



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

ENCLOSURE 1

EXAMINATION REPORT 50-395/OL-89-02

Facility Licensee: South Carolina Electric and Gas Company
 P.O. Box 88
 Jenkinsville, SC 29065

Facility Name: V. C. Summer Nuclear Station

Facility Docket No.: 50-395

Facility License No.: NPF-12

Examinations were administered at V. C. Summer Nuclear Station near Jenkinsville, South Carolina.

Chief Examiner:	<u>Michael E. Ernstes</u> Michael E. Ernstes	<u>1/12/90</u> Date Signed
Approved By:	<u>John F. Manro</u> John F. Manro, Chief Operator Licensing Section 1 Division of Reactor Safety	<u>1/12/90</u> Date Signed

SUMMARY

Examinations were administered on December 5-7, 1989.

Written examinations and operating tests were administered to five RO applicants, five of whom passed.

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 PDR ADUCK 05000395
 V FDC

REPORT DETAILS

1. Facility Employees Contacted:

- *K. Woodward, Manager, Nuclear Operations Education and Training
- *G. Taylor, Manager, Operations
- *S. Furstenberg, Associate Manager, Operations
- *V. Kelly, Supervisor, Nuclear Operator Training
- *W. R. Quick, Senior Instructor
- *G. Lippard, Lead Instructor, Reactor Operator Training

*Attended Exit Meeting

2. Examiners:

- *M. Ernstes, NRC, Region II
- R. Vinther, PNL
- A. Lopez, PNL

*Chief Examiner

3. Exit Meeting:

At the conclusion of the site visit, the examiners met with representatives of the plant staff to discuss the results of the examinations. There were no facility comments submitted for the written exam.

The cooperation given to the examiners and the effort to ensure an atmosphere in the control room conducive to oral examinations was also noted and appreciated.

The licensee did not identify as proprietary any material provided to or reviewed by the examiners.

PROCTOR COPY

DRAFT COPY

U. S. NUCLEAR REGULATORY COMMISSION
REACTOR OPERATOR LICENSE EXAMINATION
REGION 2

FACILITY: V. C. Summer 1
REACTOR TYPE: PWR-WEC3
DATE ADMINSTERED: 89/12/04
CANDIDATE:

INSTRUCTIONS TO CANDIDATE:

Points for each question are indicated in parentheses after the question. The passing grade requires at least 80% correct overall. Examination papers will be picked up four and one half (4 1/2) hours after the examination starts.

CATEGORY VALUE	% OF TOTAL	NUMBER CORRECT	CATEGORY
29.50	36.88		EMERGENCY AND ABNORMAL PLANT EVOLUTIONS (36%)
50.50	63.13		PLANT SYSTEMS (51%) AND PLANT-WIDE GENERIC RESPONSIBILITIES (13%)
80.00			
		OVERALL	
			% CORRECT OVERALL

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

Candidate's Signature

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QUESTION: 01 (1.00)

WHICH ONE (1) of the following describes the response of the component cooling water pump "A" to a loss of offsite power in conjunction with a SI signal? ASSUME the pump is operating. (1.0)

- a. Pump continues operation without interruption.
- b. Pump stops and is restarted by ESF loading sequencer.
- c. Pump stops and will not restart until offsite power is restored.
- d. Pump continues operation until standby pump is started by ESF loading sequencer, then shuts down.

ANSWER: 01 (1.00)

b. [+1.0]

REFERENCE:

- 1. VCS: Component Cooling Water, p. 26, Enabling Objective #1, 4 and 8.
- 2. KA 000026A202 (2.9).

000026A202 ..(KA's)

QUESTION: 02 (1.00)

WHICH ONE (1) of the following items would NOT be a consequence of a continuous control rod withdrawal per AOP-403.3 "Continuous Control Rod Withdrawal"?

(1.0)

- a. RCS Tavg-Tref Deviation.
- b. Rod Control Urgent Failure.
- c. Reactor Power-Turbine Power Mismatch
- d. Overpower Delta-T Rod Stop

ANSWER: 02 (1.00)

b. [+1.0]

REFERENCE:

- 1. VCS: AOP-403.3, "Continuous Control Rod Withdrawal," p. 1.
- 2. KA 000001A205 (4.4) 000005G005 (3.1).

000005G005 000001A205 ..(KA's)

QUESTION: 03 (1.00)

WHICH ONE (1) of the following symptoms would be an indication of a loss of condenser vacuum according to AOP-206.1, "Loss of Condenser Vacuum"?

(1.0)

- a. Increasing pressure in the steam sealing header.
- b. Decreasing electrical load with constant steam flow.
- c. Decreasing circulating water inlet temperature.
- d. Decreasing condenser hotwell level.

ANSWER: 03 (1.00)

b. [+1.0]

REFERENCE:

1. VCS: AOP-206.1, "Loss of Condenser Vacuum," p. 1.
2. KA 000051G001 (2.7)

000051G011 ..(KA's)

QUESTION: 04 (1.00)

WHICH ONE (1) of the following actions is used to collapse a void according to EOP-18.2, "Response to Voids in Reactor Vessel"?

ASSUME a void exists in the reactor vessel with all RCPs stopped. (1.0)

- a. Decrease temperature while maintaining system pressure.
- b. Increase system pressure using pressurizer heaters while maintaining pressurizer level.
- c. Start a SI pump to increase system pressure while keeping temperature constant.
- d. Fill pressurizer solid and vent the reactor vessel head.

ANSWER: 04 (1.00)

b. [+1.0]

REFERENCE:

1. VCS: EOP-18.2, "Response to Voids in Reactor Vessel," p. 5.
2. KA 000074K311 (4.0).

000074K311 ..(KA's)

QUESTION: 05 (1.00)

WHICH ONE (1) of the following is an immediate operator action for EOP-6.0, "Loss of All ESF AC Power"? (1.0)

- a. Place CCW pump switches in pull to lock or OFF position.
- b. Check if Letdown Isolation Valves are closed.
- c. Restore AC power to at least one (1) ESF bus.
- d. Check main steamline isolation and bypass valves are closed.

ANSWER: 05 (1.00)

b. [+1.0]

REFERENCE:

- 1. VCS: EOP-6.0, "Loss of All ESF AC Power."
- 2. KA 000C55G010 (4.1).

000055G010 ..(KA's)

QUESTION: 06 (1.00)

WHICH ONE (1) of the following actions must be performed FIRST following Pressurizer Pressure Channel PT-444 failing HIGH, according to AOP-401.5, "Pressurizer Pressure Control Channel Failure?" (1.0)

- a. Close PORV block valve MVG-8000B.
- b. Close pressurizer PORV 444B.
- c. Defeat pressurizer channel PT-444.
- d. Place pressurizer pressure control in manual.

ANSWER: 06 (1.00)

b. [+1.0]

REFERENCE:

1. VCS: AOP-401.5, "Pressurizer Pressure Control Channel Failure."
2. KA 000027A215 (3.7) 000027G011 (3.7)

000027A215 000027G011 ..(KA's)

QUESTION: 07 (1.00)

WHICH ONE (1) of the following, in addition to T/Cs NOT less than 1200 deg F, also represents a solid line path for core cooling assuming subcooling condition is less than zero?

