NC System.

b. Secure operating ND and NC pump[s].

c. Secure operating ND pump[s] and manually initiate Phase A isolation.

d. Secure operating ND and NC pump[s] and manually initiate Phase B isolation.

MASTER COPY

QUESTION: 091 (1.00)

During Mode 1 operation, with the Pressure Control Selector Switch selected to the 1-2 position, which ONE [1] of the following statements describes the effects of Pressurizer Pressure Control Channel I failing LOW? [NOTE: Assume no operator action is taken]

a. All heaters on; PORV NC34 blocked; NC pressure rises; PORVs 32 & 36 open; NC pressure modulates between 2235 and 2315 psig.

b. Sprays full on; PORV 34 opens; PORV 34 closes at 2185 psig; Low Pressure Reactor Trip at 1945 psig; Low Pressure SI at 1845 psig.

c. All heaters on; PORV 32 & 36 open; PORV 32 & 36 close at 2185 psig; spray valves modulate NC pressure between 2260 and 2310 psig.

d. Sprays full on; PORVs 32 & 36 blocked; all heaters on at 2210 psig; heaters modulate to maintain NC pressure between 2210 and 2218 psig.

MASTER COPY

QUESTION: 092 (1.00)

EP/1/A/5000/2A1 'Nuclear Power Generation/ATWS" has been entered. Which ONE [1] of the following sets of indications is used to verify Reactor Trip?

a. Rapidly decreasing power, zero start up rate, Tave steady.

b. Rod bottom lights LIT, Intermediate Range amps decreasing, Control Rod Drive M-G Set breakers open.

c. Rod bottom lights out, positive start up rate, SI Actuated status light LIT.

d. Rod bottom lights LIT, Intermediate Range amps decreasing, Reactor Trip breakers open.

MASTER COPY

QUESTION: 093 (1.00)

The following plant conditions exist:

- Reactor startup is in progress.
- Source Range Channel N31 indicates 7E3 cps.
- Source Range Channel N32 indicates 8E3 cps.
- Intermediate Range Channel N35 indicates 3E-11 amps.
- Intermediate Range Channel N36 indicates 1.5E-10 amps.

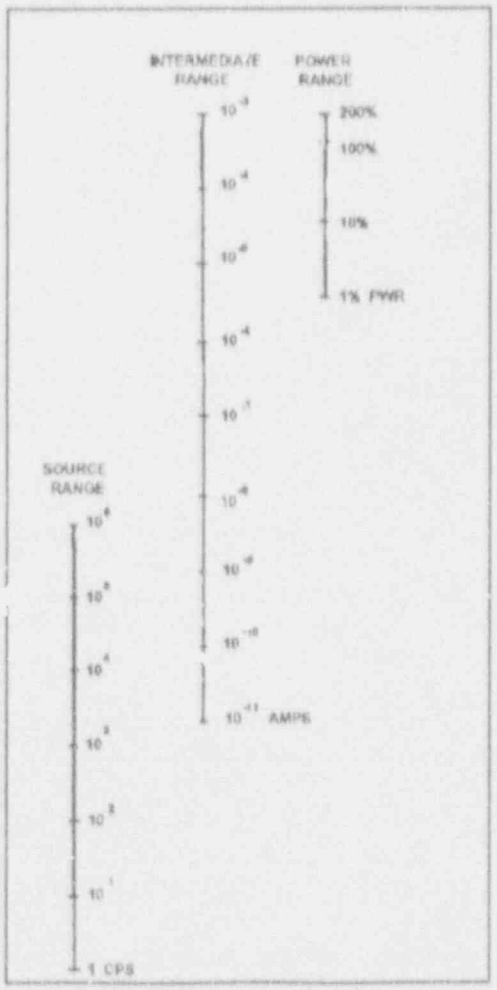
Which ONE [1] of the following statements describes the status of the nuclear instruments? [Note: Figure CN-IC-ENB-3 below]

a. N35 is over compensated.

b. N35 is under compensated.

c. N36 is over compensated.

d. N36 is under compensated.



MASTER COPY

QUESTION: 094 (1.00)

Which ONE [1] of the following reasons describes the basis for maintaining the pressure in a ruptured S/G [Steam Generator] less than 1125 psig?

a. Provide a margin to lifting the steam line safety valves.

b. Minimize secondary system contamination from the NC [Reactor Coolant] System.

c. Prevent excessive cooldown of the NC System from overfeeding the S/G.

d. Allow NC System depressurization and rapid equalizing with S/G pressure.

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QUESTION: 095 (1.00)

The following plant conditions exist:

- AP/1/A/5500/06 "Loss of S/G Feedwater" was entered due to a loss of feedwater supply to the S/Gs.
- Case II actions of AP05 have been completed through Step 14.C.
- Hotwell levels are 0.22 feet W.C.
- CA flow is 590 gpm.

Which ONE [1] of the following actions should be performed? [NOTE: AP/1/A/5500/06 is attached]

a. Shift CA suction to the CACST and UST.

b. Isolate RN from the CA Pump suction.

c. Run only one CA Pump.

d. Stop all CA Pumps.

MASTER COPY

QUESTION: 096 (1.00)

Which ONE [1] of the following conditions must be satisfied before blackout switchgear control power may be swapped back from the alternate supply to the normal supply?

a. The undervoltage relay on CDA must be reset.

b. 250 VDC Battery 1DPB or 2DPB breakers are closed.

c. Supply breakers to 4160 & 600V control power and CAPT control power are closed.

d. Battery charger ECA has its AC input and DC output breakers closed.

MASTER COPY

QUESTION: 097 (1.00)

Which ONE [1] of the following reasons describes the MOST LIKELY cause of a reactor trip during a sustained loss of Instrument Air.

a. NC [Reactor Coolant] Low Pressure due to excessive cooldown from S/G [Steam Generator] PORVs failing open.

b. S/G Lo Lo Level due to CF [Main Feed] control valves failing closed.

c. NC High Pressure due to failure of pressurizer spray.

d. Pressurizer High Level due to failure of Steam Dumps to operate.

MASTER COPY

QUESTION: 098 (1.00)

In addition to ensuring the Unit 2 Control Operator is notified, which ONE [1] of the following actions must be performed immediately if Instrument Air pressure falls to the low pressure alarm setpoint on Unit 1?

a. Dispatch operators to VI [Instrument Air] compressor panels to verify proper compressor operation and to start the backup temporary VI compressor.

b. Dispatch operators to VI compressor panels to verify proper compressor operation and dispatch operators to locate and isolate the leak on the VI system.

c. Dispatch operators to locate and isolate the leak on the VI system and start the backup temporary VI compressor.

d. Dispatch operators to isolate the leak on the VI system and to open 1VS-78 locally.

MASTER COPY

QUESTION: 099 (1.00)

If a D/G [Diesel Generator] is supplying its associated bus as a result of a Loss of Offsite Power, which ONE [1] of the following reasons explains the basis for NOT exceeding 5750 KW on the D/G?

a. To limit generator winding temperature rise.

b. To ensure RN can provide adequate D/G cooling.

c. To limit engine crankshaft and piston stresses.

d. To ensure an underfrequency condition does not occur on the bus.

MASTER COPY

(********** END OF EXAMINATION **********)

ANSWER: 001 (1.00)

b.

REFERENCE:

-SD, Rev. 09/06-09-92/ELR, Page 30, Para. G.1.& 2.

KA 1K101 [3.6/3.7]

Both RO and SRO

194001K101 ..(KA's)

ANSWER: 002 (1.00)

d.

REFERENCE:

OMP 8, Rev. , Page 2, Para. 3.3.C.

KA 194001K101 [3.6/3.7]

Both RO and SRO

194001K101 ..(KA's)

ANSWER: 003 (1.00)

b.

MASTER COPY

REFERENCE:

CNS Directive 3.8.6 [TS], Rev. 22, Page 3, Para. 4.1, Page 4, Para. 4.4

KA 194001K103 [2.8/3.4]

Both RO and SRO

194001K103 ..(KA's)

ANSWER: 004 (1.00)

a.

REFERENCE:

CNS Directive 3.8.8, Rev. 27, page 16, Para. 5.17.2 & 5.17.4

KA 194001K104 [3.3/3.5]

Both RO and SRO

194001K104 ..(KA's)

ANSWER: 005 (1.00)

d.

REFERENCE:

CNS Directive 3.8.5 [TS], Revision 18, Page 3, Para. 6.1.4.

KA 194001K104 [3.3/3.5]

Both RO and SRO

194001K104 ..(KA's)

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ANSWER: 006 (1.00)

a.

REFERENCE:

SD 2.11.12, Rev. 0

KA 194001K109 [3.4/3.4]

Both RO and SRO

194001K109 ..(KA's)

ANSWER: 007 (1.00)

c.

REFERENCE:

SD 2.11.4 (SS), Rev. 16, Page 1, Para. 2.1.1.

KA 194001K114 [3.3/3.6]

RO only

194001K114 ..(KA's)

ANSWER: 008 (1.00)

a.

MASTER COPY

REFERENCE:

OMP 2-17, Rev. 23, Page 2, Para. 6.1.C.

KA 194001A106 [3.4/3.4]

Both RO and SRO

194001A106 ..(KA's)

ANSWER: 009 (1.00)

b.

REFERENCE:

OMP 2-31, Rev. 17, Page 1, Para. 4.1.

KA 194001A106 [3.4/3.4]

RO only

194001A106 ..(KA's)

ANSWER: 010 (1.00)

c.

REFERENCE:

OMP 2-10, Rev. 2, Page 6, Para. 8.5.A&B.

KA 194001A107 [2.5/3.2]

Both RO and SRO

194001A107 ..(KA's)

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ANSWER: 011 (1.00)

a.

REFERENCE:

OMP 2-11, Rev. 16, Page 2, Para. 4.4 and Page 3, Para. 6.1.

KA 194001A109 [2.7/3.9]

Both RO and SRO

194001A109 ..(KA's)

ANSWER: 012 (1.00)

d.

REFERENCE:

OMP 2-16, Rev. 12, Page 4, Para. 6.0.H.

KA 194001A109 [2.7/3.9]

Both RO and SRO

194001A109 ..(KA's)

ANSWER: 013 (1.0

c.

MASTER COPY

REFERENCE:

OMP 1-8, Rev. 18, Page 11, Para. 10.1.
CN-OP-ADM-OMP, Rev. 09/03-23-92/SWH, Page 23, Para. f.2.

