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

EXAMINATION REPORT - 50-269/OL-89-01

Facility Licensee: Duke Power Company
P. O. Box 1439
Seneca, SC 29678

Facility Name: Oconee Nuclear Station

Facility Docket No.: 50-269

One written examination was administered at the Region II Office in Atlanta, Georgia.

Chief Examiner: _____ 7/12/89
Richard S. Baldwin — Date Signed

Approved By: _____ 7/12/89
Kenneth E. Brockman, Chief — Date Signed
Operator Licensing Section 2
Division of Reactor Safety

Summary:

Examination was administered on May 3, 1989.

One candidate was administered a written re-examination and passed.

Based on the results described above, one of one ROs passed.

REPORT DETAILS

1. Facility Employees Contacted:

Travis Farmer
Scott Hollingsworth

2. Examiners:

*Richard S. Baldwin
Richard McWhorter
Curtis W. Rapp

*Chief Examiner

3. Examination Review Meeting

At the conclusion of the written examination, the examiners provided H. Lefkowitz with a copy of the written examination and answer key for review to be delivered to Travis Farmer. The NRC resolutions to facility comments are listed below.

a. RO Exam

(1) Question 3.01 - NRC Resolution: Comment Not Accepted.

The question asks which ISC action happens roughly 10 to 15 seconds after trip of one MFW pump at 85 percent power. The fact that the simulator has all actions completed within 10 seconds does not disqualify this question. Two of the choices occur immediately (runback, track). The facility comment notes that feedwater crosslimits came in after four seconds, and before neutron crosslimits, which is what is expected, and why feedwater crosslimits is not the correct answer. Neutron crosslimit do not come in until the runback causes neutron demand to be reduced 5 percent below neutron power, which will occur after feedwater crosslimits. This makes it the only appropriate choice. The details of timing will depend on runback speed, differential rod worth, and the rate of increase on Tave due to reduced feedwater flow.

(2) Question 3.14a - NRC Resolution: Comment Partially Accepted.

Due to a typo, the question did ask for loads on DCA instead of DIA (for which the Answer Key was written). Instead of deleting the question as recommended by the facility, the Answer Key has been corrected to address loads on DCA instead of DIA.

4. Exit Meeting

No exit meeting was held since the examination was given at the Region II Office.

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MASTER

Nuclear Regulatory Commission
[illegible]
[illegible]

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date of examination.

U. S. NUCLEAR REGULATORY COMMISSION
REACTOR OPERATOR LICENSE EXAMINATION

FACILITY: OCONEE

REACTOR TYPE: PWR-B&W177

DATE ADMINSTERED: 89/05/01

INSTRUCTIONS TO CANDIDATE:

Use separate paper for the answers. Write answers on one side only. Staple question sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires at least 70% in each category and a final grade of at least 80%. Examination papers will be picked up six (6) hours after the examination starts.

CATEGORY VALUE	% OF TOTAL	CANDIDATE'S SCORE	% OF CATEGORY VALUE	CATEGORY
25.3	25.3			1. REACTOR PRINCIPLES (7%) THERMODYNAMICS (7%) AND COMPONENTS (11%) (FUNDAMENTALS EXAM)
27.8	26.7			2. EMERGENCY AND ABNORMAL PLANT EVOLUTIONS (27%)
48.5	48.0			3. PLANT SYSTEMS (38%) AND PLANT-WIDE GENERIC RESPONSIBILITIES (10%)
101.6		FINAL GRADE	%	TOTALS

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

Candidate's Signature

NRC RULES AND GUIDELINES FOR LICENSE EXAMINATIONS

During the administration of this examination the following rules apply:

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

. Restroom trips are to be limited and only one candidate 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.

. Use black ink or dark pencil only to facilitate legible reproductions.

. Print your name in the blank provided on the cover sheet of the examination.

. Fill in the date on the cover sheet of the examination (if necessary).

. Use only the paper provided for answers.

. Print your name in the upper right-hand corner of the first page of each section of the answer sheet.

. [illegible] answer sheet, write "End of Category __" as appropriate. Start each category on a new page, write only on one side of the paper, and write "Last Page" on the last answer sheet.

. Number each answer as to category and number, for example, 1.4, 6.3.

. Skip at least three lines between each answer.

. Separate answer sheets from pad and turn in all answer sheets face down on your desk or table.

. Use abbreviations only if they are commonly used in facility literature.

. The point value for each question is indicated in parentheses after the question and can be used as a guide for the depth of answer required.

. Show all calculations, methods, or assumptions used to obtain an answer to mathematical problems whether indicated in the question or not.

5. Partial credit may be given. Therefore, ANSWER ALL PARTS OF THE QUESTION AND DO NOT LEAVE ANY ANSWER BLANK.

6. If parts of the examination are not clear as to intent, ask questions of the examiner only.

7. You must sign the statement on the cover sheet that indicates that the work is your own and you have not received or been given assistance in completing the examination. This must be done after the examination has been completed.

5. When you complete your examination, you shall:

a. Assemble your examination as follows:

(1) Exam questions on top.

(2) Exam aids - figures, tables, etc.

(3) Answer pages including figures which are part of the answer.

b. Turn in your copy of the examination and all pages used to answer the examination questions.

c. Turn in all scrap paper and the balance of the paper that you did not use for answering the questions.

d. Leave the examination area, as defined by the examiner. If after leaving, you are found in this area while the examination is still in progress, your license may be denied or revoked.

QUESTION 1.01 (1.00)

The following question concerns the power defect vs. reactor power curve (Enclosure 13.16 of PT/1/A/1103/15).

WHY does the slope of the curve change at 15% power level? (1.0)

(***** CONTINUED ON NEXT PAGE *****)

QUESTION: 1.02 (1.00)

Based on examination of the integral control rod worth curve PT/3/A/1103/15, Enclosure 13.9, WHICH ONE (1) of the following statements is correct? (1.0)

(a.) Differential rod worth is greatest near the top of the core at EOC.

(b.) Differential rod worth is greatest near the center of the core at EOC.

(c.) Differential rod worth is greatest near the top of the core at BOC.

(d.) Differential rod worth is greatest near the center of the core at BOC.

***** CATEGORY 1 CONTINUED ON NEXT PAGE *****

QUESTION 1.03 (1.00)

WHICH ONE (1) of the following results in an INCREASE in shutdown margin? CONSIDER each case separately. ASSUME the plant is operating at power. (1.0)

(a.) Reactor coolant boron concentration decreases.

(b.) Reactor coolant system temperature decreases 5 deg F.

(c.) A single control rod in group 7 mechanically binds at 70% withdrawn.

(d.) Samarium concentration increases.

QUESTION: 1.04 (1.00)

Other than performing a reactivity balance, HOW is an operator assured shutdown margin is within limits during power operations? (1.0)

QUESTION 1.05 (1.00)

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

The power defect curve shifts as core burnup increases becoming: (1.0)

(a.) Less negative due to increased neutron capture in Pu 240 and fission product poisons.

(b.) More negative due to decreased neutron capture in Pu 240 and fission product poisons.

(c.) More negative due to increased neutron capture in Pu 240 and fission product poisons.

(d.) Less negative due to decreased neutron capture in Pu 240 and fission product poisons.