(1.0)

	<u>At Least One RCP Running</u>	<u>Core Exit Temperature</u>	<u>RVLIS Vessel Level</u>
a.	no	greater than 700 deg F	greater than 40%
b.	yes	less than 700 deg F	greater than 40%
c.	no	greater than 700 deg F	less than 40%
d.	yes	less than 700 deg F	less than 40%

ANSWER: 07 (1.00)

c. [+1.0]

REFERENCE:

1. VCS: EOP-14.0, "Response to Inadequate Core Cooling."
2. VCS: EOP-12.0, "Monitoring of Critical System Functions," Attachment 2.
3. KA 000074G011 (4.5).

000074G011 ..(KA's)

QUESTION: 08 (1.00)

WHICH ONE (1) of the following Critical Safety Function conditions should have first priority? ASSUME a steam line break has occurred and SI has actuated. (1.0)

- a. S/G narrow range level is less than 30% with feedwater flow at 300 gpm.
- b. Containment pressure is at 24 psig.
- c. A 128 deg F cooldown occurred in eight (8) minutes resulting in RCS cold leg temperature at 220 deg F.
- d. PZR level is being maintained at 6%.

ANSWER: 08 (1.00)

a. [+1.0]

REFERENCE:

1. VCS: EOP-12.0, "Monitoring of Critical Safety Functions."
2. KA 000040G012 (3.8).

000040G012 ..(KA's)

QUESTION: 09 (1.00)

WHICH ONE (1) of the following items will determine the amount of RCS subcooling required during a natural circulation cooldown in accordance with EOP-1.3, "Natural Circulation Cooldown"?

(1.0)

- a. RCS pressure
- b. RCS vessel level
- c. number of CRDM fans running
- d. amount of EFW flow to S/Gs

ANSWER: 09 (1.00)

c. [+1.0]

REFERENCE:

- 1. VCS: EOP-1.3, "Natural Circulation Cooldown," p. 4.
- 2. KA 000015A121 (4.4).

000015A121 ..(KA's)

QUESTION: 10 (1.00)

WHICH ONE (1) of the following correctly discriminates between a steamline rupture inside containment and a small break LOCA?

(1.0)

- a. RCS temperature
- b. RCS pressure
- c. containment temperature
- d. containment pressure

ANSWER: 10 (1.00)

a. [+1.0]

REFERENCE:

1. VCS: EOP-1.0, "Reactor Trip/Safety Injection Actuation,"
step 15, p. 6 and step 28, p. 11.
2. KA 000040A203 (4.6) 000011A213 (3.7).

000040A203 000011A213 ..(KA's)

QUESTION: 11 (1.00)

WHICH ONE (1) of the following statements correctly completes the sentence?

During an ATWS (Anticipated Transient Without Scram) with a loss of feedwater, the operator should (1.0)

- a. "... leave the main turbine on line to provide a heat sink for the RCS."
- b. "... trip the main turbine to initiate a reactor trip."
- c. "... leave the main turbine on line to reduce RCS pressure."
- d. "... trip the main turbine to prevent steam generator dryout."

ANSWER: 11 (1.00)

d. [+1.0]

REFERENCE:

1. VCS: EOP-13.0, "Response to Abnormal Power Generation," p. 2.
2. VCS: FR-S.1, Bases, pp. 75-77, "Westinghouse Background Information."
3. KA 000029K306 (4.2) 000029K312 (4.4).

000029K306 000029K312 ..(KA's)

QUESTION: 12 (1.00)

WHICH ONE (1) of the following correctly states one of the bases for the reactor coolant pump tripping criteria in EOP-2.0, "Loss of Reactor or Secondary Coolant."

(1.0)

- a. Minimizes two phase flow in a large break LOCA.
- b. Conserves coolant inventory in a small break LOCA.
- c. Reduces overall plant loads.
- d. Prevents accident consequence from exceeding 10CFR100 criteria (site boundary dose limits).

ANSWER: 12 (1.00)

b. [+1.0]

REFERENCE:

1. VCS: EOP E-0, "Westinghouse Background Information."
2. KA 000009K321 (4.2) 000009K323 (4.2)

000009K321 000009K323 ..(KA's)

QUESTION: 13 (1.00)

WHICH ONE (1) of the following states the basis for the immediate operator action "Ensure Turbine Trip," according to EOP-1.0, "Reactor Trip/Safety Injection Actuation?" (1.0)

- a. Prevent damage to the turbine.
- b. Prevent uncontrolled cooldown of the RCS.
- c. Conserve and provide decay heat for turbine driven auxiliary equipment.
- d. Prevent fluctuations in electrical power to the grid as turbine coasts down.

ANSWER: 13 (1.00)

b. [+1.0]

REFERENCE:

- 1. VCS: EOP-1.0, "Reactor Trip/Safety Injection Actuation", p.4.
- 2. KA 000007K103 (3.7).

000007K103 ..(KA's)

QUESTION: 14 (1.00)

WHICH ONE (1) of the following is NOT a Critical Safety Function monitored by EOP-12.0, "Status Trees?" (1.0)

- a. Containment
- b. Heat Sink
- c. Subcriticality
- d. Subcooling

ANSWER: 14 (1.00)

d. [+1.0]

REFERENCE:

1. VCS: EOP-12.0, "Monitoring of Criticality Safety Functions", p.1
2. KA 000007G011 (4.1).

000007G011 ..(KA's)

QUESTION: 15 (1.00)

WHICH ONE (1) of the following is NOT an immediate action that must be taken according to AOP-404.1, "Audio Count Rate Malfunction," if the audio count rate signal is lost? (1.0)

- a. Discontinue refueling operations.
- b. Place fuel in a safe condition.
- c. Stop all positive reactivity additions.
- d. Immediately initiate emergency boration.

ANSWER: 15 (1.00)

d. [+1.0]

REFERENCE:

1. VCS: AOP-404.1, "Audio Count Rate Malfunction."
2. KA 000032G011 (3.1) 000032G005 (2.8).

000032G011 000032G005 ..(KA's)

QUESTION: 16 (1.00)

WHICH ONE (1) of the following is an indication that natural circulation flow exists per EOP-1.3, "Natural Circulation Cooldown"? (1.0)

- a. RCS delta-T decreasing
- b. S/G pressure decreasing with RCS T-cold constant
- c. RCS or core exit temperature increasing
- d. S/G level increasing with constant feedflow

ANSWER: 16 (1.00)

a. [+1.0]

REFERENCE:

- 1. VCS: EOP-1.3, "Natural Circulation Cooldown."
- 2. KA 000011A209 (4.2) 000015A121 (4.4)

000011A209 000015A121 ..(KA's)

QUESTION: 17 (1.00)

WHICH ONE (1) of the following is the reason all reactor coolant pumps are tripped according to EOP-15.0, "Response to Loss of Heat Sink"?

(1.0)

- a. To get increased safety injection flow by decreasing RCS cold leg pressure.
- b. To conserve reactor coolant inventory by reducing seal leak off.
- c. To conserve steam generator secondary inventory by reducing heat input to the RCS.
- d. To minimize the possibility of a tube rupture as EFW is restored to the S/G.

ANSWER: 17 (1.00)

c. [+1.0]

REFERENCE:

- 1. Westinghouse EOP Basis FR-H.1, p. 8.
- 2. KA 000054K304 (4.4).

000054K304 ..(KA's)

QUESTION: 18 (1.00)

WHICH ONE (1) of the following is an immediate action that must be taken according to EOP-2.4, "Loss of Residual Heat Removal System While Refueling" (Condition B), if low flow is indicated on loop A and B?