KA 194001A111 [2.8/4.1]

Both RO and SRO

194001A111 ..(KA's)

ANSWER: 014 (1.00)

c.

REFERENCE:

OP-CN-IC-IRE, Rev. 07/03-16-92/GFW, Page 19, Para. 8.c.

KA 001000K103 [3.4/3.6]

Both RO and SRO

001000K103 ..(KA's)

ANSWER: 015 (1.00)

a.

REFERENCE:

OP-CN-IC-IRE, Rev. 07/03-16-92/GFW, Page 25, Para. 2.4.A.1.a.

KA 001000K407 [3.7/3.8]

RO only

001000K407 ..(KA's)

MASTER COPY

ANSWER: 016 (1.00)

d.

REFERENCE:

OP-CN-IC-IRE, Rev. 07/03-16-92/GFW, Page 10, Para. C.1.

KA 001000K558 [2.7/3.2]

Both RO and SRO

001000K558 ..(KA's)

ANSW .: 017 (1.00)

a.

REFERENCE:

OP-CN-IC-IRE, Rev. 07/03-16-19/GFW, page 27, Para. 12.

KA 001000G010 [3.3/3.5]

RO only

001000G010 ..(KA's)

ANSWER: 018 (1.00)

b.

MASTER COPY

REFERENCE:

OP-CN-CNT-CNT, Rev. 10/06-02-92/JWH, Page 28, Para. 2.4.B.2
Catawba Exam Bank Question NCP-13

KA 003000K201 [3.1/3.1]

Both RO and SRO

003000K201 ..(KA's)

ANSWER: 019 (1.00)

d.

REFERENCE:

OP-CN-PS-NCP, Rev. 04/09-18-90/GFW, Page 17, Para. 4.b.9(a)

KA 003000A401 [3.3/3.2]

RO only

003000A401 ..(KA's)

ANSWER: 020 (1.00)

a.

REFERENCE:

Technical Specification Bases, Page B 3/4 4-1

KA 003000G006 [2.7/3.8]

Both RO and SRO

003000G006 ..(KA's)

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ANSWER: 021 (1.00)

c.

REFERENCE:

OP-CN-PSS-KC, Rev. 13/03-03-92/CFW, Page 9, Para. B.3.a.
OP-CN-PS-NV, Rev. 04/04-10-92/PEV, Page 25, Para. B.14.0.3.

KA 004000A401 [3.8/3.9]

Both RO and SRO

004000A401 ..(KA's)

ANSWER: 022 (1.00)

d.

REFERENCE:

OP-CN-PS-NV, Rev. 04/04-10-92/PEV, Page 26, Para. 5.c
Catawba Examination Bank Question NV-89

KA 004010A205 [4.1/4.3]

Both RO and SRO

004010A205 ..(KA's)

ANSWER: 023 (1.00)

b.

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REFERENCE:

OP-CN-ECCS-ISE, Rev. 10/03-11-92/CTK, Page 16, Para. 2.d.

KA 013000A105 [3.4/3.6]

Both RO and SRO

013000A105 ..(KA's)

ANSWER: 024 (1.00)

a.

REFERENCE:

OP-CN-ECCS-ISE, Rev. 10/03-11-92/CTK, Page 19, Para. F.1.a.

KA 013000A403 [4.5/4.7]

SRO only

013000A403 ..(KA's)

ANSWER: 025 (1.00)

a.

REFERENCE:

Catawba Examination Bank Question EDA-15

KA 014000G008 [2.9/3.1]

Both RO and SRO

014000G008 ..(KA's)

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ANSWER: 026 (1.00)

b.

REFERENCE:

OP-CN-IC-ENB, DWG CN-IC-ENB-3

KA 015000A303 [3.9/3.9]

Both RO and SRO

015000A303 ..(KA's)

ANSWER: 027 (1.00)

d.

REFERENCE:

OP-CN-IC-END, Rev. 09/03-19-92/JLY, Page 11, Para. H.8.

KA 015000K604 [3.1/3.2]

Both RO and SRO

015000K604 ..(KA's)

ANSWER: 028 (1.00)

a.

MASTER COPY

REFERENCE:

OP-CN-IC-ENB, Rev. 09/03-19-92/JLY, Page 7, Para. C.5.b.

KA 015000K406 [3.9/4.2]

Both RO and SRO

015000K406 ..(KA's)

ANSWER: 029 (1.00)

b.

REFERENCE:

OP-CN-IC-ENA, Rev. 05/08-05-90/GFW, Page 10, Para. 14.h.

KA 017000K101 [3.2/3.2]

Both RO and SRO

017020K101 ..(KA's)

ANSWER: 030 (1.00)

d.

REFERENCE:

Catawba Examination Bank Question CNT-VV-9

KA 022000A404 [3.1/3.2]

Both RO and SRO

022000A404 ..(KA's)

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ANSWER: 031 (1.00)

a.

REFERENCE:

Catawba Technical Specifications, Page B 3/4 6-5.

KA 025000K301 [3.8/3.8]

Both RO and SRO

025000K301 ..(KA's)

ANSWER: 032 (1.00)

b

REFERENCE:

OP-CN-CF-CF, Rev. 09/02-25-92/JLY, Page 29, Para. 4.d.

KA 059000A411 [3.1/3.9]

RO only

059000A411 ..(KA's)

ANSWER: 033 (1 00)

b.

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REFERENCE:

OP-CN-CF-CF, Rev. 09/02-25-92/JLY, Page 11, Para. 4.b.3

KA 059000G010 [2.9/2.9]

RO only

059000G010 ..(KA's)

ANSWER: 034 (1.00)

a.

REFERENCE:

Catawaba Examina on Bank Question CA-31

KA 061000A202 [3.2/3.6]

Both RO and SRO

061000A202 ..(KA's)

ANSWER: 035 (1.00)

d.

REFERENCE:

OP-CN-CF-CA, Rev. 10/03-19-22/ELR

KA 061000G002 [3.0/3.8]

RO only

061000G002 ..(KA's)

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ANSWER: 036 (1.00)

c.

REFERENCE:

OP/0/B/6350/07, Page 1, Para. 2.4

KA 063000G010 [3.?/3.2]

Both RO and SRO

063000G010 ..(KA's)

ANSWER: 037 (1.00)

b.

REFERENCE:

OP-CN-WE-EMF, Rev. 09/12-11-91/CTK, Page 13, Para. 3.a.4

KA 072000A202 [2.8/2.9]

RO only

072000A202 ..(KA's)

ANSWER: 038 (1.00)

b.

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REFERENCE:

OP-CN-WE-EMF, Rev. 09/12-11-91/CTK, Page 12, Para. 2.c.

KA 072000G007 [2.6/2.9]

Both RO and SRO

072000G007 ..(KA's)

ANSWER: 039 (1.50)

a. 2.
b. 5.
c. 7. [0.5 each]

REFERENCE:

Drawing CN-PS-NC-09

KA 002000K109 [4.1/4.4]

RO only

002000K109 ..(KA's)

ANSWER: 040 (1.00)

b.

REFERENCE:

OP-CN-PS-NC, Rev. 08/02-25-92/GFW, Page 27, Para. 5.b.3.c. and 5.b.4.c.

KA 002000K603 [3.1/3.6]

Both RO and SRO

002000K603 ..(KA's)

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ANSWER: 041 (1.50)

a. 6
b. 5
c. 7 [0.5 each]

REFERENCE:

Drawing CN-ECCS-MI-7

KA 006000K409 [3.8/4.1]

RO only

006000K409 ..(KA's)

ANSWER: 042 (1.00)

d.

REFERENCE:

OP-CN-PS-IPE, Rev. 04/10-03-90/GFW, Page 17, Para. 2.3.A.

KA 010000K201 [3.0/3.4]

Both RO and SRO

010000K201 ..(KA's)

ANSWER: 043 (1.00)

c.

MASTER COPY

REFERENCE:

OP-CN-PS-IPE, Rev. 04/10-03-90/GFW, Page 13, Para. 8.C.2

KA 010000A403 [4.0/3.8]

Both RO and SRO

010000A403 ..(KA's)

ANSWER: 044 (1.00)

a.

REFERENCE:

Catawba Examination Bank Question ILE-26

KA 011000A211 [3.4/ .6]

Both RO and SRO

011000A211 ..(KA's)

ANSWER: 045 (1.00)

b.

REFERENCE:

Catawba Examination Bank Question IFX-30

KA 012000K501 [3.3/3.8]

Both RO and SRO

012000K501 ..(KA's)

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ANSWER: 046 (1.00)

c.

REFERENCE:

Catawba Examination Bank Question EDA-33

KA 014000G008 [2.9/3.1]

RO Only

014000G008 ..(KA's)

ANSWER: 047 (1.00)

a.

REFERENCE:

Drawing CN-PS-NC-5

KA 016000K101 [3.4/3.4]

Both RO and SRO

016000K101 ..(KA's)

ANSWER: 048 (1.00)

a.

MASTER COPY

REFERENCE:

OP-CN-CF-IFE, Rev. 06/03-09-92/GFW, Page 21, para. L.3.[illegible]

KA 016000K106 [3.6/3.5]

RO only

016000K106 ..(KA's)

ANSWER: 049 (1.00)

c.

REFERENCE:

OP-CN-ECCA-NS, Rev. 09/01-08-92/RJK, Page 11, Para. 2.2.B.

KA 026000G009 [3.6/3.6]

RO only

026000G009 ..(KA's)

ANSWER: 050 (1.00)

a.

REFERENCE:

OP-CN-FH-KF, Rev. 06/11-28-90/GFW, Page 18, Para B.1.b.

KA 033000K303 [3.0/3.3]

Both RO and SRO

033000K303 ..(KA's)

ANSWER: 051 (1.00)

c.

MASTER COPY

REFERENCE:

OP-CN-STM-SH, Rev. 09/02-06-92/RJF, Page 15, Para 2.a. & b.

KA 039000A302 [3.1/3.5]

Both RO and SRO

039000A302 ..(KA's)

ANSWER: 052 (1.00)

c.

REFERENCE:

OP-CN-EL-EP, Rev. 06/03-30-92/ELR, Page 14, Para 7.a. & b.

KA 062000G009 [3.2/3.3]

RO only

062000G009 ..(KA's)

ANSWER: 053 (1.00)

a.