***** CATEGORY 1 CONTINUED ON NEXT PAGE *****

QUESTION 1.06 (1.00)

The effective delayed neutron fraction (B-eff) decreases over core life due to the production of __(1)_____, which has a smaller delayed neutron fraction than __(2)_____, which is depleted. (FILL in the blanks). (1.0)

***** EXAMINATION CONTINUED ON NEXT PAGE *****

QUESTION 1.07 (1.00)

When performing a reactor startup to full power that commenced FIVE (5) hours after a trip from full power equilibrium conditions, a 5%/min ramp was used. HOW would the resulting xenon transient vary if a 2%/min ramp was used instead? (1.0)

(a.) The xenon dip would be smaller in magnitude and occur sooner.

(b.) The xenon dip would be smaller in magnitude and occur later.

(c.) The xenon dip would be larger in magnitude and occur later.

(d.) The xenon dip would be larger in magnitude and occur sooner.

***** (CATEGORY 1 CONTINUED ON NEXT PAGE *****

QUESTION 1.08 (1.00)

A reactor startup is being performed 15 hours after a trip using an estimated critical position calculated just before the startup commenced. WHICH ONE (1) of the following events would raise the actual critical rod position compared to the estimated critical position? (1.0)

(a.) The startup is delayed for approximately two (2) hours.

(b.) The turbine bypass valve setpoint is increased.

(c.) A reactor coolant pump is stopped.

(d.) RCS boron concentration is lowered ten ppm.

***** CATEGORY 1 CONTINUED ON NEXT PAGE *****

QUESTION 1.09 (1.00)

WHAT are the two (2) methods of RCS low temperature overpressurization protection specified in OP-OC-CP-014, "Controlling Procedure for Unit Shutdown," to minimize the possibility of brittle fracture? Setpoints are NOT necessary. (1.0)

***** CATEGORY 1 CONTINUED ON NEXT PAGE *****

QUESTION 1.10 (1.50)

WHAT FIVE (5) parameters are limited by Technical Specifications to assure that core safety limits are not exceeded? (1.5)

***** CONTINUED ON NEXT PAGE *****

1. REACTOR PRINCIPLES (7%) THERMODYNAMICS (7%) AND COMPONENTS (11%) (FUNDAMENTALS EXAM)

QUESTION 1.1 (2.00)

a. CALCULATE the amount of subcooling that exists for reactor coolant system conditions of 2155 psig, 580 deg. F. SHOW work. (1.0)

b. At 2155 psig, 580 deg. F., approximately HOW FAR could pressure drop prior to reaching saturation conditions? CHOOSE one (1) of the following: (1.0)

(1.) 145 psi
(2.) 345 psi
(3.) 645 psi
(4.) 845 psi

(***** CATEGORY 1 CONTINUED ON NEXT PAGE *****)

QUESTION 1.12 (1.50)

The reactor is at full power when a station blackout occurs. The following are pertinent plant conditions for BEFORE and AFTER the station blackout.

	BEFORE	AFTER
Thermal Power	100%	2%
Core delta-T	60 Deg. F.	40 Deg. F.
Mass Flow Rate	100%	?

Use the information above to determine the mass flow rate AFTER the station blackout. ASSUME natural circulation flow is established and stable. SHOW all work.

1.5
~~1.0~~

***** CONTINUED ON NEXT PAGE *****

QUESTION 1.13 (1.00)

WHICH ONE (1) of the following conditions would cause DNBR to DECREASE? (1.0)

(a.) increasing reactor coolant system temperature

(b.) increasing reactor coolant system pressure

(c.) increasing mass flow rate in the core 10%

(d.) decreasing local power density

***** CATEGORY 1 CONTINUED ON NEXT PAGE *****

QUESTION 1.14 (1.00)

WHICH ONE (1) of the following would cause the outlet temperature of the component cooling system heat exchanger to DECREASE? ASSUME all other parameters are held constant. (1.0)

(a.) an increase in low pressure service water (LPSW) temperature

(b.) an increase in LPSW system flow

(c.) an increase in component cooling system flow

(d.) an increase in component cooling system pressure

***** END OF QUESTION ***** CONTINUED ON NEXT PAGE *****

QUESTION 1.15 (1.00)

WHICH ONE (1) of the following describes the response of a resistance temperature device (RTD) that has failed open? (1.0)

(a.) Indicates lower resistance, as if the temperature of the measured substance had decreased, resulting in higher than actual indicated temperature.

(b.) Indicates a lower resistance, as if temperature of the measured substance had increased, resulting in higher than actual indicated temperature.

(c.) Indicates a higher resistance, as if the temperature of the measured substance had increased, resulting in a higher than actual indicated temperature.

(d.) Indicates a higher resistance, as if the temperature of the measured substance had increased, resulting in a lower than actual indicated temperature.

***** END OF CATEGORY 1 ***** CONTINUED ON NEXT PAGE *****

QUESTION 1.16 (2.00)

ANSWER the following questions concerning level detectors.

a. WHY can indicated level be higher than actual level under adverse containment conditions? (1.0)

b. The pressurizer level indication system utilizes both temperature compensated transmitters and pressure compensated transmitters. Briefly EXPLAIN WHY compensated pressure can be used as an accurate level compensation. (1.0)

***** CATEGORY 1 CONTINUED ON NEXT PAGE *****

QUESTION 1.17 (1.00)

The generator hydrogen temperature control valve (C-58) opens in response to a temperature increase in the hydrogen system. WHICH ONE (1) of the following statements identifies the expected response of the condensate cooler flow control valve (C-61) to the position change of C-58 as stated above? (1.0)

(a.) C-61 closes and increases flow through the hydrogen coolers and stator coolers.

(b.) C-61 closes and decreases flow through the hydrogen coolers and stator coolers.

(c.) C-61 opens and increases flow through the hydrogen coolers and stator coolers.

(d.) C-61 opens and decreases flow through the hydrogen coolers and stator coolers.

(***** CAT'L.RY , CONTINUED ON NEXT PAGE *****)

QUESTION 1.18 (1.00)

In a system where a second centrifugal pump is started in series with a running pump, WHICH ONE (1) of the following describes the effect on system pressure and flowrate for most operating conditions? (1.0)

(a.) head increases by a factor of approximately 2; flow increases by a factor of approximately 2

(b.) head increases by a factor of approximately 2; flow remains approximately the same

(c.) head remains approximately the same; flow increases by a factor of approximately 2

(d.) flow remains approximately the same; flow remains approximately the same

(***** END OF QUESTION 1 CONTINUED ON NEXT PAGE *****)

QUESTION 1.19 (1.00)

When transferring breakers 1TC, 1TD, and 1TE between 4KV buses, the procedure cautions the operator to wait three (3) seconds after opening the initial power source before closing the desired breaker source. WHAT is the reason for the three (3) second delay? (1.0)

(***** CONTINUED ON NEXT PAGE *****)

QUESTION 1.20 (1.00)

Concerning the purification demineralizers:

a. WHY is maximum flow through the demineralizers limited to 150 gpm? (0.5)

b. WHAT automatic action protects demineralizer resins from high letdown temperatures? INCLUDE setpoint. (0.5)

***** [illegible] CONTINUED ON NEXT PAGE *****

QUESTION 1.21 (1.00)

Under WHAT TWO (2) conditions, (starting duty requirements) can a reactor coolant pump (RCP) be restarted soon after it inadvertently trips?
NOTE: List applicable setpoints. (1.0)

***** END OF CATEGORY 1 CONTINUED ON NEXT PAGE *****

QUESTION 1.22 (1.00)

WHICH ONE (1) of the following types of radiation is primarily measured by the pocket dosimeter? (1.0)

(a.) alpha

(b.) beta

(c.) gamma

(d.) neutron

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(***** END OF CATEGORY 2 ***** CONTINUED ON NEXT PAGE *****)

QUESTION 2.01 (1.00)

EP/1/A/1800/01, Section 502, "Loss of Heat Transfer," requires that the number of reactor coolant pumps (RCPs) be reduced to one/loop. WHICH ONE (1) of the following statements describes the reason for this requirement? (1.0)

(a.) To remove the heat being added by the operating RCP's.