(1.0)

- a. Verify reactor vessel level at half-pipe or greater.
- b. Maintain Refueling Reactor Building integrity.
- c. Stop any core alterations in progress.
- d. Reduce demand on HCV-603A(B) (A,B RHR Hx outlet).

ANSWER: 18 (1.00)

c. [+1.0]

REFERENCE:

- 1. VCS: EOP-2.4, Condition B, "Loss of Residual Heat Removal System While Refueling," pp. 7 and 8.
- 2. KA 000025G010 (3.9).

000025G010 ..(KA's)

QUESTION: 19 (1.00)

WHICH ONE (1) of the following is an automatic action that will occur on a loss of normal letdown according to AOP-102.1, "Loss of All Letdown Capability?"

(1.0)

- a. FCV-122 (Charging flow) will modulate closed.
- b. PCV-145 (Pressure Control) will modulate open.
- c. TCV-144 (Temperature Control) will modulate open.
- d. LCV-115A (Divert valve) will start to divert.

ANSWER: 19 (1.00)

a. [+1.0]

REFERENCE:

- 1. VCS: AOP-102.1, "Loss of All Letdown Capability," pp. 1 and 2.
- 2. KA 000028G011 (3.6)

000028G010 ..(KA's)

QUESTION: 20 (0.50)

FILL IN THE BLANKS. Procedure AOP-206.1, "Loss of Condenser Vacuum", has just been entered. At (a) _____ inches Hg vacuum, operation of all condenser steam dump valves will be blocked. Turbine Trip will occur at (b) _____ inches Hg vacuum.

(0.5)

ANSWER: 20 (0.50)

(a) 5.0" Hg [+0.25]

(b) 8.0" Hg [+0.25]

REFERENCE:

1. VCS: AOP-206.1, "Loss of Condenser Vacuum," p. 1.
2. VCS: IC-1, "Steam Dump System," p. 32.
3. KA 000051A202 (3.9).

000051A202 ..(KA's)

QUESTION: 21 (1.00)

FILL IN THE BLANKS. The listed automatic actions that must be verified per AOP-220.1, "Loss of Instrument Air", include that the reactor may trip on (a) _____ due to the (b) _____ valve(s) failing closed on loss of air.

(1.0)

ANSWER: 21 (1.00)

(a) low steam generator level [+0.5]

(b) feedwater regulating [+0.5]

REFERENCE:

1. VCS: AOP-220.1, "Loss of Instrument Air," p. 1.
2. KA 000065G012 (3.1).

000065G012 ..(KA's)

QUESTION: 22 (0.50)

FILL IN THE BLANK. Per EOP-1.1, "Reactor Trip Recovery", the operator must ensure SI actuation and go to EOP-1.0 "Reactor Trip/Safety Injection Actuation" if Pressurizer pressure DECREASES BELOW _____ psig.

(0.5)

ANSWER: 22 (0.50)

1850 (psig) [+0.5]

REFERENCE:

1. VCS: EOP-1.1, "Reactor Trip Recovery", p.5.
2. KA 000007G011 (4.1).

000007G011 ..(KA's)

QUESTION: 23 (1.00)

FILL IN THE BLANKS. Per Technical Specification 3.4.6.2, action must be taken by the operators if Steam Generator tube leakage exceeds (a) _____ GPM primary-to-secondary leakage through all Steam Generators and (b) _____ gallons per day through any one Steam Generator not isolated from the Reactor Coolant System.

(1.0)

ANSWER: 23 (1.00)

(a) 1 [+0.5]

(b) 500 [+0.5]

REFERENCE:

1. VCS: Technical Specification 3.4.6.2, p. 3/4 4-19
2. KA 000037A210 (3.7).

000037A210 ..(KA's)

QUESTION: 24 (1.50)

LIST the THREE (3) valves that the AB Operator ensures are closed as an immediate action per EOP-8.0, "Control Room Evacuation".

(1.5)

ANSWER: 24 (1.50)

1. Boric acid blender inlet isolation valve (XVD-8430-CS)
2. Chemical mixer tank header isolation valve (XVD-8454-CS)
3. RMW charging pump suction isolation valve (XVD-8441-CS)

[+0.5] each for a total of [+1.5] points.

REFERENCE:

1. VCS: EOP-8.0, "Control Room Evacuation". p.2.
2. KA 000068K318 (4.2).

000068K318 ..(KA's)

QUESTION: 25 (1.50)

STATE the THREE (3) symptoms/plant conditions requiring emergency boration in accordance with EOP-11.0, "Emergency Boration".

(1.5)

ANSWER: 25 (1.50)

1. Failure of the reactor makeup control system (such that bypass is necessary to accomplish boration.)
2. Uncontrolled cooldown NOT requiring SI.
3. Any questionable shutdown margin.

[+0.5] each

REFERENCE:

1. VCS: EOP-11.0, "Emergency Boration," p. 1.
2. KA 000024G010 (4.0) 000024K301 (4.1).

000024G010 000024K301 ..(KA's)

QUESTION: 26 (2.50)

WHAT are the FOUR (4) contingency action steps the operator may take from the control board if the turbine stop valves do NOT shut according to EOP-13.0, "Response to Abnormal Nuclear Power Generation"? ASSUME conduct of each contingency action is ineffectual.

(2.5)

ANSWER: 26 (2.50)

1. Manually trip turbine [+0.5]
2. Stop EHC pump A and B [+0.5] and pull-to-lock [+0.5]
3. Runback the turbine [+0.5]
4. Close all main steam isolation (and bypass valves) [+0.5]

Accept maintenance isolation for full credit

(Allow full 1.0 credit for pull-to-lock)

REFERENCE:

1. VCS: EOP-13.0, "Response to Abnormal Nuclear Power Generation," p. 2.
2. KA 000007A107 (4.3) 000029A113 (4.1).

000007A107 000029A113 ..(KA's)

QUESTION: 27 (2.00)

STATE the FOUR (4) immediate actions that must be taken according to AOP-403.6, "Dropped Control Rod", if during Mode 1 operation ONE (1) rod has fallen into the core and its rod bottom light is lit?

(2.0)

ANSWER: 27 (2.00)

1. Verify reactor did not trip. [+0.5]
2. If reactor tripped, implement EOP-1.0, Reactor Trip/ Safety Injection Actuation. [+0.5]
3. Decrease Turbine load to ensure Tavg within 5 deg F of Tref. [+0.5]
4. Rotate ROD CNTRL BANK SEL switch to MANUAL. [+0.5]

REFERENCE:

1. VCS: AOP-403.6, "Dropped Control Rod," p. 1.
2. KA 000003G010 (3.9) 000003G011 (3.6).

000003G010 000003G011 ..(KA's)

QUESTION: 01 (1.00)

WHICH ONE (1) of the following is a prerequisite for starting
a reactor coolant pump? (1.0)

- a. Oil lift pump has been operated for 1 (one) minute.
- b. Reactor Coolant System pressure is above 315 psig.
- c. #1 seal leakoff flow is above 0.2 gpm.
- d. Delta pressure across #1 seal is greater than 150 psid.

ANSWER: 01 (1.00)

c. [+1.0]

REFERENCE:

- 1. VCS: AB-4, Reactor Coolant pumps, p.24. Enabling Objective #6.
- 2. KA 003000K614 (2.6).