REFERENCE:

OP-CN-DG-EQG, Drawing CN-DG-EQG-12

KA 064000K411 [3.5/4.0]

Both RO and SRO

064000K411 ..(KA's)

ANSWER: 054 (1.00)

c.

MASTER COPY

REFERENCE:

OP-CN-SS-RFY, Rev. 02/12-11-89/SMD, Page 22, Para 11.

KA 086000K406 [3.0/3.3]

Both RO and SRO

086000K406 ..(KA's)

ANSWER: 055 (1.00)

c.

REFERENCE:

OP-CN-PS-ND, Rev. 09/02-27-92/GFW, Page 12, Para D.2.c.

KA 005000K407 [3.2/3.5]

RO only

005000K407 ..(KA's)

ANSWER: 056 (1.00)

a.

REFERENCE:

OP-CN-PS-NC, Rev. 08/02-25-92/GFW, Page 22, Para 18.d.

KA 007000K401 [2.6/2.9]

RO only

007000K401 ..(KA's)

ANSWER: 057 (1.00)

b.

MASTER COPY

REFERENCE:

OP-CN-PSS-KC, Rev. 13/03-03-92/GFW, pages 10 & 11, Para B.3.c.4.

KA 008000K102 [3.3/3.4]

Both RO and SRO

008000K102 ..(KA's)

ANSWER: 058 (1.00)

d.

REFERENCE:

OP-CN-PSS-KC, Rev. 13/03-03-92/GFW, Page 10, Para B.3.c 4.a & b.

KA 008030A304 [3.6/3.7]

Both RO and SRO

008030A304 ..(KA's)

ANSWER: 059 (1.00)

b.

REFERENCE:

OP-CN-CNT-VX, Rev. 06/03-10-92/PEV, Page 10, Para C.6.

KA 028000K601 [2.6/3.1]

RO only

028000K601 ..(KA's)

ANSWER: 060 (1.00)

d.

MASTER COPY

REFERENCE:

Catawba Examination Bank Question VP-6

KA 029000K302 [2.9/3.5]

Both RO and SRO

029000K302 ..(KA's)

ANSWER: 061 (1.00)

d.

REFERENCE:

Catawba Examination Bank Question FL-19

KA 034000A201 [3.6/4.4]

RO only

034000A201 ..(KA's)

ANSWER: 062 (1.00)

c.

REFERENCE:

OP-CN-STM-IDE, Rev. 05/02-25-92/DPM, Page 16, Para 5.5.B.

KA 041020K417 [3.7/3.9]

Both RO and SRO

041020K417 . (KA's)

ANSWER: 063 (1.00)

a.

MASTER COPY

REFERENCE:

OP-CN-PSS-RN, Rev. 13/02-05-92/ELW, Pages 14 & 15, Para 5.

KA 076000G010 [2.7/2.9]

RO only

076000G010 ..(KA's)

ANSWER: 064 (1.00)

d.

REFERENCE:

OP-CN-IC-IRE, Rev. 07/03-16-92/GFW, Page 28, Para 2.6.A.

KA 000001G008 [3.2/3.8]

Both RO and SRO

000001G008 ..(KA's)

ANSWER: 065 (1.00)

a.

REFERENCE:

Catabwa Examination Bank Question IRE-75

KA 000005G005 [3.1/3.3]

Both RO and SRO

000005G005 ..(KA's)

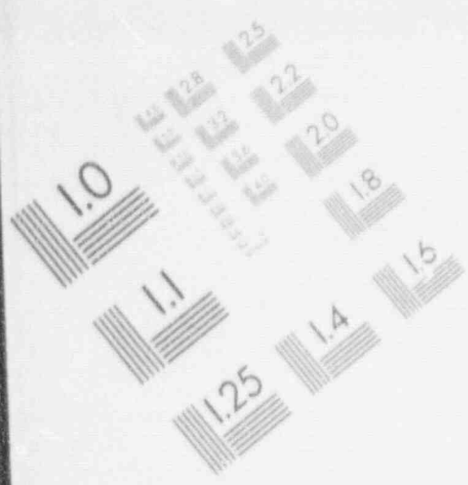
ANSWER: 066 (1.00)

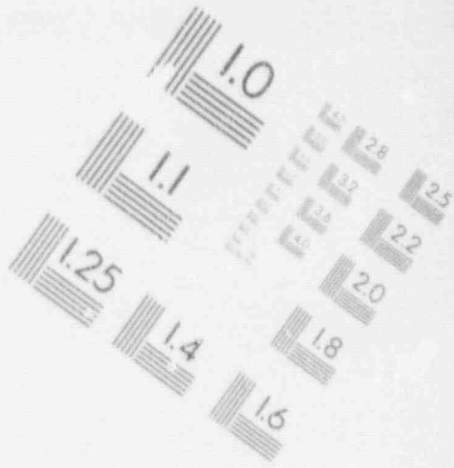
b.

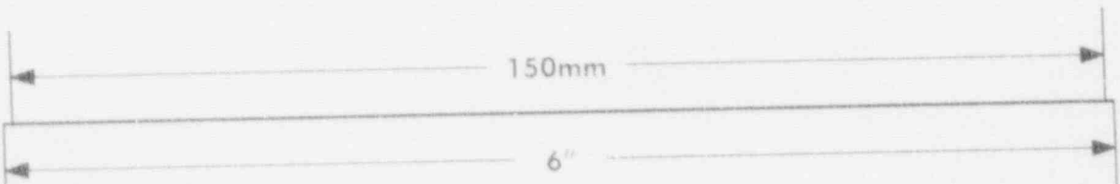
MASTER COPY

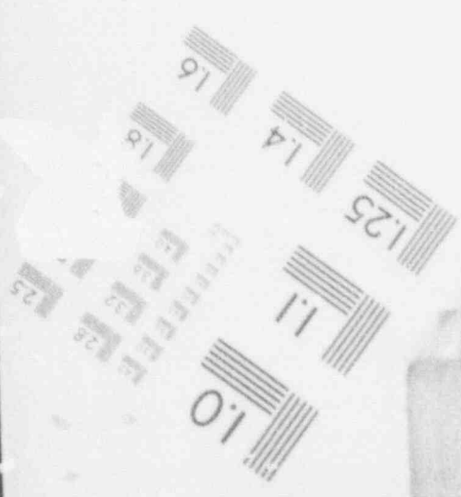
1

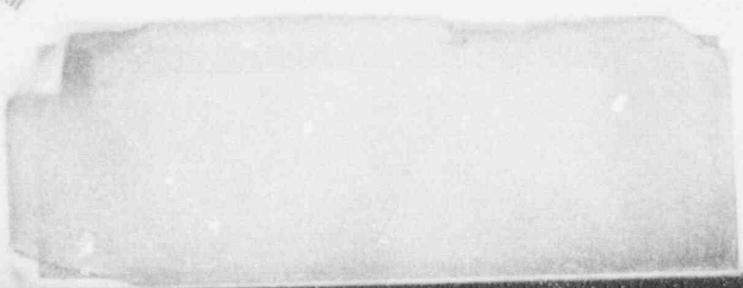
IMAGE EVALUATION TEST TARGET (MT-3)





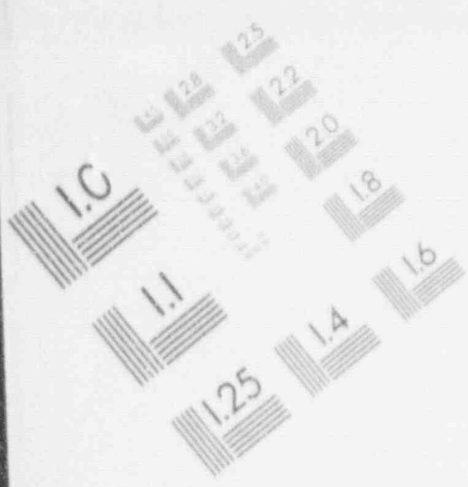


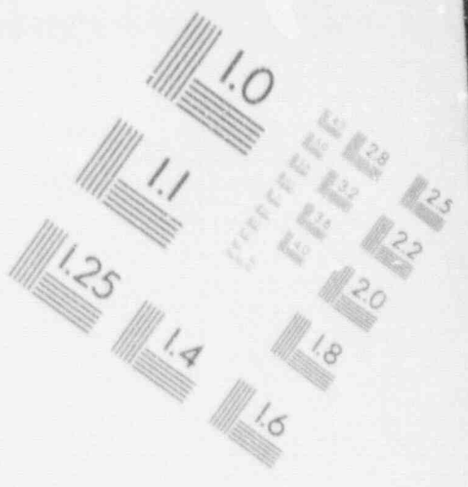


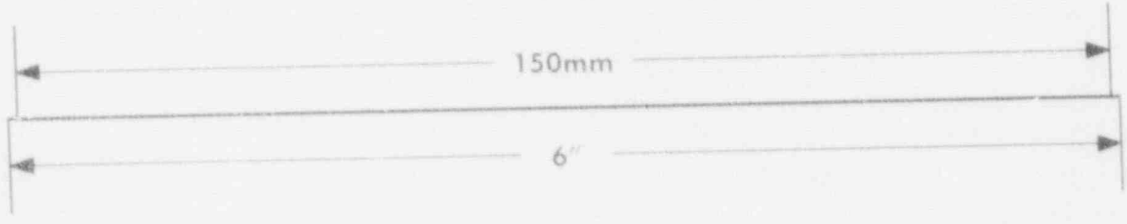


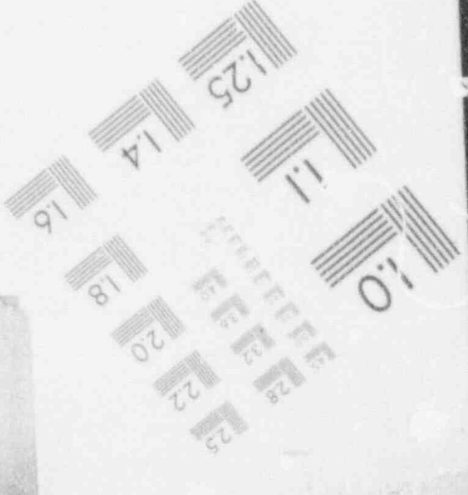
1

IMAGE EVALUATION
TEST TARGET (MT-3)