(b.) To prevent loss of all the RCPs due to cavitation.

(c.) To reduce the potential for core uncovery and mass inventory loss due to a LOCA.

(d.) To reduce RCS pressure by removing the pressure head created by the RCPs.

***** CATEGORY 2 CONTINUED ON NEXT PAGE *****

QUESTION 2.02 (2.00)

On a load rejection WITHOUT a reactor trip, AP/1/A/1700/01, "Load Rejection," directs the operator to INCREASE letdown flow. If the reactor trips during a load rejection, EP/1/A/1800/01, "Emergency Operating Procedures," directs the operator to ISOLATE letdown flow.

a. STATE the reason for INCREASING letdown flow on a load rejection WITHOUT a reactor trip. INCLUDE the parameter affected. (1.0)

b. STATE the reason for ISOLATING letdown flow on a load rejection WITH a reactor trip. INCLUDE the parameter affected. (1.0)

(***** LATE ... CONTINUED ON NEXT PAGE *****)

QUESTION 2.03 (1.00)

STATE TWO (2) actions which must be taken if a power operated valve is to be used to assure containment isolation per AP/1/A/1700/17, "Loss of Containment Integrity." (1.0)

***** CATEGORY 2 CONTINUED ON NEXT PAGE *****

QUESTION E.04 (1.00)

According to AP/1/A/1700/21, "High Activity in the RC System," if the unit is shutdown and RCS cooldown is to be performed during operations with failed fuel, reactor building (RB) air temperatures are to be maintained greater than 100 degrees F. STATE the reason why this is required. (1.0)

(***** CONTINUED ON NEXT PAGE *****)

QUESTION 2.05 (1.50)

WHAT are THREE (3) indications that subcooled natural circulation has been established. (1.5)

(***** CATEGORY 2 CONTINUED ON NEXT PAGE *****)

QUESTION 2.06 (1.00)

WHICH ONE (1) of the following methods contained within the Emergency procedures is the method for removal of RCS voids that are due to the presence of non-condensible gases? (1.0)

a.) repressurization of the RCS

b.) RCP restart

c.) RCP bumping

d.) vessel or not leg venting

(***** CATEGORY 2 CONTINUED ON NEXT PAGE *****)

QUESTION : 2.07 (3.50)

According to AP/1/A/1700/8, "Loss of Control Room":

a. WHAT are the FIVE (5) items you are required to take from the control room to the Auxiliary Shutdown Panel? (2.5)

b. You are required to maintain pressurizer level at 220 inches (compensated). If RCS pressure is 1900 psi, using the supplied Enclosure 6.1, the corresponding uncompensated level is? (1.0)

(1.) 125
(2.) 135
(3.) 145
(4.) 155

(***** CATEGORY 2 CONTINUED ON NEXT PAGE *****)

QUESTION 2.08 (1.00)

ASSUME reactor is operating at 100% power, steady state conditions when component cooling valve CC-8 fails closed. WHICH ONE (1) of the components, which if left without component cooling, would require manually tripping the reactor within four (4) minutes? (1.0)

(a.) letdown cooler

(b.) RCP cooling jacket and seal cooler

(c.) CRD stator cooling coil

(d.) quench tank cooler

***** CATEGORY 2 CONTINUED ON NEXT PAGE *****

QUESTION 2.09 (1.00)

WHICH ONE (1) of the following statements about the cardox system for the Safe Shutdown Facility (SSF) is CORRECT? (1.0)

(a.) In case of a power failure the actuator handle behind the glass face of the electro manual pilot valve cabinet will no longer actuate the system.

(b.) Actuation of a fire detection device results in the shutdown of machinery in the area protected by the detector.

(c.) After a fire detection device has actuated, the pre-discharge alarm period may be bypassed by pushing the manual actuation pushbutton at the Pushbutton Station.

(d.) After actuation of the system the red indicating light on the control panel remains on until the manual reset button on the panel is pushed.

(***** CONTINUED ON NEXT PAGE *****)

QUESTION 2.10 (2.00)

Procedure EP/O/A/1700/19, "Emergency Feedwater System Recovery," requires that FDW-315 and 316 controllers (EFW control valves) have their manual loader output matched with the automatic output AND placed in MANUAL prior to resetting a main feedwater pump.

a. WHY is this action necessary prior to resetting a main FDWP? (1.0)

b. WHAT undesirable consequence(s) is this requirement protecting against? (1.0)

***** QUESTION CONTINUED ON NEXT PAGE *****

QUESTION 2.11 (1.50)

During decay heat removal operation with 30 inches of RCS level indicated by LT-5, the operating low pressure injection (LPI) pump cavitates.

a. STATE the probable cause of cavitation according to AP/1/A/1700/07, "Loss of Low Pressure Injection System." (0.5)

b. STATE TWO (2) alternative methods for re-establishing decay heat removal following LPI pump cavitation. (1.0)

(***** CATEGORY 2 CONTINUED ON NEXT PAGE *****)

QUESTION 2.12 (1.00)

If RC pump seal injection is lost due to a line break on the seal injection header, WHICH ONE (1) of the following should NOT be done? (1.0)

(a.) close 1HP-115, the cross connect between pumps "1A" and "1B".

(b.) trip the "1B" pump

(c.) trip the "1A" pump

(d.) isolate letdown by closing 1HP-5

(***** CONTINUED ON NEXT PAGE *****)

QUESTION 2.13 (1.00)

WHICH ONE (1) of the following describes the effect of loss of compensating voltage on the intermediate range indication? (1.0)

(a.) Results in a higher gamma induced current from the inner chamber.

(b.) Results in an indicated neutron level higher than actual.

(c.) Results in a greater indicated startup rate (SUR).

(d.) Results in a decrease in the amount of overlap between nuclear instruments.

***** END OF EXAM CONTINUED ON NEXT PAGE *****

QUESTION 2.14 (1.50)

Per EP/1/A/1800/01, Section 506, "Unanticipated Nuclear Power Production," STATE the THREE (3) required operator actions. (1.5)

***** END OF CATEGORY 2 ***** CONTINUED ON NEXT PAGE *****

QUESTION 2.15 (1.00)

During operation at 50% power with one dropped control rod, a second rod is dropped:

a. STATE the action which must be taken. (0.5)

b. STATE ONE (1) reason why this action is required. (0.5)

***** END OF CATEGORY 2 - CONTINUED ON NEXT PAGE *****

2. EMERGENCY AND ABNORMAL PLANT EVOLUTIONS
(27%)

QUESTION 2.1a (1.25)

WHAT are FIVE (5) indications of a stuck open relief valve? (1.25)

***** CONTINUED ON NEXT PAGE *****

QUESTION 2.17 (1.00)

The shift supervisor has approved a gaseous waste release. Unit 1 is releasing the contents of GWD 1A and Unit 3 is performing a reactor building purge. While both units are in the process of releasing gaseous waste, Unit 2 receives an alert alarm on unit vent monitor, RIA-45. ASSUME RIA-45 is set at its normal setpoints.