003000K614 ..(KA's)

QUESTION: 02 (1.00)

WHICH ONE (1) of the following Pressurizer water levels is
the setpoint at which the CVCS letdown isolation valves
(LCV-459 and LCV-460) will automatically close? (1.0)

- a. 27%
- b. 22%
- c. 17%
- d. 12%

ANSWER: 02 (1.00)

c. [+1.0]

REFERENCE:

1. VCS: AB-3, Chemical and Volume Control System, p.6. Enabling Objective #5.
2. KA 004000A302 (3.6).

004000A302 ..(KA's)

QUESTION: 03 (1.00)

WHICH ONE (1) of the following will occur if VCT level channel LT-115 has failed HIGH? ASSUME no operator action is taken. (1.0)

- a. Actual VCT level decrease with potential charging pump damage.
- b. Charging pump suction will shift to RWST at 5% actual level.
- c. Letdown will not go to recycle holdup tanks.
- d. VCT level remains unchanged.

ANSWER: 03 (1.00)

a. [+1.0]

REFERENCE:

1. VCS: AB-3, Chemical and Volume Control, p.16. Enabling Objectives 5 and 7.
2. KA 004010A211 (3.1).

004010A211 ..(KA's)

QUESTION: 04 (1.00)

The following data concerning power range nuclear instrumentation exists. (STP-108.001, "Quadrant Power Tilt Ratio", Attachment 1 is attached for use if needed)

	N41	N42	N43	N44
lower current reading	237 mA	236 mA	244 mA	241 mA
lower reference current	474 mA	472 mA	489 mA	481 mA
upper current reading	222 mA	214 mA	245 mA	257 mA
upper reference current	444 mA	426 mA	474 mA	486 mA

WHICH ONE (1) of the following is closest to the Quadrant Power Tilt Ratio (QPTR) given the conditions shown above?

(1.0)

- a. 1.00
- b. 1.01
- c. 1.02
- d. 1.03

ANSWER: 04 (1.00)

d. [+1.0]

REFERENCE:

1. VCS: Station Curve Book: Fig V-3A.
2. VCS: Surveillance Test Procedure STP-108.001.
3. VCS: IC-8, Nuclear Instrumentation, p.1, Enabling objective #9.
4. KA 015000A104 (3.5).

015000A104 ..(KA's)

QUESTION: 05 (1.00)

WHICH ONE (1) of the following serves as the alternate water supply suction for the Emergency Feedwater pumps? (1.0)

- a. Condensate Storage Tank
- b. Water Treatment Building
- c. Demineralized Water Tank
- d. Service Water System

ANSWER: 05 (1.00)

d. [+1.0]

REFERENCE:

- 1. VCS: IB-3, Emergency Feedwater System, p. 5. Enabling Objective #3.
- 2. KA 061000K401 (3.9).

061000K401 ..(KA's)

QUESTION: 06 (1.00)

WHICH ONE (1) of the following supplies steam to drive the three (3) main feedwater pump turbines? ASSUME normal 100 percent plant load with three feedwater pumps running. (1.0)

- a. Hot reheat steam from Moisture Separator Reheater A.
- b. Main steam supplementing hot reheat steam.
- c. Hot reheat steam from Moisture Separator Reheater B.
- d. Main steam supplementing cold reheat steam.

ANSWER: 06 (1.00)

a. [+1.0]

REFERENCE:

1. VCS: TB-7, Feedwater System, p. 9, Enabling Objectives #3 and #4.
2. KA 039000A403 (2.8).

039000A403 ..(KA's)

QUESTION: 07 (1.00)

At WHICH ONE (1) of the following RCS pressures does the ECCS
accumulator tank contents begin injecting into the RCS? (1.0)

- a. 1350 psig
- b. 650 psig
- c. 350 psig
- d. 150 psig

ANSWER: 07 (1.00)

b. [+1.0]

REFERENCE:

1. VCS: AB-10, Emergency Core Cooling Systems, p. 37. Enabling
Objective #5.
2. KA 006020K603 (3.0) 006000K602 (3.4) 006000A301 (4.0)

006020K603 006000K602 006000A301 ..(KA's)

QUESTION: 08 (1.00)

WHICH ONE (1) of the following conditions is the proper valve status for the Residual Heat Removal System in the normal standby ECCS mode?

(1.0)

- a. Residual Heat Exchanger Bypass Valves (FCV-605A/B) open.
- b. Recirculation Sump Isolation Valves (MVG-8811A/B) open.
- c. Cold Leg Injection Isolation Valves (MVG-8888A/B) open.
- d. Hot Leg Injection Isolation Valve (MVG-8889) open.

ANSWER: 08 (1.00)

c. [+1.0]

REFERENCE:

- 1. VCS: AB-10, Emergency Core Cooling Systems, p. 35, Enabling Objective #3 and #4.
- 2. KA 006020A302 (3.9).

006020A302 ..(KA's)

QUESTION: 09 (1.00)

WHICH ONE (1) of the following occurs when Hot Leg Recirculation Phase is initiated?

(1.0)

- a. Reverse flow through the core is stopped.
- b. A steam bubble is formed in vessel head.
- c. Water flow through the core is reduced.
- d. Boron washes back into solution.

ANSWER: 09 (1.00)

d. [+1.0]

REFERENCE:

1. VCS: AB-10, Emergency Cooling System, p. 40. Enabling Objective #1 and 3.
2. KA 006000G004 (3.5) 006030K403 (3.4).

006000G004 006030K403 ..(KA's)

QUESTION: 10 (1.00)

WHICH ONE (1) of the following specifies the LIMIT that inserted rods shall be positioned at within their group step counter demand position according to Technical Specification 3.1.3, "Moveable Control Assemblies"?

(1.0)

- a. +/- 12 steps
- b. +/- 14 steps
- c. +/- 16 steps
- d. +/- 18 steps

ANSWER: 10 (1.00)

a. [+1.0]

REFERENCE:

1. VCS: Tech. Spec. 3.1.3.1
2. VCS: IC-5 Rod Control System, Enabling Objective #9.
3. KA 014000A204 (3.4).

014000A204 ..(KA's)

QUESTION: 11 (1.00)

WHICH ONE (1) of the following conditions or events will result
in a DECREASE in the OP-delta T setpoint? (1.0)

- a. Pressurizer spray valve sticks open for 15 seconds
(assume no reactor trip).
- b. A reactor boration is initiated at 50% power.
- c. A power ascension from 75% to 100% power.
- d. Feed flow to a steam generator is increased.

ANSWER: 11 (1.00)

c. [+1.0]

REFERENCE:

- 1. VCS: IC-9, Reactor Protection and Safeguards System, p. 29.
Enabling Objective #7.
- 2. KA 012000K611 (2.9).

012000K611 ..(KA's)

QUESTION: 12 (1.00)

WHICH ONE (1) of the following conditions will cause the actuation of the steam dump system? ASSUME steam dumps in Tavg mode unless otherwise indicated and no operator action is taken.

(1.0)

- a. Failure of impulse pressure PT-447 LOW at a fast rate with a coincident Tavg-Tref error signal of 6 deg F.
- b. Failure of BOTH impulse pressure PT-446 and PT-447 HIGH, coincident with a hot leg RTD failed HIGH.
- c. Failure of impulse pressure PT-446 LOW with the steam dump controller in "Steam Pressure" and setpoint at no-load value.
- d. Failure of impulse pressure PT-446 LOW coincident with a hot leg RTD failed LOW.