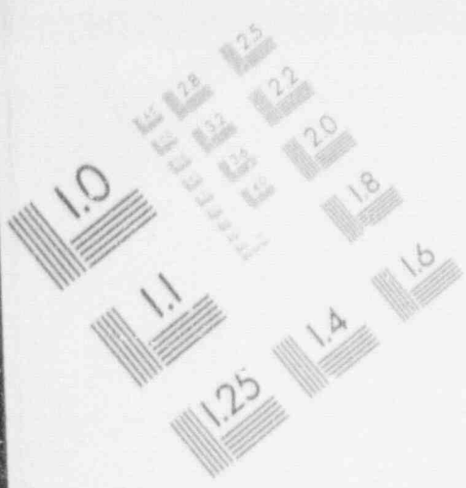


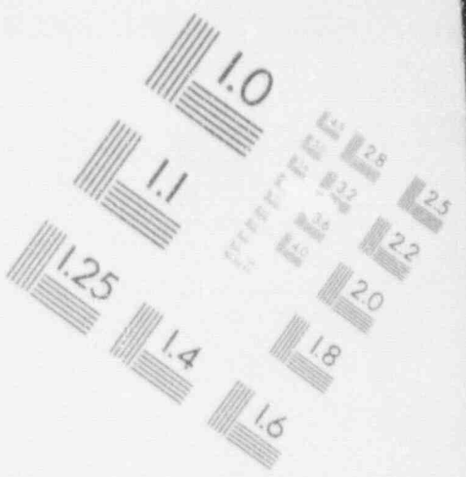


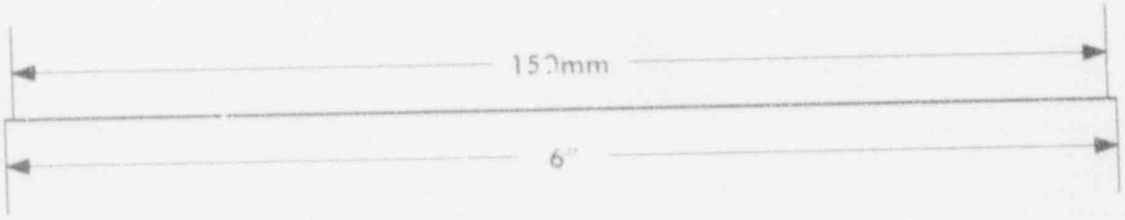


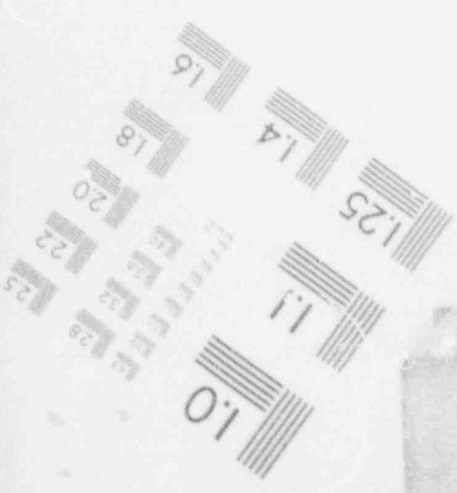
1

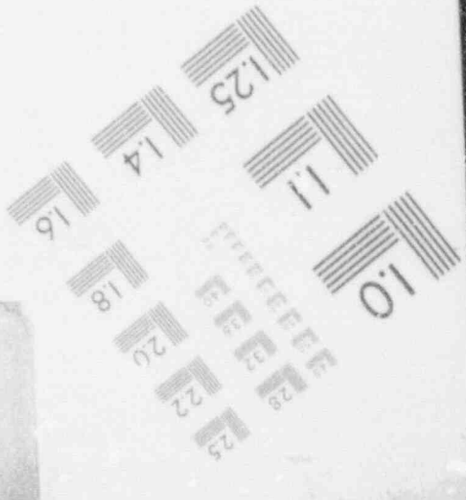
IMAGE EVALUATION
TEST TARGET (MT-3)











REFERENCE:

OP-CN-PS-NCP, Rev. 04/09-18-90/GFW, Page 39, Para 2.

KA 000015K207 [2.9/2.9]

Both RO and SRO

000015K207 ..(KA's)

ANSWER: 067 (1.00)

c.

REFERENCE:

AP/1/A/5500/04, Retype #7, Page 2, Para C.2

KA 000015G010 [3.4/3.4]

Both RO and SRO

000015G010 ..(KA's)

ANSWER: 068 (1.00)

a.

REFERENCE:

Catawba Examination Bank Question KC-3

KA 000026A105 [3.1/3.1]

Both RO and SRO

000026A105 ..(KA's)

ANSWER: 069 (1.00)

c.

MASTER COPY

REFERENCE:

OP-CN-EP-CSF, Rev. 11/05-27-92/DPM, Page 11, Para 2.e.3.

KA 000029K312 [4.4/4.7]

Both RO and SRO

000029K312 ..(KA's)

ANSWER: 070 (1.00)

a.

REFERENCE:

EP/2/A/5000/01, Retype #13, page 1, Para 3

KA 000029G011 [4.4/4.6]

Both RO and SRO

000029G011 ..(KA's)

ANSWER: 071 (1.00)

d.

REFERENCE:

Catawba Examination Bank Question CSF-60

KA 000040G012 [3.8/4.1]

Both RO and SRO

000040G012 ..(KA's)

ANSWER: 072 (1.00)

b.

MASTER COPY

REFERENCE:

AP/1/A/5500/23, Retype #6, Page 4, Para 8.b.
OP-CN-MT-MT-1, Rev. 04/12-11-90/GFW, Page 28, Para 5.3.F.

KA 000051A202 [3.9/4.1]

Both RO and SRO

000051A202 ..(KA's)

ANSWER: 073 (1.00)

b.

REFERENCE:

OP-CN-EP-EP5, Rev. 08/07-22-91/CWN, Page 9, Para B.2.

KA 000055K302 [4.3/4.6]

RO only

000055K302 ..(KA's)

ANSWER: 074 (1.00)

d.

REFERENCE:

EP/1/A/5000/03, Retype #10, Page 3, Para 3.b.

KA 000055A203 [3.9/4.7]

RO only

000055A203 ..(KA's)

ANSWER: 075 (1.00)

c.

MASTER COPY

REFFRENCE:

OP-CN-EL-EPL, Rev. 04/01-27-92/CWN, Page 16, Para 2.1.G.2

KA 000057A101 [3.7/3.7]

Both RO and SRO

000057A101 ..(KA's)

ANSWER: 076 (1.00)

d.

REFERENCE:

Catawba Examination Bank Question EMF-20

KA 000059A102 [3.3/3.4]

Both RO and SRO

000059A102 ..(KA's)

ANSWER: 077 (1.00)

b.

REFERENCE:

OP-CN-SS-RFY, Rev. 02/12-11-89/SMD, Page 20, Para 2.2.M.2

KA 000067A203 [3.3/3.5]

Both RO and SRO

000067A203 ..(KA's)

ANSWER: 078 (1.00)

d.

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REFERENCE:

OP-CN-SS-RFY, Rev. 02/12-11-89/SMD, Page 26, Para 2.3.C.3

KA 000067G012 [3.4/3.4]

Both RO and SRO

000067G012 ..(KA's)

ANSWER: 079 (1.00)

b.

REFERENCE:

OP-CN-EP-CSF, Rev. 11/05/27/92/DPM, Page 18, Para k. & m.

KA 000074K103 [4.5/4.9]

Both RO and SRO

000074K103 ..(KA's)

ANSWER: 080 (1.00)

a.

REFERENCE:

OP-CN-EP-CSF, Rev. 11/05-27-92/DPM, Page 17, Para e.

KA 000074K304 [3.9/4.2]

Both RO and SRO

000074K304 ..(KA's)

ANSWER: 081 (1.00)

a.

MASTER COPY

REFERENCE:

OP-CN-EP-CSF, Rev. 11/05-27-92/DPM, Page 17, Para d.

KA 000074K311 [4.0/4.4]

Both RO and SRO

000074K311 ..(KA's)

ANSWER: 082 (1.00)

a.

REFERENCE:

OP-CN-PS-NC, Rev. 08/02-25-92/GFW, Page 33, Para 2.3.A.8.

KA 000076G012 [2.9/3.1]

Both RO and SRO

000076G012 ..(KA's)

ANSWER: 083 (1.00)

b.

REFERENCE:

OP-CN-IC-IRE, Rev. 07/03-16-92/GFW, Page 28, Para 2.5.C.2.a

KA 000001G010 [3.9/4.0]

RO only

000001G010 ..(KA's)

ANSWER: 084 (1.00)

b.

MASTER COPY

REFERENCE:

OP-CN-IC-EDA, Rev. 05/07·)3-91/GFW, Page 12, Para 2.3.H.2. & 3.

KA 000003A201 [3.7/3.9]

RO only

000003A201 ..(KA's)

ANSWER: 085 (1.00)

d.

REFERENCE:

EP/1/A/5000/01, Retype #13, Page 5, Step 3

KA 000007G010 [4.2/4.1]

Both RO and SRO

000007G010 ..(KA's)

ANSWER: 086 (1.00)

b.

REFERENCE:

OP-CN-PS-NC, Rev. 08/02-25-92/GFW, Page 22, Para 2.2.A.17.

KA 000008K101 [3.2/3.7]

Both RO and SRO

000008K101 ..(KA's)

ANSWER: 087 (1.00)

a.

MASTER COPY

REFERENCE:

EP/1/A/5000/1A1, Retype #9, Page 6, Step 11

KA 000009A237 [4.2/4.5]

Both RO and SRO

000009A237 ..(KA's)

ANSWER: 088 (1.00)

d.

REFERENCE:

Catawba Examination Bank Question EP1-53

KA 000011A103 [4.0/4.0]

Both RO and SRO

000011A103 ..(KA's)

ANSWER: 089 (1.00)

c.

REFERENCE:

OP-CN-EP-EP2, Rev. 11/03-03-92/GFW, Page 28, Para 2.4.B.6

KA 000011A105 [4.3/3.9]

RO only

000011A105 ..(KA's)

ANSWER: 090 (1.00)

b.

MASTER COPY

REFERENCE:

AP/1/A/5500/19, Retype #19, Page 17, Para C.1 & 2.
OP-CN-PS-ND, Rev. 09/02-27-92/GFW, Page 24, Para 2.3.J.2

KA 000025G011 [3.6/3.9]

Both RO and SRO

000025G011 ..(KA's)

ANSWER: 091 (1.00)

a.