WHAT action(s) should the operator take based on this alarm? (1.0)

(***** CATEGORY 2 CONTINUED ON NEXT PAGE *****)

QUESTION 2.16 (2.00)

On a loss of instrument air pressure:

a. WILL the instrumentation measuring HPI and LPI discharge header pressure fail HIGH, AS IS, or LOW? (0.5)

b. HOW and WHY will the turbine driven emergency feedwater pump be affected? (1.0)

c. STATE the immediate manual action required by AP/1/A/1700/22, "Loss of Instrument Air." (0.5)

***** CATEGORY 2 CONTINUED ON NEXT PAGE *****

QUESTION 2.19 (1.00)

Following damage to a spent fuel assembly in the reactor building, RIA-49, the "RB Gas" channel, alarms due to its "ALERT" setpoint being exceeded. According to AP/1/A/1700/09, "Spent Fuel Damage," WHICH ONE (1) of the following must be done manually? (1.0)

(a.) sound the local evacuation alarm

(b.) trip the RB purge fan

(c.) close 1 LWD-2, the RB normal sump isolation valve

(d.) start fans F-1 and F-2 on the spent fuel pool (SFP) filtered exhaust system

(***** CATALOG) CONTINUED ON NEXT PAGE *****)

QUESTION 2.29 (1.00)

ASSUME a S/G tube leak is detected on an operating steam generator:

a. WHAT is the preferred method of discontinuing reactor operations? (0.25)

b. WHY is there a preferred method for discontinuing reactor operations for this event? (0.75)

(***** END OF CATEGORY 2 *****)

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***** CATEGORY 3 CONTINUED ON NEXT PAGE *****

QUESTION 3.01 (1.00)

During operation at 85% power with the Integrated Control System (ICS) in full automatic operation, one main feedwater pump trips. WHICH ONE (1) of the following actions occurs roughly ten (10) to fifteen (15) SECONDS after the pump trip? (1.0)

(a.) crosslimits, feedwater to rods initiates (Feedwater crosslimits)

(b.) track initiates

(c.) crosslimits, rods to feedwater initiates (Neurton crosslimits)

(d.) unit load demand runback initiates

***** CATEGORY 3 CONTINUED ON NEXT PAGE *****

QUESTION 3.02 (1.00)

The 1800 psi HPI trip bistable for ~~ESFAS~~ analog channel "A" is failed in the tripped position. If vital power from panelboard KVIB is lost, WHICH ONE (1) of the following describes which digital channel(s) will trip? (1.0)

(a.) 1

(b.) 2

(c.) 1 and 2

(d.) 1, 3, and 5

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

QUESTION 3.03 (2.00)

The following matching question concerns ALARMS associated with the letdown/makeup system.

PLACE the number in Column II in the correct space provided in Column I. (2.0)

	Column I		Column II
a.	_____	Letdown Storage Tank Low Level	1. 130 deg. F.
b.	_____	Reactor Coolant Low Pressure	2. 2375 psig
c.	_____	Letdown Storage Tank High Level	3. 88 inches
d.	_____	Injection Pump Low Header Pressure	4. 1600 psig
e.	_____	Letdown High Temperature	5. 10 inches
f.	_____	ES High Pressure Injection Channel Trip	6. 150 deg. F.
			7. 86 inches
			8. 1750 psig
			9. 200 deg. F.
			10. 2055 psig

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

QUESTION 3.04 (1.00)

The wide rang, Reactor Coolant Systeme pressure transmitter for Engineered Safeguards Channel "A" is failed LOW. On the diagrams of indicating light arrangements for analog channel "A" and digital channels 1 and 3, IDENTIFY the lights which are illuminated brightly by writing the word "BRIGHT" by the light on the diagram.
(1.0)

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

QUESTION 3.05 (1.00)

Upon receipt of a reactor building cooling unit rupture alarm, it is important to secure the affected unit and to isolate low pressure service water in order to prevent: (1.0)

(a.) runout of the LPSW pumps

(b.) LPSW from collecting in the RB sump

(c.) radioactive contamination of the LPSW system

(d.) overheating of the RBCU fan

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

QUESTION 3.06 (1.00)

What would happen to vent header pressure if during operation, the vent header pressure control valve, GWD-1, failed closed?

(1.0)

***** CATEGORY 3 CONTINUED ON NEXT PAGE *****

QUESTION 3.07 (1.00)

WHICH ONE (1) of the following statements about the Area Radiation Monitors is CORRECT? (1.0)

(a.) To set the ALERT alarm setpoint requires pulling the module all of the way out of the panel.

(b.) When reinserting a module into the panel you should push on the glass window.

(c.) When the stat-alarm is illuminated steadily, due to receipt of an alarm, receipt of another alarm is not indicated.

(d.) Modules are automatically source-checked each hour.

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

QUESTION 3.08 (1.00)

WHICH ONE (1) of the following statements is CORRECT concerning the Core Exit Thermocouples (CETCs)? (1.0)

(a.) When power is >= 2%, the subcooling margin program takes the average of the 47 operable CETCs not being used by the Safe Shutdown Facility (SSF).

(b.) Use of only the 47 operable CETCs not being used by the SSF is mandatory if a hostile environment exists in the reactor building.

(c.) CETCs > 10 degree F higher or lower than the average reading are excluded from the subcooling margin calculation.

(d.) When power [illegible]% the subcooling margin program takes the average of the [illegible] highest of the 47 operable CETCs.

(***** [illegible] CONTINUED ON NEXT PAGE *****)

QUESTION 3.09 (1.00)

EXPLAIN HOW the turbine driven EFW pump can be operated, without damage, following steam generator overfilling which results in water entering the steam lines. (1.0)

***** CATEGORY 3 CONTINUED ON NEXT PAGE *****

QUESTION 3.10 (1.00)

If the nuclear instrument supplying ICS were to fail LOW during full power operation with the ICS in full AUTO, actual reactor power would: (1.0)

(a.) decrease to hot standby

(b.) decrease until limited to 10% power

(c.) increase to the high power trip

(d.) increase until limited to 101% power

***** [illegible] CONTINUED ON NEXT PAGE *****

QUESTION 3.11 (1.00)

The hotwell (HW) pump discharge control valve (C-10) is interlocked such that it must be LESS THAN 10% open before starting the FIRST hotwell pump. This interlock prevents WHICH ONE (1) of the following? (1.0)

(a.) The HW pump from tripping on overcurrent while it is coming up to full speed.

(b.) Backflow through the idle HW pumps until the minimum flow recirculation line opens.

(c.) The rupturing of downstream components which occurs from the resultant water hammer.

(d.) Low pressure areas [illegible] filtering demineralizing resins out of [illegible].