ANSWER: 12 (1.00)

a. [+1.0]

REFERENCE:

1. VCS: IC-1, Steam Dump System, Enabling Objective #6 and figure IC.11.
2. KA 041020K411 (2.8) 041020K414 (2.5).

041020K411 041020K414 ..(KA's)

QUESTION: 13 (1.00)

WHICH ONE (1) of the following Refueling Water Storage Tank (RWST) conditions meets the operability requirements for the RWST as specified in Technical Specification 3.5.4?

(1.0)

- a. 450,000 gallon volume, boron concentration of 2250 ppm, and a water temperature of 41 degrees F.
- b. 455,000 gallon volume, boron concentration of 2450 ppm, and a water temperature of 38 degrees F.
- c. 460,000 gallon volume, boron concentration of 2550 ppm, and a water temperature of 40 degrees F.
- d. 465,000 gallon volume, boron concentration of 2350 ppm, and a water temperature of 42 degrees F.

ANSWER: 13 (1.00)

d. [+1.0]

REFERENCE:

- 1. VCS: AB-10, "ECCS", Enabling Objective #9.
- 2. Technical Specification 3.5.4, page 3/4 5-9.
- 3. KA 006020A109 (3.3)

006020A109 ..(KA's)

QUESTION: 14 (1.00)

WHICH ONE (1) of the following reactor building instrument air discharge header pressures is the setpoint at which the Backup Instrument Air Valve (PVA-2659) will automatically open to provide backup instrument air?

(1.0)

- a. 105 psig
- b. 90 psig
- c. 75 psig
- d. 60 psig

ANSWER: 14 (1.00)

b. [+1.0]

REFERENCE:

1. VCS: AB-14, Reactor Building Instrument Air, p. 6. Enabling Objective #5.
2. KA 078000K402 (3.2).

078000K402 ..(KA's)

QUESTION: 15 (1.00)

WHICH ONE (1) of the following loads is supplied by the Component Cooling Water System?

(1.0)

- a. Diesel generator coolers
- b. HVAC mechanical chillers
- c. Reactor building cooling units
- d. Reactor Coolant Drain Tank Heat Exchanger

ANSWER: 15 (1.00)

d. [+1.0]

REFERENCE:

1. VCS: 1B-2, Component Cooling System, p.18. Enabling Objectives #1,4.
2. VCS: 1B-1, Service Water, p. 10. Enabling Objective, #1,4.
3. KA 008000K102 (3.3).

008000K102 ..(KA's)

QUESTION: 16 (1.00)

WHICH ONE (1) of the following arrangements during NORMAL full-power operations satisfies the component cooling heat removal requirements?

(1.0)

- a. One (1) CCW pump operating in SLOW speed.
- b. Two (2) CCW pumps operating in SLOW speed.
- c. Two (2) CCW pumps operating: One in SLOW speed and one in FAST speed.
- d. Two (2) CCW pumps operating in FAST speed.

ANSWER: 16 (1.00)

a. [+1.0]

REFERENCE:

1. VCS: 1B-2 Component Cooling, p. 25. Enabling Objective #6.
2. KA 008000A101 (2.8) 008030A302 (2.5) 008010A303 (2.9)

008000A101 008030A302 008010A303 ..(KA's)

(***** CATEGORY 3 CONTINUED ON NEXT PAGE *****)

QUESTION: 17 (1.00)

WHICH ONE (1) of the following statements is allowable concerning the requirements for the Nuclear Instrumentation Recorder NR-45, in order to perform a reactor startup? (1.0)

- a. BOTH source range channels are selected.
- b. The LOWEST indicating source range channel and the HIGHEST indicating intermediate range channel are selected.
- c. The HIGHEST indicating source range channel and the LOWEST indicating intermediate range channel are selected.
- d. BOTH intermediate range channels are selected.

ANSWER: 17 (1.00)

c. [+1.0]

REFERENCE:

- 1. VCS: IC-8, Nuclear Instrumentation System, p. 40. Enabling Objective # 4,5.
- 2. KA 015000A402 (3.9) 015000A401 (3.6).

015000A402 015000A401 ..(KA's)

QUESTION: 18 (1.00)

WHICH ONE (1) of the following will cause a main feedwater pump trip? ASSUME the plant is operating at 50% power. (1.0)

- a. Low deaerator storage tank level.
- b. Low feedwater pump discharge pressure.
- c. Excessive feedwater pump vibration.
- d. Loss of a feedwater booster pump.

ANSWER: 15 (1.00)

d. [+1.0]

REFERENCE:

1. VCS: IB-2, Component Cooling System, p.18. Enabling Objectives #1,4.
2. VCS: IB-1, Service Water, p. 10. Enabling Objective, #1,4.
3. KA 008000K102 (3.3).

008000K102 ..(KA's)

QUESTION: 16 (1.00)

WHICH ONE (1) of the following arrangements during NORMAL full-power operations satisfies the component cooling heat removal requirements?

(1.0)

- a. One (1) CCW pump operating in SLOW speed.
- b. Two (2) CCW pumps operating in SLOW speed.
- c. Two (2) CCW pumps operating: One in SLOW speed and one in FAST speed.
- d. Two (2) CCW pumps operating in FAST speed.

ANSWER: 16 (1.00)

a. [+1.0]

REFERENCE:

1. VCS: IB-2 Component Cooling, p. 25. Enabling Objective #6.
2. KA 008000A101 (2.8) 008030A302 (2.5) 008010A303 (2.9)

008000A101 008030A302 008010A303 ..(KA's)

QUESTION: 17 (1.00)

WHICH ONE (1) of the following statements is allowable concerning the requirements for the Nuclear Instrumentation Recorder NR-45, in order to perform a reactor startup? (1.0)

- a. BOTH source range channels are selected.
- b. The LOWEST indicating source range channel and the HIGHEST indicating intermediate range channel are selected.
- c. The HIGHEST indicating source range channel and the LOWEST indicating intermediate range channel are selected.
- d. BOTH intermediate range channels are selected.

ANSWER: 17 (1.00)

c. [+1.0]

REFERENCE:

- 1. VCS: IC-8, Nuclear Instrumentation System, p. 40. Enabling Objective # 4,5.
- 2. KA 015000A402 (3.9) 015000A401 (3.6).

015000A402 015000A401 ..(KA's)

QUESTION: 18 (1.00)

WHICH ONE (1) of the following will cause a main feedwater pump trip? ASSUME the plant is operating at 50% power. (1.0)

- a. Low deaerator storage tank level.
- b. Low feedwater pump discharge pressure.
- c. Excessive feedwater pump vibration.
- d. Loss of a feedwater booster pump.

ANSWER: 18 (1.00)

a. [+1.0]

REFERENCE:

1. VCS: TB-7, Feedwater System, p. 12-13. Enabling Objective #5.
2. KA 059000K416 (3.1).

059000K416 ..(KA's)

QUESTION: 19 (1.00)

WHICH ONE (1) of the following radiation monitors can be used to
detect primary to secondary leakage? (1.0)

- a. Main Plant Vent (RM-A13)
- b. Particulate and Gaseous activity (RM-A2)
- c. Main Steam Line (RM-G19 A,B,C)
- d. Reactor Building Purge Supply & Exhaust System (RM-A14)

ANSWER: 19 (1.00)

c. [+1.0]

REFERENCE:

1. VCS: Technical Specifications 3.3.3.1, Radiation
Monitoring Instrumentation, p. 3.4-41.
2. VCS: AB-2 Reactor Coolant System, p. 47. Enabling Objective #9.
3. KA 002000A301 (3.7) 073000G011 (2.8) 073000G007 (2.9).