REFERENCE.

OP-CN-PS-IPE, Rev. 04/10-03-90/GFW, Page 23, Para 2.6.D.2.

KA 000027A218 [3.4/3.5]

Both RO and SRO

000027A218 ..(KA's)

ANSWER: 092 (1.00)

d.

REFERENCE:

EP/1/A/5000/2A1, Retype #5, Page 1, Para 1.

KA 000029K301 [4.2/4.5]

RO only

000029K301 ..(KA's)

ANSWER: 093 (1.00)

d.

MASTER COPY

REFERENCE:

OP-CN-IC-ENB, Rev. 09/03-19-92/JLY, Page 9, Para 2.1.E.2.

KA 000033A202 [3.3/3.6]

Both RO and SRO

000033A202 ..(KA's)

ANSWER: 094 (1.00)

a.

REFERENCE:

OP-CN-EP-EP4, Rev. 11/12-12-91/PEV, Page 12, Para 2.1.B.4

KA 000038K302 [4.4/4.5]

Both RO and SRO

000038K302 ..(KA's)

ANSWER: 095 (1.00)

d.

REFERENCE:

AP/1/A/5500/06, Retype #10, Page 12, Para 2.a.

KA 000054G012 [3.2/3.2]

Both RO and SRO

000054G012 ..(KA's)

ANSWER: 096 (1.00)

c.

MASTER COPY

REFERENCE:

Catawba Examination Bank Question EPF-1

KA 000058A101 [3.3/3.5]

Both RO and SRO

000058A101 ..(KA's)

ANSWER: 097 (1.00)

b.

REFERENCE:

OP-CN-SS-VI, Rev. 10/05-21-92/GFW, Page 22, Para 2.1.M.3.c.2.

KA 000065A201 [2.9/3.2]

Both RO and SRO

000065A201 ..(KA's)

ANSWER: 098 (1.00)

a.

REFERENCE:

OP-CN-SS-VI, Rev. 10/05-21-92/GFW, Page 21, Para 2.1.M.3.b.

KA 000065G010 [3.2/3.3]

Both RO and SRO

000065G010 ..(KA's)

ANSWER: 099 (1.00)

c.

MASTER COPY

REFERENCE:

OP-CN-EP-EP5, Rev. 08/07-22-91/CWN, page 20, para 2.3.B.6.

KA 000056A214 [4.4/4.6]

RO only

000056A214 .(KA's)

MASTER COPY

(********** END OF EXAMINATION **********)

A N S W E R K E Y

MULTIPLE CHOICE

001 b
002 d
003 b
004 a
005 d
006 a
007 c
008 a
009 b
010 c
011 a
012 d
013 c
014 c
015 a
016 d
017 a
018 b
019 d
020 a
021 c
022 d
023 b
024 a
025 a
026 b
027 d
028 a
029 b
030 d
031 a
032 b
033 b
034 a
035 d
036 c
037 b
038 b
039 MATCHING

a 2

b 5

c 7

MULTIPLE CHOICE

040 b

MASTER COPY

A N S W E R K E Y

041 MATCHING

a 6

b 5

c 7

MULTIPLE CHOICE

042 d

043 c

044 a

045 b

046 c

047 a

048 a

049 c

050 a

051 c

052 c

053 d

054 c

055 c

056 a

057 b

058 d

059 b

060 d

061 d

062 c

063 a

064 d

065 a

066 b

067 c

068 a

069 c

070 a

071 d

072 b

073 b

074 d

075 c

076 d

077 b

078 d

079 b

080 a

081 a

082 a

MASTER COPY

A N S W E R K E Y

083 b

084 b

085 d

086 b

087 a

088 d

089 c

090 b

091 a

092 d

093 d

094 a

095 d

096 c

097 b

098 a

099 c

MASTER COPY

(****** **** END OF EXAMINATION **********)

R O E x a m P W R R e a c t o r

O r g a n i z e d b y Q u e s t i o n N u m b e r

QUESTION	VALUE	REFERENCE
001	1.00	9000251
002	1.00	9000252
003	1.00	9000254
004	1.00	9000255
005	1.00	9000256
006	1.00	9000259
007	1.00	9000260
008	1.00	9000262
009	1.00	9000263
010	1.00	9000264
011	1.00	9000265
012	1.00	9000266
013	1.00	9000267
014	1.00	9000270
015	1.00	9000271
016	1.00	9000272
017	1.00	9000273
018	1.00	9000275
019	1.00	9000276
020	1.00	9000277
021	1.00	9000278
022	1.00	9000279
023	1.00	9000280
024	1.00	9000281
025	1.00	9000282
026	1.00	9000283
027	1.00	9000284
028	1.00	9000285
029	1.00	9000286
030	1.00	9000287
031	1.00	9000288
032	1.00	9000290
033	1.00	9000291
034	1.00	9000292
035	1.00	9000293
036	1.00	9000294
037	1.00	9000295
038	1.00	9000296
039	1.50	9000297
040	1.00	9000298
041	1.50	9000300
042	1.00	9000303
043	1.00	9000304
044	1.00	9000305
045	1.00	9000306
046	1.00	9000307
047	1.00	9000308
048	1.00	9000309
049	1.00	9000312

MASTER COPY

R O E x a m P W R R e a c t o r

O r g a n i z e d b y Q u e s t i o n N u m b e r

QUESTION	VALUE	REFERENCE
050	1.00	9000313
051	1.00	9000314
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053	1.00	9000316
054	1.00	9000317
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056	1.00	9000320
057	1.00	9000321
058	1.00	9000322
059	1.00	9000323
060	1.00	9000324
061	1.00	9000325
062	1.00	9000326
063	1.00	9000327
064	1.00	9000329
065	1.00	9000332
066	1.00	9000336
067	1.00	9000337
068	1.00	9000338
069	1.00	9000339
070	1.00	9000340
071	1.00	9000341
072	1.00	9000342
073	1.00	9000343
074	1.00	9000344
075	1.00	9000345
076	1.00	9000346
077	1.00	9000347
078	1.00	9000348
079	1.00	9000349
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081	1.00	9000351
082	1.00	9000352
083	1.00	9000353
084	1.00	9000354
085	1.00	9000356
086	1.00	9000357
087	1.00	9000358
088	1.00	9000359
089	1.00	9000360
090	1.00	9000363
091	1.00	9000364
092	1.00	9000365
093	1.00	9000367
094	1.00	9000368
095	1.00	9000369
096	1.00	9000370
097	1.00	9000371
098	1.00	9000373

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R O E x a m P W R R e a c t o r

O r g a n i z e d b y Q u e s t i o n N u m b e r

QUESTION	VALUE	REFERENCE
099	1.00	9000376
	100.00	
	100.00	

MASTER COPY

R O E x a m P W R R e a c t o r

o r g a n i z e d b y K A G r o u p

PLANT WIDE GENERICS

QUESTION	VALUE	KA
008	1.00	194001A106
009	1.00	194001A106
010	1.00	194001A107
011	1.00	194001A109
012	1.00	194001A109
013	1.00	194001A111
002	1.00	194001K101
001	1.00	194001K101
003	1.00	194001K103
004	1.00	194001K104
005	1.00	194001K104
006	1.00	194001K109
007	1.00	194001K114

PWG Total	13.00	

PLANT SYSTEMS

Group I

QUESTION	VALUE	KA
017	1.00	001000G010
014	1.00	001000K103
015	1.00	001000K407
016	1.00	001000K558
019	1.00	003000A401
020	1.00	003000G006
018	1.00	003000K201
021	1.00	004000A401
022	1.00	004010A205
023	1.00	013000A105
024	1.00	013000A403
026	1.00	015000A303
028	1.00	015000K406
027	1.00	015000K604
029	1.00	017020K101
030	1.00	022000A404
031	1.00	025000K301
032	1.00	059000A411
033	1.00	059000G010
034	1.00	061000A202
035	1.00	061000G002
037	1.00	072000A202
038	1.00	072000G007

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R O E x a m P W R R e a c t o r

O r g a n i z e d b y K A G r o u p

PLANT SYSTEMS

Group I

QUESTION	VALUE	KA
PS-I Total	23.00	

Group I1

QUESTION	VALUE	KA
039	1.50	002000K109
040	1.00	002000K603
041	1.50	006000K409
043	1.00	010000A403
042	1.00	010000K201
044	1.00	011000A211
045	1.00	012000K501
025	1.00	014000G008
046	1.00	014000G008
047	1.00	016000K101
048	1.00	016000K106
049	1.00	026000G009
060	1.00	029000K302
050	1.00	033000K303
051	1.00	039000A302
052	1.00	062000G009
036	1.00	063000G010
053	1.00	064000K411
054	1.00	086000K406
PS-II Total	20.00	

Group III

QUESTION	VALUE	KA
055	1.00	005000K407
056	1.00	007000K401
057	1.00	008000K102
058	1.00	008030A304
059	1.00	028000K601
061	1.00	034000A201
062	1.00	041020K417
063	1.00	076000G010
PS-III Total	8.00	
P[illegible] Total	51.00	

MASTER COPY

R O E x a m P W R R e a c t o r

O r g a n i z e d b y K A G r o u p

EMERGENCY PLANT EVOLUTIONS

Group I

QUESTION	VALUE	KA
065	1.00	000005G005
067	1.00	000015G010
066	1.00	000015K207
068	1.00	000026A105
091	1.00	000027A218
071	1.00	000040G012
072	1.00	000051A202
074	1.00	000055A203
073	1.00	000055K302
075	1.00	000057A101
077	1.00	000067A203
078	1.00	000067G012
079	1.00	000074K103
080	1.00	000074K304
081	1.00	000074K311
082	1.00	000076G012

EPE-I Total	16.00	

Group II

QUESTION	VALUE	KA
064	1.00	000001G008
083	1.00	000001G010
084	1.00	000003A201
085	1.00	000007G010
086	1.00	000008K101
087	1.00	000009A237
088	1.00	000011A103
089	1.00	000011A105
090	1.00	000025G011
070	1.00	000029G011
092	1.00	000029K301
069	1.00	000029K312
093	1.00	000033A202
094	1.00	000038K302
095	1.00	000054G012
096	1.00	000058A101
076	1.00	000059A102

EPE-II Total	17.00	

Group III

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R O E x a m P W R R e a c t o r

O r g a n i z e d b y K A G r o u p

EMERGENCY PLANT EVOLUTIONS

Group III

QUESTION	VALUE	KA
099	1.00	000056A214
097	1.00	000065A201
098	1.00	000065G010
EPE-III Total	3.00	
EPE Total	36.00	
Test Total	100.00	

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3/4.4.8 SPECIFIC ACTIVITY

LIMITING CONDITION FOR OPERATION

3.4.8 The specific activity of the reactor coolant shall be limited to:

a. Less than or equal to 1 microCurie per gram DOSE EQUIVALENT I-131, and

b. Less than or equal to 100/$\bar{E}$ microCuries per gram of gross specific activity.