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

QUESTION 3.12 (2.00)

MATCH the components listed in Column A with the correct location where they are connected to the RCS. Items in Column B may be used more than once. (2.0)

Column A		Column B	
a.	Unit 1 PZR Spray	1.	A1 RCP Suction
b.	Unit 3 Normal HPI Line	2.	B1 RCP Suction
c.	Unit 2 Letdown Line	3.	A1 RCP Discharge
d.	Unit 1 Decay Heat Removal Line	4.	B1 RCP Discharge
		5.	B1 RCP Discharge
		6.	A Hot Leg
		7.	B Hot Leg

***** ATTACH (CONTINUED ON NEXT PAGE *****

QUESTION 3.17 (1.50)

During full power reactor operation, the feedwater flow to an operating steam generator is decreased. STATE the following about the affected steam generator:

a. The initial effect on the steaming rate. (0.5)

b. The change in the steaming rate once the initial effect has lapsed AND the reason for the change. (1.0)

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

QUESTION 3.14 (2.50)

The following questions concern the DC Electrical System.

a. STATE SIX (6) loads that would be affected by the loss of DC control power to the vital DCA bus. (1.5)

b. STATE TWO (2) purposes of the Kirk-Key interlock feature on the standby charger output breakers. (1.0)

***** CATEGORY 3 CONTINUED ON NEXT PAGE *****

QUESTION 3.15 (1.00)

WHICH ONE (1) of the following will NOT trip an operating Keowee generator unit? (1.0)

(a.) normal lockout

(b.) alarm lockout

(c.) emergency lockout

(d.) startup inhibit

(***** END ***** CONTINUED ON NEXT PAGE *****)

QUESTION 3.16 (1.00)

According to Enclosure 13.1 of P1/O/A/230/01, "Radiation Monitor Check," the ALERT alarm setpoint of 1RIA-36 should be background plus 10 u ci/ml. The background count rate is ~~10E3~~ 7.5E3 CPM. USE the RM correlation graph, Enclosure 13.4, which is supplied, to determine the ALERT setpoint in CPM. The result is WHICH ONE (1) of the following? (1.0)

(a.) 2.9 x 10E3 CPM

(b.) 1.0 x 10E4 CPM

(c.) 2.9 x 10E4 CPM

(d.) 1.0 x 10E5 CPM

***** LATE! CONTINUED ON NEXT PAGE *****

QUESTION 3.17 (3.00)

Reactor is operating at 100% power and all control systems are stable. The annunciator for core flood tank (CFT) comes on.

a. WHAT is the primary concern associated with high level in the CFT? INCLUDE the reason WHY in your answer. (1.0)

b. Investigation of the alarm determines that the high level is caused by leakage past the seats of the manual isolation valves on the HPI pump discharge. STATE TWO (2) precautions that are required when operating in this degraded mode AND the reason for each precaution? (2.0)

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

QUESTION 3.18 (2.00)

The spent fuel storage racks are designed to prevent the possibility of inadvertent criticality.

a. WHAT TWO (2) design features maintain k-eff less than 0.95, even if the spent fuel pool is filled with unborated water? (1.0)

b. HOW does the design of the storage racks allow cooling of the fuel if spent fuel pool cooling is lost? (1.0)

***** END OF CATEGORY 3 CONTINUED ON NEXT PAGE *****

QUESTION 3.19 (1.00)

On a loss of transformer CT-1 the main feeder busses (MFB's) may be energized from the standby buses. However, AP/1/A/1700/11, "Loss of Power," directs different actions depending on whether the standby buses are energized from transformer CT-4 or the Lee Gas Turbine. STATE WHICH of these sources must be treated differently and WHY. (1.0)

***** CATEGORY 3 CONTINUED ON NEXT PAGE *****

QUESTION 3.20 (1.00)

WHICH ONE (1) of the following is a CORRECT statement concerning the loop "A" narrow range hot leg temperature signals monitored by the Smart Automatic Signal Selector (SASS) if the red TRIP light for the selected signal is illuminated? (1.0)

(a.) The signal drifted slowly until the mismatch between it and the alternate signal exceeded 3%.

(b.) When the signal mismatch clears, the channel will have to be manually reset.

(c.) On a loss of SASS power, the signal from the alternate channel will be fed through.

(d.) Before switching to the alternate signal, this channel must be tested via the TEST switches.

**** CATEGORY 3 CONTINUED ON NEXT PAGE ****

QUESTION 3.21 (2.00)

The following questions concern the reactor building spray system:

a. WHAT is the input signal that will automatically actuate the reactor building spray system? INCLUDE setpoint and coincidence. (1.0)

b. During the recirculation mode from the reactor building emergency sump (RBES), the reactor building spray pump flows are limited to approximately 1000 gpm. WHAT is the reason for limiting the flow from the RBS pumps? (1.0)

***** CATEGORY 3 CONTINUED ON NEXT PAGE *****

QUESTION 3.22 (2.00)

Various RPS trips provide different types of protection. MATCH the protection provided (Column II) with its associated trip (Column I). (2.0)

Column I	Column II
a. __ High Flux Trip	1. Primary steady state protection for DNBR safety limit.
b. __ Variable Low Pressure Trip	2. Primary trip for SLOW reactivity insertion.
c. __ High RC Pressure Trip	3. Primary trip for RAPID reactivity insertion.
d. __ Flux/Flow/Imbalance Trip	4. Primary steady state protection for linear heat generation rate.
	5. Primary trip for protection for RCS design temperature.
	6. Anticipatory trip for RCS design high temperature or high pressure.

(***** CARD) CONTINUED ON NEXT PAGE *****)

QUESTION 3.23 (1.00)

Following a failure of an ICS Turbine Header Pressure Instrument, WHAT sole ICS control station when placed in "Hand" by the operator will terminate the unit transient? (1.0)

(a.) Turbine Header Pressure

(b.) Reactor Bailey

(c.) FDW Masters

(d.) Steam Generator-Reactor Master

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

QUESTION 3.24 (1.00)

INDICATE which unit(s) the following High Pressure Injection System interlocks are associated with:

a. On low seal injection flow to the RCPs, the standby HPI pump will start. (0.5)

b. If seal injection is lost and the Component Cooling is lost, the associated seal return valve will close. (0.5)

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

QUESTION 3.05 (2.50)

During a reactor trip recovery after the RPS has been reset, an operator resets the CRD breakers while the turbine bypass valves (TBVs) are in "AUTO".

a. STATE the effect this will have on the TBVs AND the REASON for this effect. (1.0)

b. Indicate how each of the following RCS parameters will be affected:

1. RCS pressure ~~(.75)~~ 1.5

2. RCS temperature

3. Pressurizer level

***** CATEGORY 3 CONTINUED ON NEXT PAGE *****

QUESTION 3.26 (1.00)

WHAT indication tells the operator that all nitrogen has been vented from the Pressurizer, when forming a steam bubble in accordance with OP/O/A/1103/05, "Pressurizer Bubble Formation?" (1.0)

(***** QUESTION CONTINUED ON NEXT PAGE *****)

QUESTION: 3.27 (2.00)

The following questions concern hydrogen recombiner and purge control systems.

a. WHAT are three (3) mechanisms by which hydrogen is produced following a LOCA? (1.0)

b. The hydrogen recombiner and purge system are both available to control hydrogen concentrations in containment. STATE WHICH system is preferable and INCLUDE the reason for your choice. (1.0)

(***** QUESTION CONTINUED ON NEXT PAGE *****)

QUESTION 3.28 (1.00)

According to OMP 2-3, Reactor Operator Log, WHICH ONE (1) of the following is NOT required to be noted in the RO Log? (1.0)

(a.) Realignment of switchyard breaker lineup.