002000A301 073000G011 073000G007 ..(KA's)

QUESTION: 20 (1.00)

WHICH ONE (1) of the following components receives its input
from Pressurizer pressure transmitter PT-445?

(1.0)

- a. "PZR PRESS LO" annunciator
- b. Both Pressurizer Spray controllers
- c. Proportional heater controller
- d. P-11 interlock

ANSWER: 20 (1.00)

a. [+1.0]

REFERENCE:

- 1. VCS: IC-3, Pressurizer Pressure and Level Control, p. 11-21.
Enabling Objective #2,3, and 4.
- 2. KA 010000G007 (3.4) 010000K601 (2.7) 010000A302 (3.6).

010000A302 010000G007 010000K601 ..(KA's)

QUESTION: 21 (1.00)

WHICH ONE (1) of the following describes the plant response to a pressurizer level channel failure? ASSUME LT-459 control channel failed LOW, the system is in automatic, no operator action is taken, and the reactor is at 100% power.

(1.0)

- a. Charging flow decreases, actual level decreases, letdown isolates, and the level stabilizes at setpoint.
- b. Charging flow remains the same, letdown flow temperatures increase, backup heaters turn on if actual level increases greater than 5% above program.
- c. Letdown isolates, charging flow increases, actual level increases, and the reactor trips on high pressurizer level.
- d. Letdown isolates, heaters turn off, pressurizer pressure decreases, and the reactor eventually trips on low pressurizer pressure.

ANSWER: 21 (1.00)

c. [+1.0]

REFERENCE:

1. VCS: IC-2, Pressurizer Pressure and Level Control, p. 24-30 and Enabling Objective # 2,4, and 5.
2. KA 011000A211 (3.4).

011000A211 ..(KA's)

QUESTION: 22 (1.00)

WHICH ONE (1) of the following valves is used to THROTTLE
Pressurizer auxiliary spray flow? (1.0)

- a. PVT-8145 (Auxiliary Spray Valve)
- b. FCV-122 (Charging Flow Control Valve)
- c. PCV-444C (Spray Valve for Loop C)
- d. PCV-444D (Spray Valve for Loop A)

ANSWER: 22 (1.00)

b. [+1.0]

REFERENCE:

- 1. VCS: AB-2, Reactor Coolant System, p. 29-30. Enabling Objective #4.
- 2. VCS: AB-3, CVCS, p. 23-24
- 3. KA 010000A202 (3.9) 010000A401 (3.7)

010000A202 010000A401 ..(KA's)

QUESTION: 23 (1.00)

WHICH ONE (1) of the following actions will occur if the operator were to push the "SCAN" pushbutton on the Incore Instrumentation System panel? ASSUME Incore Instrumentation System is setup for automatic operation.

(1.0)

- a. Inserts detectors(s) at LOW speed to the top-of-core limit.
- b. Inserts detector(s) at HIGH speed to the top-of-core limit.
- c. Inserts detector(s) at LOW speed to the bottom-of-core limit.
- d. Inserts detector(s) at HIGH speed to the bottom-of-core limit.

ANSWER: 23 (1.00)

a. [+1.0]

REFERENCE:

1. VCS: IC-7, Incore Instrumentation, p. 19. Enabling Objective #4.
2. KA 015000A303 (3.9)

015000A303 ..(KA's)

QUESTION: 24 (1.50)

MATCH the correct seal leakage flows from Column B with the correct reactor coolant pump seal in Column A. (Items in Column B may be used more than once). ASSUME normal full-power conditions. (1.5)

COLUMN A	COLUMN B
a. #1 Seal _____	1. 50 cc/hr
b. #2 Seal _____	2. 100 cc/hr
c. #3 Seal _____	3. 3 gph
	4. 3 gpm
	5. 5 gpm
	6. 8 gpm

ANSWER: 24 (1.50)

- a. 4 [+0.5]
- b. 3 [+0.5]
- c. 2 [+0.5]

REFERENCE:

- 1. VCS: AB-4, Reactor Coolant Pumps, Enabling Objective #2.
- 2. KA 003000K602 (2.7) 003000A301 (3.3).

003000K602 003000A301 ..(KA's)

QUESTION: 25 (2.00)

MATCH the correct detection instrument from Column B with the correct range in Column A. (Items in Column B may be used more than once)

(2.0)

COLUMN A		COLUMN B
a. Source Range detectors N31 and N32	_____	1. BF3 proportional detector
b. Source Range detector N33	_____	2. U-235 Fission Chamber
c. Intermediate Range detectors N-35 and N-36	_____	3. Uncompensated Ion Chamber
d. Power Range detectors N41, N42, N43, N44	_____	4. Compensated Ion Chamber
		5. Li crystal detector

ANSWER: 25 (2.00)

- a. 2 [+0.5]
- b. 1 [+0.5]
- c. 2 [+0.5]
- d. 3 [+0.5]

REFERENCE:

- 1. VCS: IC-8, Nuclear Instrumentation, p. 4-10. Enabling Objective #3.
- 2. KA 015000K601 (2.9).

015000K601 ..(KA's)

QUESTION: 26 (1.00)

MATCH the setpoint values from Column B with the correct Rod Stop interlock in Column A. (Items in Column B may be used more than once).

(1.0)

COLUMN A	COLUMN B
a. C-1, Intermediate Range Rod Stop, % power _____	1. 1%
	2. 2%
b. C-2, Power Range over-power Rod Stop, % power _____	3. 3%
	4. 4%
c. C-3, OT delta T Rod Stop, % from trip setpoint _____	5. 12%
	6. 20%
d. C-4, OP delta T Rod Stop, % from trip setpoint _____	7. 30%
	8. 103%
	9. 109%

ANSWER: 26 (1.00)

- a. 6 [+0.25]
- b. 8 [+0.25]
- c. 3 [+0.25]
- d. 3 [+0.25]

REFERENCE:

1. VCS: IC-8, Nuclear Instrumentation, p. 50. Enabling Objective #5.
2. KA 015000K402 (3.7) 001000K407 (3.7)

015000K402 001000K407 ..(KA's)

QUESTION: 27 (1.00)

MATCH the correct power supply from Column B with the correct Emergency Core Cooling System pump in Column A. (Items in column B may be used more than once).

(1.0)

COLUMN A		COLUMN B
a. RHR Pump A	_____	1. 1DA
b. RHR Pump B	_____	2. 1DA1
c. Charging Pump A	_____	3. 1DB
d. Charging Pump B	_____	4. 1DB1
		5. 1A3
		6. 1DA or 1DB

ANSWER: 27 (1.00)

- a. 2
- b. 4
- c. 1
- d. 3

[+0.25] pts each

REFERENCE:

1. VCS: AB-3, CVCS p. 20. Enabling Objective #4.
2. VCS: AB-10, ECCS, p. 28,61. Enabling Objective #4.
3. KA 005000K201 (3.0) 006000K201 (3.6).