APPLICABILITY: MODES 1, 2, 3, 4, and 5.

ACTION:

MODES 1, 2 and 3*:

a. With the specific activity of the reactor coolant greater than 1 microCurie per gram DOSE EQUIVALENT I-131 for more than 48 hours during one continuous time interval or exceeding the limit line shown on Figure 3.4-1, be in at least HOT STANDBY with T_{avg} less than 500°F within 6 hours;

b. With the gross specific activity of the reactor coolant greater than 100/$\bar{E}$ microCuries per gram of gross radioactivity, be in at least HOT STANDBY with T_{avg} less than 500°F within 6 hours; and

c. The provisions of Specification 3.0.4 are not applicable.

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*With T_{avg} greater than or equal to 500°F.

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

MODES 1, 2, 3, 4, and 5:

With the specific activity of the reactor coolant greater than 1 microCurie per gram DOSE EQUIVALENT I-131 or greater than 100/$\bar{E}$ microcuries per gram, perform the sampling and analysis requirements of Item 4.a) of Table 4.4-4 until the specific activity of the reactor coolant is restored to within its limits.

SURVEILLANCE REQUIREMENTS

4.4.8 The specific activity of the reactor coolant shall be determined to be within the limits by performance of the sampling and analysis program of Table 4.4-4.

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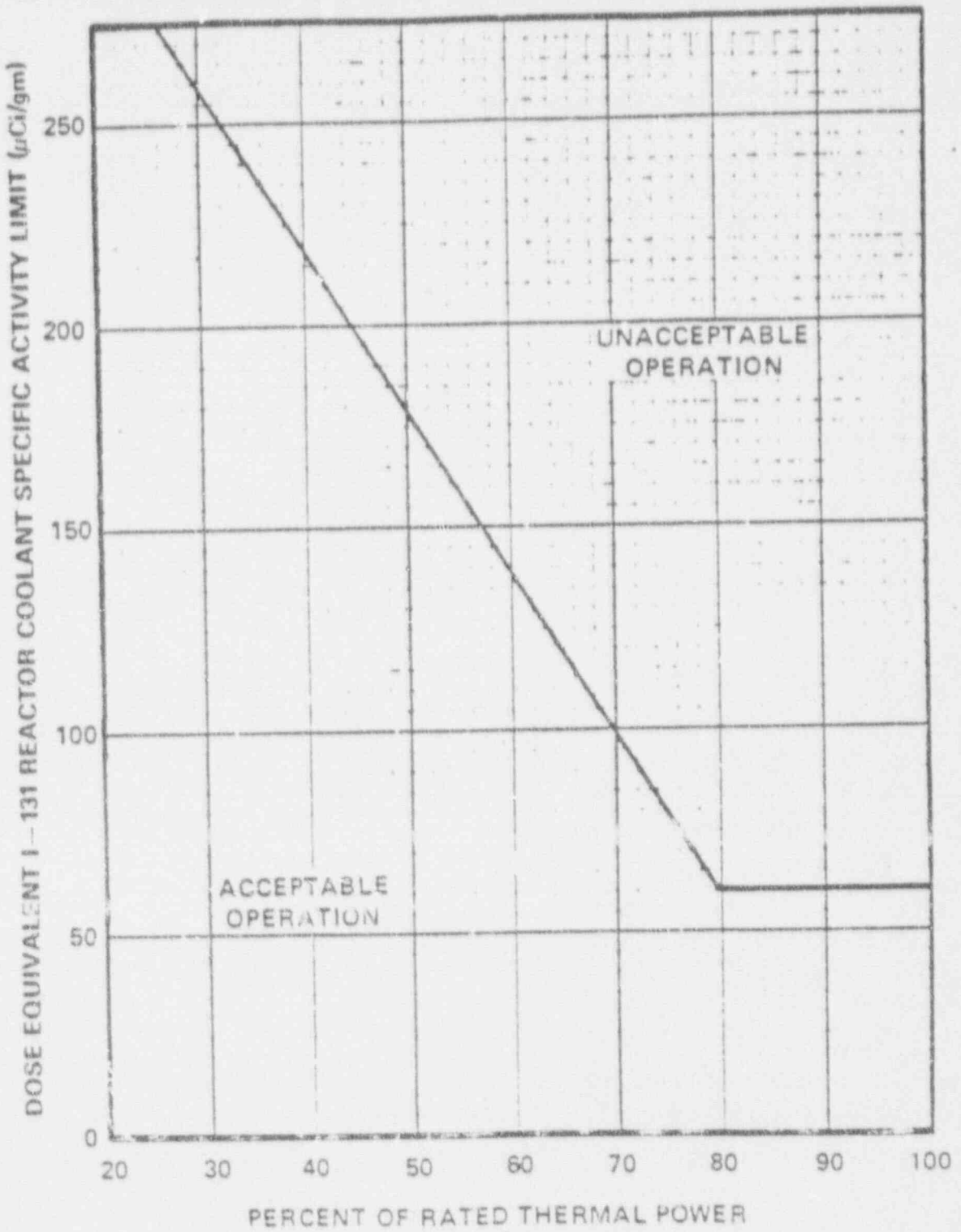

FIGURE 3.4-1

DOSE EQUIVALENT I-131 REACTOR COOLANT SPECIFIC ACTIVITY LIMIT VERSUS PERCENT OF RATED THERMAL POWER WITH THE REACTOR COOLANT SPECIFIC ACTIVITY > 1 μCi/gram DOSE EQUIVALENT I-131

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TABLE 4.4-4

REACTOR COOLANT SPECIFIC ACTIVITY SAMPLE AND ANALYSIS PROGRAM

TYPE OF MEASUREMENT AND ANALYSIS	SAMPLE AND ANALYSIS FREQUENCY	MODES IN WHICH SAMPLE AND ANALYSIS REQUIRED
1. Gross Radioactivity Determination**	At least once per 72 hours	1, 2, 3, 4
2. Isotopic Analysis for DOSE EQUIVALENT I-131 Concentration	1 per 14 days	1
3. Radiochemical for $\bar{E}$ Determination***	1 per 6 months*	1
4 Isotopic Analysis for Iodine Including I-131, I-133, and I-135	a) Once per 4 hours, whenever the specific activity exceeds 1 μCi/gram DOSE EQUIVALENT I-131 or 100/$\bar{E}$ μCi/gram of gross radioactivity, and	1#, 2#, 3#, 4#, 5#
	b) One sample between 2 and 6 hours following a THERMAL POWER change exceeding 15% of the RATED THERMAL POWER within a 1-hour period.	1, 2, 3

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TABLE 4.4-4 (Continued)

TABLE NOTATIONS

#Until the specific activity of the Reactor Coolant System is restored within its limits.

*Sample to be taken after a minimum of 2 EFPD and 20 days of POWER OPERATION have elapsed since reactor was last subcritical for 48 hours or longer.

**A gross radioactivity analysis shall consist of the quantitative measurement of the total specific activity of the reactor coolant except for radionuclides with half-lives less than 10 minutes and all radioiodines. The total specific activity shall be the sum of the degassed beta-gamma activity and the total of all identified gaseous activities in the sample within 2 hours after the sample is taken and extrapolated back to when the sample was taken. Determination of the contributors to the gross specific activity shall be based upon those energy peaks identifiable with a 95% confidence level. The latest available data may be used for pure beta-emitting radionuclides.

***A radiochemical analysis for $\bar{E}$ shall consist of the quantitative measurement of the specific activity for each radionuclide, except for radionuclides with half-lives less than 10 minutes and all radioiodines, which is identified in the reactor coolant. The specific activities for these individual radionuclides shall be used in the determination of $\bar{E}$ for the reactor coolant sample. Determination of the contributors to $\bar{E}$ shall be based upon those energy peaks identifiable with a 95% confidence level.

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3/4.1.3 MOVABLE CONTROL ASSEMBLIES

GROUP HEIGHT

LIMITING CONDITION FOR OPERATION

3.1.3.1 All full-length shutdown and control rods shall be OPERABLE and positioned within ±12 steps (indicated position) of their group step counter demand position.

APPLICABILITY: MODES 1* and 2*.

ACTION:

a. With one or more full-length rods inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour and be in HOT STANDBY within 6 hours.

b. With more than one full-length rod misaligned from the group step counter demand position by more than ±12 steps (indicated position), be in HOT STANDBY within 6 hours.

c. With one full-length rod trippable but inoperable due to causes other than addressed by ACTION a., above, or misaligned from its group step counter demand height by more than ±12 steps (indicated position), POWER OPERATION may continue provided that within 1 hour:

1. The rod is restored to OPERABLE status within the above alignment requirements, or

2. The rod is declared inoperable and the remainder of the rods in the group with the inoperable rod are aligned to within ± 12 steps of the inoperable rod while maintaining the rod sequence and insertion limits of Specification 3.1.3.6. The THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, or

3. The rod is declared inoperable and the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied POWER OPERATION may then continue provided that:

a) A reevaluation of each accident analysis of Table 3.1-1 is performed within 5 days; this reevaluation shall confirm that the previously analyzed results of these accidents remain valid for the duration of operation under these conditions;

b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours;

*See Special Test Exceptions Specifications 3.10.2 and 3.10.3.

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

c) A power distribution map is obtained from the movable incore detectors and $F_Q(Z)$ and $F^N_{\Delta H}$ are verified to be within their limits within 72 hours; and

d) The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within the next hour and within the following 4 hours the High Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER.

d. With more than one full-length rod trippable but inoperable due to causes other than addressed by ACTION a above, POWER OPERATION may continue provided that:

1. Within 1 hour, the remainder of the rods in the bank(s) with the inoperable rods are aligned to within ±12 steps of the inoperable rods while maintaining the rod sequence and insertion limits of Specification 3.1.3.6. The THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, and

2. The inoperable rods are restored to OPERABLE status within 72 hours.

SURVEILLANCE REQUIREMENTS

4.1.3.1.1 The position of each full-length rod shall be determined to be within the group demand limit by verifying the individual rod positions at least once per 12 hours except during time intervals when the Rod Position Deviation Monitor is inoperable, then verify the group positions at least once per 4 hours.