(b.) Failure of RC pump instrumentation readout on the control room computer.

(c.) Trashcan fire in the warehouse.

(d.) RCS makeup through the "B" HPI injection nozzle during hot shutdown.

QUESTION: 3.29 (1.00)

If, while performing a procedure, you realize that the next step performed as written will result in damage to a piece of equipment, you should immediately stop and _____.

a. Get the supervisor to N/A the step.

b. Fill out a Procedure Problem report.

c. Fill out a Removal and Restoration Form.

d. Fill out a Procedure Major Change Process record.

(***** SYSTEM: * CONTINUED ON NEXT PAGE *****)

QUESTION: 3.30 (1.00)

Independent verification is required on R&R procedures that affect each of the items listed below, EXCEPT:

a. Equipment that could impair safety related equipment.

b. Equipment that provides turbine trip protection.

c. Equipment that would result in a radioactive release.

d. Equipment that provides fire protection.

(***** CONTINUED ON NEXT PAGE *****)

QUESTION: 3.31 (1.00)

Which one of the following represents when a Procedure Problem Report Form should be used?

a. Interchangeably with Procedure Change Forms.

b. Instead of using the Temporary Procedure Change process.

c. For correcting problems with operating procedures on the next scheduled procedure rewrite.

d. In cases where an immediate change or correction to an operating procedure is needed.

QUESTION 3.32 (1.00)

Refer to Enclosure 4.1 of RP/O/B/1000/16, Medical Response Procedure, to answer this question.

A non-licensed operator trips at the doorway to the control room. He falls, visibly breaking his middle finger. According to the procedure, WHICH ONE (1) of the following actions is NOT an acceptable response? (1.0)

(a.) Use a company car to take the victim to Oconee Memorial Hospital.

(b.) Use the personal car of another operator to take the victim to Oconee Memorial Hospital.

(c.) [illegible]

(d.) Use the Pickens County Ambulance Service to take the victim to Cannon Memorial Hospital.

(***** END OF ITEM - ZERO (0) NEXT PAGE *****)

QUESTION 3.35 (1.00)

WHICH ONE (1) of the following duties is a control room operator responsible for in regards to the Oconee firebrigade?

(a.) assist in directing the brigade when on shift during an emergency

(b.) respond to emergency calls and report to the fire captain during an emergency

(c.) ensure all fire protection systems and fire brigade equipment is available for use when required

(d.) alert fire brigade members and other plant personnel [illegible]

***** [illegible] ON NEXT PAGE *****

QUESTION 3.34 (1.00)

WHICH ONE (1) of the following cases would require independent verification of system or equipment lineup? (1.0)

(a.) Where operation of improperly aligned equipment could result in personnel safety being jeopardized.

(b.) Where operation of improperly aligned equipment could result in the release of radioactive liquids or gases from the site.

(c.) Where operation of improperly aligned equipment could result in false indication in the control room.

(d.) Where operation of improperly aligned equipment could jeopardize [illegible] continued operation.

(***** QUESTION CONTINUED ON NEXT PAGE *****)

QUESTION 3.35 (1.25)

MATCH the following tag colors with what they indicate. NOTE: some colors may indicate more than one thing. (1.25)

Column I	Column II
a. __ Red Tags	1. Used to block closing of an electrical breaker after a trip-out.
b. __ White Tags	2. Used for equipment protection.
c. __ Yellow Tags	3. Used to indicate radioactive contamination exceeds limit for release to unrestricted areas.
d. __ Green Tags	4. Used to identify ladders with loose or cracked rungs.
	5. Used for personnel safety.
	6. Used to indicate OK to release to unrestricted areas.
	7. Used to indicate flammable liquid container.

***** CONTINUED ON NEXT PAGE *****

QUESTION 3.3a (1.0)

MATCH the term in Column I with the most appropriate phrase/definition in Column II. (1.0)

Column I		Column II	
a.	Restricted Area _____	1.	Limited to authorized persons through a control point.
b.	Controlled Area _____	2.	Greater than 20 DPM/100 square centimeters alpha.
c.	Radiation Area _____	3.	Shall be locked and posted.
d.	Contaminated Area _____	4.	Access controlled to limit radiation exposure.
		5.	Within the station fence.
		6.	Greater than 100 mRem in 1 days.
		7.	Greater than 100 mRem/hr.
		8.	Greater than 20 DPM/100 square centimeters beta/gamma.

QUESTION 3.17 (1.00)

10CFR50 appendix I limits are based on:

a. ALARA.

b. Accident Assessment Criteria.

c. Finished drinking water concentration limits.

d. Emergency Plan activation criteria.

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

ANSWER 1.01 (1.00)

Due to Tavg [+0.5] reaching its constant operating value [+0.5].

REFERENCE

1. Oconee: Lesson Plans, Vol. 1, OP-OC-RT-RBC, p. 11, L.O. 4.
2. Oconee: PT/1/A/1103/15, Enclosure 13.16.

192004K117 ..(KA's)

ANSWER ..[..] (..)

a. ...[..]

REFERENCE

1. Oconee: Lesson Plans, Vol. 1, OP-OC-RT-1F, pp. 14-26.
2. Oconee: PT/1/A/1107/15, Enclosure 13.9.

192005K114 192005K105 ..(KA's)

ANSWER 1.00 (1.00)

(d.) [+1.0]

REFERENCE

1. Oconee: OP-OC-RT-RBC, p. 16.
2. Oconee: Fundamentals of Nuclear Reactor Engineering, p. 241.

192002K114 ..(KA's)

ANSWER 1.04 (1.00)

All control rods are withdrawn to or beyond the insertion limits of the rod position limit curves. [+1.0]

REFERENCE

1. Oconee: OP-OC-SPS-APC-T47.

192005K115 ..(KA's)

ANSWER 1.05 (1.00)

(c.) [+1.0]

REFERENCE

1. Oconee: Design Plans, Vol. 1, OP-OC-RT-REC, p. 11, Learning Objective 7, RT-1(A,1)03/11, Enclosure 1.16.

192004K107 ..(KA's)

ANSWER 1.06 (1.00)

1. RC 229 [+0.5]
2. LPI 235 [+0.5]

REFERENCE

1. Oconee: OP-OC-RT-FP, Learning Objectives 9 and 10, p. 19.

192003K107 ..(KA's)

ANSWER 1.07 (1.00)

(b.) [+1.00]

(***** QUESTION CONTINUED ON NEXT PAGE *****)

REFERENCE

1. Oconee: OP-OC-SPS-RT-FPP, L.O. 2.

192006K109 192006K107 ..(KA's)

ANSWER 1.08 (1.00)

(b.) [+1.0]

REFERENCE

1. Oconee: Lesson None, OP-OC-RT-FPP, Fission Product Poisons, p. 16.

192006K107 ..(KA's)

ANSWER 1.09 (1.00)

1. Deactivating both trains of high pressure injection. [+0.5] - All 3 pumps

2. Having the PORV operable (with conditions of RCS as specified in Technical Specifications). [+0.5]

REFERENCE

1. Oconee: Lesson Plan, Vol. VI, OP-OC-CP-014, pp. 12-13, Lesson Objective #1. and 4a.

193011K104 ..(KA's)

ANSWER 1.10 (1.50)

RCS (outlet) Temperature
RCS (outlet) Pressure
Reactor Thermal Power
Reactor Power Imbalance
RCS Flow (or number of running pumps)

[+0.3] each

(***** END OF SECTION ***** CONTINUED ON NEXT PAGE *****)

REFERENCE

1. Oconee: Technical Specification 2.1. "Safety Limits, Reactor Core."

2. Oconee: Lesson Plan, Vol VI, OP-OC-CP-011, Lesson Objective B.2.b.

193009K105 ..(KA's)

ANSWER 1.11 (2.00)

a. Tsat for 2170 psia = 647.44 deg F (from steam tables) [+0.5]

Margin = 647.44 - 580 deg. F.
= 67.44 deg. F = [illegible] deg F. [+0.5]

b. [illegible] [+1.]