006000K201 005000K201 ..(KA's)

QUESTION: 28 (2.50)

MATCH the RCS loop segments from Column B with the RCS penetrations in Column A. (Items in Column B may be used more than once). (2.5)

COLUMN A	COLUMN B
a. CVCS Normal Charging _____	1. Loop A cold leg
b. Pressurizer Surge Line _____	2. Loop A hot leg
c. Pressurizer Spray Line _____, _____ (two Items)	3. Loop A intermediate leg
d. Normal Letdown _____	4. Loop B cold leg
	5. Loop B hot leg
	6. Loop B intermediate leg
	7. Loop C cold leg
	8. Loop C hot leg
	9. Loop C intermediate leg

ANSWER: 28 (2.50)

- a. 4 [+0.5]
- b. 2 [+0.5]
- c. 1 and 7 [+0.5] each
- d. 3 [+0.5]

REFERENCE:

- 1. VCS: AB-2, Reactor Coolant System, Fig AB2.3, Learning Objective #3, 4.
- 2. KA 002000K109 (4.1) 002000K106 (3.7)

002000K106 002000K109 ..(KA's)

QUESTION: 29 (1.00)

MATCH the correct rod speeds in Column B with the appropriate rod bank and mode of operation in Column A. (Items in Column B may be used more than once)

(1.0)

COLUMN A		COLUMN B
a. WITHDRAWING control bank "B" in control bank "B" position	_____	1. 0 spm
b. Automatic INSERTION with TAVG greater than TREF by 1 degree	_____	2. 8 spm
c. Automatic INSERTION with TAVG greater than TREF by 2 degrees	_____	3. 40 spm
d. Automatic INSERTION with TAVG greater than TREF by 5 degrees	_____	4. 48 spm
		5. 68 spm
		6. 72 spm

ANSWER: 29 (1.00)

- a. 4 [+0.25]
- b. 1 [+0.25]
- c. 2 [+0.25]
- d. 6 [+0.25]

REFERENCE:

1. VCS: IC-5 Rod Control, p. 31. Enabling Objective # 4 and 5.
2. KA 001010K404 (2.6) 001010K403 (3.4) 001000G007 (3.2)

001010K404 001010K403 001000G007 ..(KA's)

QUESTION: 30 (0.50)

FILL IN THE BLANK. The Reactor Building spray system is designed to remove fission products from the reactor building atmosphere. The fission product of particular concern is _____.

(0.5)

ANSWER: 30 (0.50)

Iodine [+0.5]

REFERENCE:

1. VCS: AB-8, Reactor Building Spray System, p. 12. Enabling Objective #1.
2. KA 026020K401 (2.8) 026000G004 (3.6).

026020K401 026000G004 ..(KA's)

QUESTION: 31 (0.50)

FILL IN THE BLANKS. The C-5 interlock prevents outward rod motion in the automatic mode if turbine power is less than

(a) _____ percent. The C-11 interlock prevents outward automatic rod motion when control bank D is at (b) _____ steps as indicated by the Rod Position Indication System.

(0.5)

ANSWER: 31 (0.50)

(a) 15% [+0.25]

(b) 220 [+0.25]

REFERENCE:

1. VCS: IC-5, Rod Control, p. 33. Enabling Objective #5.
2. KA 001000K407 (3.7).

001000K407 ..(KA's)

QUESTION: 32 (2.00)

STATE the FOUR (4) automatic start signals for the Motor Driven Emergency Feedwater Pumps.

(2.0)

ANSWER: 32 (2.00)

- a. (2/3) Low-Low Steam Generator level (from any one Steam Generator) [+0.5]
- b. All 3 Main Feedwater Pumps have tripped. [+0.5]
- c. Undervoltage on either ESF Bus (1DA,1DB) [+0.5]
- d. Safety Injection [+0.5]

e. AMSAC system actuation [+0.5]

[Any four of five, maximum 2.0 points]

(***** CATEGORY 3 CONTINUED ON NEXT PAGE *****)

REFERENCE:

1. VCS: SOP-211 Emergency Feedwater, p. 14 of 21.
2. VCS: 1B-3, Enabling Objective #5, p. 1.
3. KA 061000K402 (4.5).

061000K402 ..(KA's)

QUESTION: 33 (2.00)

STATE FOUR (4) signals that determine the main feedwater
regulating valve position.

(2.0)

ANSWER: 33 (2.00)

1. S/G level
2. power level (N-44) *(accept program level
or reference level)*
3. steam flow
4. steam pressure (to compensate steam flow)

5. Feed flow

Accept "Steam Flow/Feed Flow mismatch" as 2 answers (0.5 each)
[+0.5 each, maximum 2.0 points]

REFERENCE:

1. VCS: IC-2 Steam Generator Level Control, p. 19-21. Enabling
Objectives #3,4, and 5.
2. KA 035010K401 (3.6).

035010K401 ..(KA's)

QUESTION: 34 (1.50)

STATE the THREE (3) signals, other than manual, that will automatically close the main steam isolation valves. Logic and setpoints NOT required.

(1.5)

ANSWER: 34 (1.50)

1. (2/3) High-2 Reactor building pressure (6.35 psig) [+0.5]
2. (2/3) Low steam pressure (675 psig) [+0.5]
3. High Steam Flow (Power dependent setpoint) [+0.25]
coincident with (2/3) low-low Tavg (553 deg F) [+0.25]

REFERENCE:

1. VCS: TB-2, Main Steam System, p. 17. Enabling Objective #5.
2. KA 039000K405 (3.7).

039000K405 ..(KA's)

QUESTION: 35 (1.00)

STATE TWO (2) inputs that may trip the Waste Gas Discharge Control Valve HCV-014 during a controlled release of waste gas.

(1.0)

ANSWER: 35 (1.00)

(High Radiation on) RM-A10 [+0.5] or (High Radiation on) RM-A3
[+0.5]

REFERENCE:

1. VCS: AB-12, Waste Gas System, p. 20. Enabling Objective #5.
2. KA 071000K404 (2.9).

071000K404 ..(KA's)

QUESTION: 36 (1.00)

WHICH ONE (1) of the following is NOT a correct action performed
by an operator qualified as "Danger Tagger" when clearing a tagout? (1.0)

- a. Forward white copies of the tagout paper work to the Associate Manager, Operations.
- b. Initial tag removal on the white copy of the component log.
- c. Realign non-tagged components after removal of danger tag.
- d. Verify component restored to required operable position.

ANSWER: 36 (1.00)

c. [+1.0]

REFERENCE:

1. VCS: SAP-201 "Danger Tagging," p. 11.
2. KA 194001K102 (3.7).

194001K102 ..(KA's)

QUESTION: 37 (1.00)

WHICH ONE (1) of the following items correctly describes one requirement at VC Summer for station log entries? (1.0)

- a. Corrected entries must be explained.
- b. Midnight entry shall always start a new page.
- c. Missed entries must have entries in remarks.
- d. Entries must be made within one (1) hour of the designated time.

ANSWER: 37 (1.00)

b. [+1.0]

REFERENCE:

- 1. VCS: SAP-204, "Operating Logs and Records" p. 3 & 4.
- 2. KA 194001A106 (3.4).