4.1.3.1.2 Each full-length rod not fully inserted in the core shall be determined to be OPERABLE by movement of at least 10 steps in any one direction at least once per 31 days.

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TABLE 3.1-1

ACCIDENT ANALYSES REQUIRING REEVALUATION
IN THE EVENT OF AN INOPERABLE FULL-LENGTH ROD

Rod Cluster Control Assembly Insertion Characteristics

Rod Cluster Control Assembly Misalignment

Loss of Reactor Coolant from Small Ruptured Pipes or from Cracks in Large Pipes Which Actuates the Emergency Core Cooling System

Single Rod Cluster Control Assembly Withdrawal at Full Power

Major Reactor Coolant System Pipe Ruptures (Loss of Coolant Accident)

Major Secondary Coolant System Pipe Rupture

Rupture of a Control Rod Drive Mechanism Housing (Rod Cluster Control Assembly Ejection)

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3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} >200°F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.3% Δk/k for four loop operation.

APPLICABILITY: MODES 1, 2*, 3, and 4.

ACTION:

With the SHUTDOWN MARGIN less than 1.3% Δk/k, immediately initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7000 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1.3% Δk/k:

a. Within 1 hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s);

b. When in MODE 1 or MODE 2 with K_{eff} greater than or equal to 1 at least once per 12 hours by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6;

c. When in MODE 2 with K_{eff} less than 1, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits of Specification 3.1.3.6;

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of Specification 4.1.1.1.1e. below, with the control banks at the maximum inservice limit of Specification 3.1.3.6; and

*See Special Test Exceptions Specification 3.10.1.

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SURVEILLANCE REQUIREMENTS (Continued)

e. When in MODE 3 or 4, at least once per 24 hours by consideration of the following factors:

1) Reactor Coolant System boron concentration,

2) Control rod position,

3) Reactor Coolant System average temperature,

4) Fuel burnup based on gross thermal energy generation,

5) Xenon concentration, and

6) Samarium concentration.

4.1.1.1.2 The overall core reactivity balance shall be compared to predicted values to demonstrate agreement within ± 1% Δk/k at least once per 31 Effective Full Power Days (EFPD). This comparison shall consider at least those factors stated in Specification 4.1.1.1.1e., above. The predicted reactivity values shall be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 EFPD after each fuel loading.

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3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

CONTAINMENT SPRAY SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.2 Two independent Containment Spray Systems shall be OPERABLE with each Spray System capable of taking suction from the refueling water storage tank and transferring suction to the containment sump.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With one Containment Spray System inoperable, restore the inoperable Spray System to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours; restore the inoperable Spray System to OPERABLE status within the next 48 hours or be in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.2 Each Containment Spray System shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position;

b. By verifying, that on recirculation flow, each pump develops a differential pressure of greater than or equal to 185 psid when tested pursuant to Specification 4.0.5;

c. At least once per 18 months during shutdown,** by:

1) Verifying that each automatic valve in the flow path actuates to its correct position on a Phase "B" Isolation test signal, and

2) Verifying that each spray pump starts automatically on a Phase "B" Isolation test signal.

3) Verifying that each spray pump is prevented from starting by the Containment Pressure Control System when the containment atmosphere pressure is less than or equal to 0.25 psid, and is allowed to start at greater than or equal to 0.45 psid relative to the outside atmosphere.

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**This surveillance need not be performed until prior to entering HOT SHUTDOWN following the Unit 1 first refueling.

SURVEILLANCE REQUIREMENTS (Continued)

4) Verifying that each spray pump discharge valve closes or is prevented from opening by the Containment Pressure Control System when the containment atmosphere pressure is less than or equal to 0.25 psid and is allowed to open at greater than or equal to 0.45 psid relative to the outside atmosphere, and

5) Verifying that each spray pump is automatically deenergized by the Containment Pressure Control System when the containment atmosphere pressure is less than or equal to 0.25 psid relative to the outside atmosphere.

d. At least once per 5 years by performing an air or smoke flow test through each spray header and verifying each spray nozzle is unobstructed.

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A. **PURPOSE**

- To verify proper response to a loss of feedwater supply to the S/Gs
- To verify proper response to a loss of normal supply of auxiliary feedwater.

B. **SYMPTOMS**

Case I. Loss Of CF Supply To S/Gs

- CFPT A and B - TRIPPED
- S/G A (B,C,D) LO LEVEL ALERT alarm(s) (1AD-4) - LIT
- S/G A (B,C,D) FLOW MISMATCH LO CF FLOW alarm(s) (1AD-4) - LIT.

CASE II. Loss Of Normal CA Supply

- "CACST LO LEVEL" alarm (1AD-5, H-4) - LIT.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. OPERATOR ACTIONS

IMMEDIATE ACTIONS

None

SUBSEQUENT ACTIONS

__ 1. Verify Reactor power - LESS THAN 5%.

Perform the following:

__ a. Manually trip Reactor.

__ b. GO TO EP/1/A/5000/01, Reactor Trip or Safety Injection.

2. Verify Feedwater Isolation as indicated by following status lights (1SI-5) - LIT:

__ o "S/G A CF CONT ISOL VLVS CLSD"
__ o "S/G B CF CONT ISOL VLVS CLSD"
__ o "S/G C CF CONT ISOL VLVS CLSD"
__ o "S/G D CF CONT ISOL VLVS CLSD."

Manually initiate Feedwater Isolation:

__ o TRN A
__ o TRN B.

__ 3. Verify total CA flow - GREATER THAN 450 GPM.

Perform the following:

__ a. Manually start CA pumps.

__ b. IF CA flow cannot be established, THEN GO TO EP/1/A/5000/2C1, Loss of Secondary Heat Sink.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. Control S/G levels:	
__ a. Verify S/G N/R levels - AT 38%.	__ a. Maintain total feed flow greater than or equal to 450 gpm.
b. **WHEN** N/R level increasing in at least one S/G, **THEN** depress CA System valve control "RESET" pushbuttons: __ o TRN A __ o TRN B.	
__ c. Throttle feed flow to maintain S/G N/R levels at 38%.	
5. Verify CA supply - ADEQUATE:	
a. Ensure the following valves - OPEN: __ o 1CA-4 (CA Pmps Suct From UST) __ o 1CA-6 (CA Pmps Suct From CA CST).	
__ b. Verify "CACST LO LEVEL" alarm (1AD-5, H-4) - DARK.	b. Perform the following: __ 1) Ensure 1CA-6 (CA Pmps Suct From CA CST) - CLOSED. __ 2) **REFER TO** Case II, Loss of Normal CA Supply and perform applicable steps concurrently with remainder of this case.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

6. **Determine required notifications:**

   __ o **REFER TO** RP/0/A/5000/01, Classification of Emergency

   __ o **REFER TO** RP/0/B/5000/13, NRC Notification Requirements.

__ 7. **Determine and correct cause of loss of CF supply.**

__ 8. **Determine long term plant status. RETURN TO procedure in effect.**

END

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. OPERATOR ACTIONS

IMMEDIATE ACTIONS

None

SUBSEQUENT ACTIONS

NOTE - Closing 1CS-69 will isolate the CACST from the Unit 1 and Unit 2 CA Pumps.

__ 1. Ensure 1CA-6 (CA Pmps Suct From CACST) - CLOSED.

__ Dispatch operator to unlock and close 1CS-69 (CACST To Unit 1 and Unit 2 CA Supplies) (SB 619, T-26).

2. Initiate makeup to UST:

__ o Pump CST to UST with CST Pumps 1A and 1B.

__ o Open 1YM-100 (UST M/U CTRL).

__ 3. Verify at least one hotwell pump is available for makeup to the UST.

__ GO TO Step 11.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4. **Makeup to UST from hotwell:**

a. Dispatch op· itor to:

__ 1) Open 1CM-35 (Hotwell Hi Lvl Ctrl Byp), (TB-575, 1L-25).

2) Ensure the following valves · CLOSED:

__ o 1CS-24 (Normal Hotwell Makeup Control Inlet) (TB-595, 1G-30)

__ o 1CS-60 (Normal Hotwell Makeup Control Bypass) (TB-596, 1G-30)

__ o 1CS-32 (Hotwell Recirc Makeup Valve Inlet) (TB-573, 1G-29)

__ o 1CS-35 (Hotwell Recirc Makeup Valves Bypass) (TB-578, 1G-29).

b. **IF** all hotwell pumps are off, **THEN**:

__ 1) Notify Chemistry to ensure all CM polishing demineralizers isolated.

2) Ensure the following valves · CLOSED:

__ o Polish Demin Byp Ctrl

__ o 1CM-83 (Gen Load Reject Bypass).

__ c. Start and stop hotwell pump(s) as required to makeup from hotwell.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE
- If the CA pumps are taking a suction on the hotwell with the UST depleted and the CA auto start circuitry is actuated, then the CA pump suction will automatically align to the RN assured makeup source.
- If CA has been reset and CA pump suction is aligned to the hotwell with the UST depleted, then the CA pumps will trip on low suction pressure.

5. Verify UST level - ADEQUATE:

__ o "CACST/UST LO LEVELS" alarm (1AD-5, H-6) - DARK.

__ o Break condenser vacuum.

__ 6. IF hotwell level greater than 0.5 ft, THEN RETURN TO Step 4.c.

__ 7. WHEN hotwell level less than 0.5 ft AND "CACST/UST LO LEVELS" alarm (1AD-5, H-6) lit, THEN close 1CA-4 (CA Pmps Suct From UST).