REFERENCE

1. Oconee: Lesson Plans, Vol. 1, OP-GA-SPS-THF-STM, pp. 8-17, L.o. 2d.

193003K128 ..(KA's)

ANSWER 1.12 (1.50)

Q = M dot*C*delta-T

BEFORE

C = Q/M dot*delta-T = 100/100*60 = 1/60 [+0.75] (for recognition of calculating C from BEFORE information)

AFTER
M dot = Q/C*delta-T = 2/(1/60)*(40) = 3.0% [+0.75]

***** END OF EXAM CONTINUED ON NEXT PAGE *****

REFERENCE

1. Oconee: Lesson Plan, Vol. I, Thermo/Heat Transfer/Fluid Flow.

193006K105 ..(KA's)

ANSWER 1.13 (1.00)

(a.) [+1.0]

REFERENCE

1. Oconee: OP-OC-RT-IF. Learning Objectives 9 and 10, p. 19.

ANSWER 1.14 (1.00)

(b.) [+1.0]

REFERENCE

1. Oconee: Thermodynamics Fluid Flow and Heat Transfer for Nuclear Power Plants, p. 170-178.

193006K107 ..(KA's)

ANSWER 1.15 (1.00)

(c.) [+1.0]

REFERENCE

1. Oconee: Lesson Plan Vol. V, Instrumentation, OP-OC-IC-RCI, p. 20.

191002K114 ..(KA's)

***** END OF QUESTION - NEXT PAGE *****

ANSWER 1.16 (2.00)

a. Because of the increased temperature, the density of the fluid in the reference leg is less than the density of the rest of the fluid [+0.5]. This results in a decreased delta-p and a higher indicated level [+0.5].

b. In a saturated system such as the pressurizer, pressure can be used because of the pressure/temperature relationship, via steam tables [+1.0].

REFERENCE

1. Oconee: Lesson Plan, Vol. V, (OP-OC-IC-RC), pp. 34-39.

191003K103 ..(KA's)

ANSWER 1.17 (1.00)

(a.) [+1.0]

REFERENCE

1. Oconee: OP-OC-CF-C, p. 26, L.O. 14.c.

191003K103 ..(KA's)

ANSWER 1.18 (1.00)

(b.) [+1.0]

REFERENCE

1. Oconee: Thermodynamics, Fluid Flow and Heat Transfer for Nuclear Power Plants, pp. 158-162.

191004K110 191004K114 ..(KA's)

(***** CATEGORY 1 CONTINUED ON NEXT PAGE *****)

ANSWER 1.19 (1.00)

The three (3) second delay will prevent synchronism problems caused by previously running motors which tend to maintain the original voltage wave form on the bus immediately after the original source is removed. (To ensure a dead bus transfer is made.) [+1.0]

REFERENCE

1. Oconee: Lesson Plan, Vol. II, OP-OC-EL-EPD, p. 71.

191008R.107 ..(KA's)

ANSWER 1.21 ...

a. To prevent channeling through the demineralizers. [+0.5]

b. If temperature of letdown increases to 135 degrees F [+0.25], the letdown isolation valve (HP-1) will be interlocked closed (to protect the demineralizer resin) [+0.25].

REFERENCE

1. Oconee: Lesson Plan, OP-OC-SPS-SY-HPI, p. 15.

191007R.104 [illegible] ..(KA's)

ANSWER 1.21 (1.00)

RCP can be restarted after two (2) seconds if:

1. motor has been running normally for two (2) or more hours [+0.5], and

2. stator temperature is less than 245 degrees F (230-260) and holding steady or decreasing [+0.5].

***** CONTINUED ON NEXT PAGE *****

1. REACTOR PRINCIPLES (7%) THERMODYNAMICS (7%) AND COMPONENTS (11%) (FUNDAMENTALS EXAM)

REFERENCE

1. Oconee: OP/3.A/1103/06.

191005K106 ..(KA's)

ANSWER 1.22 (1.00)

(c.) [+1.0]

REFERENCE

1. Oconee: General Employee Traning Handbook, p. 5.

[illegible]

[illegible] END OF CATEGORY [illegible]

ANSWER 2.01 (1.00)

(a.) [+1.0]

REFERENCE

1. Oconee: EP/1/A/1800/01, Section 502.

2. Oconee: Lesson Plans Vol. VII, OP-OC-EAP-E22, p. 9, L.O. 1.6.

0000748304 ..(RA s)

ANSWER [illegible]

a. To compensate for the RCS swell [+0.5] caused by Tave increase due to increased S/G pressure [+0.5].

b. To compensate for the RCS shrink [+0.5] due to Tave decrease after reactor trip [+0.5].

REFERENCE

1. Oconee: Lesson Plans. Vol. VII. OP-OC-EAP-E11, p. 11.

0000073001 ..(F/f)

ANSWER [illegible]

1. Electric power should be removed from the motor operator.

2. Administrative controls such as tagging (the fuse holder or box or breaker) should be imposed.

3. Specific instructions should be provided regarding steps required to restore power to the components involved.

Any two (2) [+0.5] each

***** [illegible] CONTINUED ON NEXT PAGE *****

REFERENCE

1. Oconee: AP/1/A/1700/17, p. 3.

000069K301 000069A202 ..(KA's)

ANSWER 2.04 (1.00)

To keep iodine in gaseous form [+0.5] and enable its removal with the RB purge [+0.5].