194001A106 ..(KA's)

QUESTION: 38 (1.00)

WHICH ONE (1) of the following is NOT required to be reviewed by the oncoming operator at the controls (OATC) upon shift relief? (1.0)

- a. Tag Out Log
- b. Station Log
- c. Special Instruction Log
- d. Surveillance Requirements

ANSWER: 38 (1.00)

c. [+1.0]

REFERENCE:

1. VCS: SAP-200, "Conduct of Operations", p.5 and attachments II and III.
2. KA 194001A106 (3.4).

194001A106 ..(KA's)

QUESTION: 39 (1.00)

WHICH ONE (1) of the following is responsible for updating the
Main Control Status board as required?

(1.0)

- a. Nuclear Reactor Operator (NRDATC)
- b. Control Building Operator
- c. Control Room Supervisor
- d. Shift Supervisor

ANSWER: 39 (1.00)

b. [+1.0]

REFERENCE:

1. VCS: Special Instruction SI-89-05, p.2 of 5.
2. KA 194001A106 (3.4).

194001A106 ..(KA's)

QUESTION: 40 (1.00)

WHICH ONE (1) of the following items is information listed on
a CAUTION TAG but NOT listed on a DANGER TAG?

(1.0)

- a. Tag number.
- b. Reason for tag.
- c. Designated system.
- d. Location

ANSWER: 40 (1.00)

b. [+1.0]

REFERENCE:

- 1. VCS: SAP-202, "Caution Tagging", p.4.
- 2. VCS: SAP-201, "Danger Tagging", p.7.
- 3. KA 194001K102 (3.7).

194001K102 ..(KA's)

QUESTION: 41 (2.00)

MATCH the appropriate description in Column B with the
HPP-153, "Administrative Exposure Limits" allowable
dose in Column A. (Items in Column B may be used more than once) (2.0)

COLUMN A

- a. 500 mRem _____
- b. 2500 mRem _____
- c. 5000 mRem _____
- d. 12000 mRem _____

COLUMN B

- 1. Maximum lifetime dose to save a life.
- 2. Maximum quarterly dose to extremities.
- 3. Maximum quarterly dose to whole body.
- 4. Maximum quarterly dose to skin.
- 5. Maximum quarterly whole body dose to a fertile female.
- 6. Maximum annual dose to whole body.

ANSWER: 41 (2.00)

- a. 5 [+0.5]
- b. 3 [+0.5]
- c. 6 [+0.5]
- d. 2 [+0.5]

REFERENCE:

- 1. VCS: HPP-153, "Administrative Exposure Limits," page 3.
- 2. KA 194001K103 (2.8)

194001K103 ..(KA's)

QUESTION: 42 (1.50)

FILL IN THE BLANKS. All locked valves using a chain/seal tab combination will have their chains color coded as follows:

Valves locked in the CLOSED position will have (a)_____ color coded chains. (0.5)

Valves locked in the OPEN position will have (b)_____ color coded chains. (0.5)

Valves locked in a THROTTLED position will have (c)_____ color coded chains. (0.5)

ANSWER: 42 (1.50)

(a) Green [+0.5]

(b) Red [+0.5]

(c) Yellow [+0.5]

REFERENCE:

1. VCS: SI 89-04, Locked Valve Control
2. KA 194001K101 (3.6) 194001K102 (3.7)

194001K101 194001K102 ..(KA's)

QUESTION: 43 (1.00)

FILL IN THE BLANKS. To maintain the required chemistry control of the secondary systems, the chemical feed system is used to inject (a)_____ for oxygen scavenging and (b)_____ to elevate the pH.

(1.0)

(***** CATEGORY 3 CONTINUED ON NEXT PAGE *****)

ANSWER: 43 (1.00)

- (a) hydrazine [+0.5]
- (b) ammonia [+0.5]

REFERENCE:

1. VCS: IB-4 Secondary Chemistry and Chemistry Control, p. 18.
Enabling Objective #3.
2. KA 194001A114 (2.5).

194001A114 ..(KA's)

QUESTION: 44 (1.50)

LIST the THREE (3) conditions that must be met to allow a non-licensed person to manipulate controls that may affect the reactivity or power level of the reactor? (1.5)

ANSWER: 44 (1.50)

1. Under the direct supervision of a licensed operator [+0.5]
2. Part of his/her training to qualify for an operator license [+0.5]
(under 10CFR55)
3. Has been trained on the evolution he/she is about to perform [+0.5]

REFERENCE:

1. VCS: SAP-200, "Conduct of Operations ," Section 6.6.2, p. 13.
2. KA 194001A103 (2.5).

194001A103 ..(KA's)

(***** END OF CATEGORY 3 *****)
(***** END OF EXAMINATION *****)

TEST DATA SHEET FOR EXCORE INSTRUMENTATION

EXCORE DETECTOR CURRENT READINGS

EXPECTED EXCORE DETECTOR
 CURRENT READINGS AT 100%
 POWER

UPPER		LOWER	
H410 -	H411.	H410100 -	H411.100 -
H420 -	H421.	H420100 -	H421.100 -
H430 -	H431.	H430100 -	H431.100 -
H440 -	H441.	H440100 -	H441.100 -

Normalize the detector readings by dividing actual readings
 by the expected Excore reading at 100% power

H410 = _____ = 1.01 =	H411. = _____ = 1.1 =
H410:50	H411.100
H420 = _____ = 1.02 =	H421. = _____ = 1.2 =
H420100	H421.100
H430 = _____ = 1.03 =	H431. = _____ = 1.3 =
H430100	H431.100
H440 = _____ = 1.04 =	H441. = _____ = 1.4 =
H440100	H441.100
MAXIMUM IU =	MAXIMUM IL =

$$\text{AVERAGE IU} = \frac{\text{IU}_1 + \text{IU}_2 + \text{IU}_3 + \text{IU}_4}{\# \text{ DETECTORS IN USE}} = (\quad) + (\quad) + (\quad) + (\quad) = \quad =$$

$$\text{AVERAGE IL} = \frac{\text{IL}_1 + \text{IL}_2 + \text{IL}_3 + \text{IL}_4}{\# \text{ DETECTORS IN USE}} = (\quad) + (\quad) + (\quad) + (\quad) = \quad =$$

$$\text{UPPER TILT RATIO} = \frac{\text{MAXIMUM IU}}{\text{AVERAGE IU}} = \quad =$$

$$\text{LOWER TILT RATIO} = \frac{\text{MAXIMUM IL}}{\text{AVERAGE IL}} = \quad =$$

QUADRANT POWER TILT RATIO = _____
(From incore detector if applicable)

Acceptance Criteria - The Quadrant Power Tilt Ratio shall not exceed 1.02.

CWC B

DATE: _____

TIME: _____

RX POWER: _____

D-BANK: _____

DETERMINED BY: _____

- U = Upper
- L = Lower
- IU = Sum of Normalized Upper Detector Readings
- IL = Sum of Normalized Lower Detector Readings
- Maximum IU = Highest Normalized Detector Reading Upper
- Maximum IL = Highest Normalized Detector Reading Lower

ENCLOSURE 3

SIMULATOR FIDELITY REPORT

Facility Licensee: South Carolina Electric and Gas Company

Facility Docket No.: 50-395

Operating Tests Administered on: December 6-7, 1989

During the conduct of the simulator portion of the operating tests, the following item was observed :

ITEM	DESCRIPTION
CCW Surge Tank	With the "C" Component Cooling Water pump in service, a leak in the letdown heat exchanger was simulated. CCW surge tank level went to zero vice increasing as would be expected. This resulted in a misdiagnosis of the problem by the Reactor Operator. Actions taken to produce the expected indications detracted from the realism of the scenario.