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ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED

8. **Ensure CA pumps suction aligned to RN:**

   o TRN A valves - OPEN:

   __ o 1RN-250A (RN Hdr A To CA Pmp Suct Isol)

   __ o 1CA-116A (CA Pump #1 Suct Frm RN Hdr A)

   __ o 1CA-15A (CA Pump 1A Suct Frm RN Isol).

   o TRN B valves - OPEN:

   __ o 1CA-85B (CA Pump #1 Suct Frm RN Hdr B)

   __ o 1CA-18B (CA Pump 1B Suct From RN Isol)

   __ o 1RN-310B (RN Hdr B To CA Pmp Suct Isol).

9. **IF "SSF CA XFER TO RC" alarm (1AD-5, G-4) lit, THEN ensure CA Pump #1 suction aligned to RC:**

   __ o 1CA-178 (RC Supply To CA Pumps Isol) - OPEN

   __ o 1CA-174 (RC To CA Suct Isol) - OPEN

   __ o 1CA-175 (RC To CA Suct Isol) - OPEN.

10. **Determine long term plant status:**

   __ o Continue monitoring CA pump status.

   __ o **RETURN TO** procedure in effect.

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ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED

NOTE The CA pumps will trip on low suction pressure with CA reset and CA pump suction aligned to the hotwell when the UST is depleted.

11. **Establish operator control of CA System:**

__ a. **IF** CA Pump #1 is needed, **THEN** place CA Pump #1 switch in "ON".

b. Depress CA System valve control "RESET" pushbuttons:

__ o TRN A
__ o TRN B.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

12. Maintain all S/G N/R levels at 38% by using one CA pump at a time:

- o **IF** one motor driven CA pump available, **THEN** dispatch operator to open the following valves:

  __ o 1CA-111 (CA Pump 1A & 1B Disch Xover To S/G Isol) (AB-552, BB-50, Rm 250)

  __ o 1CA-112 (CA Pump 1A & 1B Disch Xover To S/G Isol) (AB-552, BB-50, Rm 250).

  OR

- o **IF** CA Pump #1 available, **THEN** open the following valves:

  __ o 1CA-66B (CA Pump 1 Disch To S/G 1A Isol)

  __ o 1CA-38A (CA Pump 1 Disch To S/G 1D Isol).

NOTE The CA pump trip on low suction pressure is being defeated in the following step so that the hotwell can be used as a CA suction source

__ 13 Initiate SWR 10403 to have IAE defeat the CA pump trip on low suction pressure on all 3 CA pumps.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14. Defeat the automatic swap of CA pump suction to the RC assured makeup source by dispatching operator to open the following breakers at the SSF (Elev. 6113:

__ a) SDSP1 Bkr #4

__ b) SDSD-F01D (RC Supply To Aux Feedwater Isol Valve 1CA-174)

__ c) SDSD-F02C (RC Supply To Aux Feedwater Isol Valve 1CA-175).

__ 15. Continuously monitor the parameters given on Enclosure 1 and perform any required actions.

__ 16. Determine long term plant status. RETURN TO procedure in effect.

END

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ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED

CONTINUOUS MONITORING OF CA PUMP PARAMETERS

NOTE If the CA pumps are taking a suction on the hotwell with the UST depleted and the CA auto start circuitry is actuated, then the CA pump suction will automatically align to the RN assured makeup source.

NOTE The preferred method of determining CA pump suction pressure is to compare hotwell level and CA pump flowrate (Enclosure 2).

1. **Continuously monitor CA pump suction pressure using any of the following methods:**

   __ o Hotwell level and CA pump flowrate, REFER TO Enclosure 2

   OR

   __ o Pressure gauges on 1MC-4

   OR

   __ o Local pressure gauges in the CA pump room.

2. **IF CA pump suction pressure drops to less than or equal to 8.2 psig, THEN perform the following:**

   __ a. Stop all CA pumps.

   __ b. Close 1CA-4 (CA Pmps Suct From UST).

   __ b. Dispatch operator to unlock and close 1CS-19 (CA Pumps Supply From UST) (TB-620, 1D-30).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. (Continued)

c. IF RN available, THEN align CA pump suction to the RN assured makeup source:

1) Align A TRN RN supply by opening the following valves:

__ o 1RN-250A (RN Hdr A To CA Pmp Suct Isol)

__ o 1CA-116A (CA Pump #1 Suct Frm RN Hdr A)

__ o 1CA-15A (CA Pump 1A Suct Frm RN Isol).

2) Align B TRN RN supply by opening the following valves:

__ o 1CA-85B (CA Pump #1 Suct Frm RN Hdr B)

__ o 1CA-18B (CA Pump 1B Suct Frm RN Isol)

__ o 1RN-310B (RN Hdr B To CA Pmp Suct Isol).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. (Continued)

d. Restore the automatic swap of CA pump suction to the RC assured makeup source by dispatching operator to close the following breakers at the SLC (Elev. 611):

__ 1) SDSP1 Bkr #4

__ 2) SDSD-F01D (RC Supply To Aux Feedwater Isol Valve 1CA-174)

__ 3) SDSD-F02C (RC Supply To Aux Feedwater Isol Valve 1CA-175.

__ e. Start CA pump(s) as necessary to maintain S/G N/R levels at 38%.

__ 3. **WHEN** the "CACST/UST LO LEVELS" alarm (1AD-5, H-6) is lit, **THEN** break Condenser vacuu

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4. **WHEN hotwell level is less than or equal to 0.5 ft, THEN perform the following:**

__ a. Stop all CA pumps.

__ b. Close 1CA-4 (CA Pmps Suct From UST).

__ b. Dispatch operator to unlock and close 1CS-19 (CA Pumps Supply From UST) (TB-620, 1D-30).

c. **IF** RN available, **THEN** align CA pump suction to the RN assured makeup sources:

1) Align A TRN RN supply by opening the following valves:

__ o 1RN-250A (RN Hdr A To CA Pmp Suct Isol)

__ o 1CA-116A (CA Pump #1 Suct Frm RN Hdr A)

__ o 1CA-15A (CA Pump 1A Suct Frm RN Isol).

2) Align B TRN RN supply by opening the following valves:

__ o 1CA-85B (CA Pump #1 Suct Frm RN Hdr B)

__ o 1CA-18B (CA Pump 1B Suct Frm RN Isol)

__ o 1RN-310B (RN Hdr B To CA Pmp Suct Isol).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4. (Continued)

d. Restore the automatic swap of CA pump suction to the RC assured makeup source by dispatching operator to close the following breakers at the SSF (Elev. 611):

__ 1) SDSP1 Bkr #4

__ 2) SDSD-F01D (RC Supply To Aux Feedwater Isol Valve 1CA-174)

__ 3) SDSD-F02C (RC Supply To Aux Feedwater Isol Valve 1CA-175.

__ e. Start CA pump(s) as necessary to maintain S/G N/R levels at 38%.

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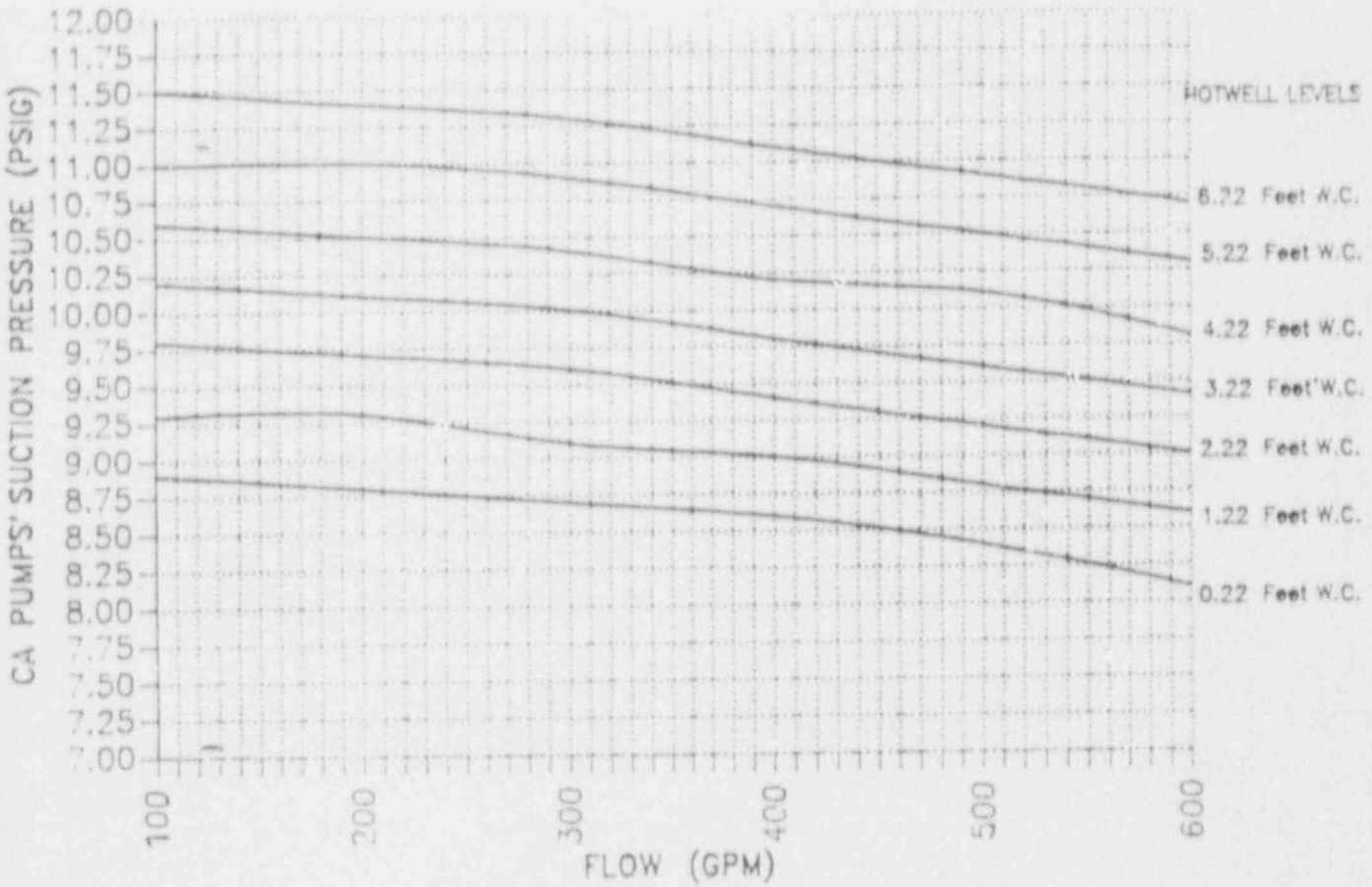
CA PUMP SUCTION PRESSURE BASED ON HOTWELL LEVEL AND FLOWRATE



NOTE

- This graph assumes that the CA pumps are aligned to the hotwell and that the CACST and UST are depleted.
- This graph is valid for either one or two CA pumps taking a suction on the hotwell with the UST depleted.

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