REFERENCE

1. Oconee: AP/1/A/1700/21, "High Activity in the RC System," p. 1.

000076K306 ..(KA's)

ANSWER 2.05 (1.50)

1. Tc approximately equal Tcst in the steam generators.

2. Th and Tc should follow temperature changes in the steam generator.

3. Temperature difference between Th and Tc is less than 50 degrees F.

4. Incore thermocouples trend Th. (STABLE OR DECREASING)

Any three (3) [+0.5] each

REFERENCE

1. Oconee: Lesson Plans Vol VI, OP-OC-SPS-PTR-AM-1, L.O. 8.

000015K101 ..(KA's)

ANSWER 2.06 (1.00)

(a.) [+1.0]

REFERENCE

1. Oconee: DPC-EPG, pp. 2-77/79.

000074K311 ..(KA's)

ANSWER 2.07 (3.50)

a. 1. reactor [+0.5]
2. emergency procedures [+0.5]
3. normal and abnormal [+0.5]
4. emergency plan [+0.5]
5. abnormal procedures [+0.5]

b. '4.' [+1.0]

REFERENCE

1. Oconee: AP/1/A/1700/8, "Loss of Control Room."

000068K310 ..(KA's)

ANSWER 2.08 (1.0)

(c. [+1.0]

REFERENCE

1. Oconee: Lesson Plans Vol IV, OP-OC-PNS-CC, p. 13.

000026G011 ..(KA's)

(***** CONTINUED ON NEXT PAGE *****)

ANSWER 2.09 (1.00)

(n.) [+1.0]

REFERENCE

1. Oconee: OP-OC-SPS-SSF-FPS, pp. 24-26.

000067A214 ..(KA's)

ANSWER 2.10 (1.00)

a. F[illegible] will automatically close when a main FDWP is reset [+0.5] [illegible] their controllers are in 'AUTO' [+0.5].

b. Loss of feedwater injection to the S/G's. [+1.0]

REFERENCE

1. Oconee: EP/0/A/1700/14; OP-OC-SPS-SY-EF, pp. 66 and 68, L.O. 4.n.

000054K303 ..(KA's)

ANSWER 2.11 (1.50)

a. Entrapment of air [+0.25] in the decay heat drop line [+0.25]

b. 1. Align LPI pump suction to the RB emergency sump [+0.5]
-OR-
2. to the BWST (after venting) [+0.5]

REFERENCE

1. Oconee: AP/1/A/1700/07, "Loss of Low Pressure Injection System," pp. 12 and 14.

000025K301 000025A207 ..(KA's)

ANSWER 2.12 (1.00)

(c.) [+1.0]

REFERENCE

1. Oconee: AP/1/A/1700/14, p. 2.

000022G010 ..(kA's)

ANSWER 2.13 (1.00)

(c.) [+1.0]

REFERENCE

1. Oconee: Lesson Plan, "Nuclear Instrumentation," [illegible] pp. 25-31.

000077A211 000033A202 ..(KA's)

ANSWER 2.14 (1.50)

a. 1. manual insertion of control rods [+0.5]
2. de-energize CRD's [+0.5]
3. initiate emergency boration [+0.5]

REFERENCE

1. Oconee: EP/1/A/1800/01, Section 506, "Unanticipated Nuclear Power Production."

2. Oconee: Lesson Plan, OP-OC-EAP-E26, pp. 5-7.

000029K304 ..(KA's)

(***** CATEGORY 2 CONTINUED ON NEXT PAGE *****)

ANSWER 2.15 (1.00)

a. trip the reactor [+0.5]

b. 1. an acceptable power distribution is no longer assured

2. effects of rod misalignment on accident analysis may be unacceptable

[+0.5] for either

REFERENCE

1. Oconee: AP/1/A/1700/15.

2. [illegible]

000000A201 ..(KA's)

ANSWER 2.16 (1.25)

7. QT PRESSURE INCREASING

1. acoustical monitors

2. quench tank level

3. quench tank temperature

4. temperature sensors on relief line

5. open/closed indicating lights

6. annunciators

Any five (5) [+0.25] each: max. [+1.25]

REFERENCE

1. Oconee: OP-OC-SPS-CM-PZR, p. 15.

000000A101 ..(KA's)

(***** CATEGORY 2 CONTINUED ON NEXT PAGE *****)

ANSWER 2.17 (1.00)

a. terminate all reggas [+1.0]
(investigate alar?

REFERENCE

1. Oconee: Lesson Plan, OP-OT-SPS-IC-PRM, "Process Radiation Monitors." pp. 19-24.

1. Oconee: OP-1 & 2/A/[illegible]/18, "Gaseous Waste Disposal System."

000060501 [illegible] ..(KA's)

ANSWER 2.18 (2.00)

a. low (zero) [+0.5]

b. It will start [+0.5] due to steam supply valve (MS-95) failing open [+0.5].

c. Send an operator to supply the service air header with diesel air compressor [+0.5].

REFERENCE

1. Oconee: AP/1/A/1700/22, pp. 2, 7, and 12.

000065A308 000065 [illegible] 000065A208 ..(KA's)

ANSWER 2.19 (1.00)

(b.) [+1.0]

REFERENCE

1. Oconee: AP/1/A/1700/09, pp. 1 and 2.

[illegible] ..(KA's)

***** CATEGORY 2 CONTINUED ON NEXT PAGE *****

ANSWER 2.20 (1.00)

a. controlled reactor shutdown [+0.25]

b. a reactor trip creates a potential for lifting the main steam relief valves [+0.25] providing a flow path for radioactive releases [+0.5]

REFERENCE

1. Oconee: Lesson Plan OP-OC-EAP-E24, p. 9.
2. Oconee: EOP EP/1/A/1800/01, Section 504, p. 55.

(***** END OF CATEGORY 2 *****)

3. PLANT SYSTEMS (38%) AND PLANT-WIDE GENERIC RESPONSIBILITIES (10%)

ANSWER 3.01 (1.00)

(c.) [+1.0]

REFERENCE

1. Oconee: OP-OC-SPS-IC-ICS, p. 22.

059000A207 059000A410 ..(KA's)

ANSWER 3.02 (1.00)

(a.) [+1.0]

REFERENCE

1. Oconee: OP-OC-IC-ES, p. 13, L.O. B.7.C.

013000A201 013000A407 013000A204 ..(KA's)

ANSWER 3.03 (2.00)

a. 3
b. 10
c. 7
d. 2
e. 1
f. 4

[+0.33] each; max [+2.0]

REFERENCE

1. Oconee: Lesson Plan OP-OC-SPS-SY-hpi, High Pressure Injection, pp. 36-38.

004000G008 ..(KA's)

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

ANSWER 3.04 (1.00)

Analog channel diagram - HPI [+0.25] and LPI [+0.25] "trip" lights.

Digital channel diagram - "Analog No. 1" lights for HPI [+0.25] and LPI [+0.25].

REFERENCE

1. Oconee: OP-OC-IC-ES. pp. 9 and 10.

013000A301 ..(KA's)

ANSWER 3.05 (1.00)

(b.) [+1.0]

REFERENCE

1. Oconee: OP-OC-PNS-RBC. p. 15. L.O. B.6.

022000A205 ..(KA's)

ANSWER 3.06 (1.00)

vent header pressure would decrease. (1.00)

REFERENCE

1. Oconee: WE-98-GWD-R, Exam bank

071000G007 ..(KA's)

***** CATEGORY 3 CONTINUED ON NEXT PAGE *****

ANSWER 3.07 (1.00)

(a.) [+1.0]

REFERENCE

1. Oconee: OP-OC-SPS-IC-ARM, p. 13.

072000A202 072000A401 072000A101 ..(KA's)

ANSWER 3.08 (1.00)

(a.) [+1.0]

REFERENCE

1. Oconee: Vol. V, Instrumentation, OP-OC-IC-RCI, pp. 27-29, L.T. [illegible]

017020K401 017020A201 ..(KA's)

ANSWER 3.09 (1.00)

Isolate main steam to the TDEFW pump [+0.5] and run it with auxiliary steam [+0.5].

REFERENCE

1. Oconee: OP-OC-1A-A1, p. 3, L.O. B.2.d.

061000K103 ..(KA's)

ANSWER 3.10 (1.00)

(c.) [+1.0]

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

3. PLANT SYSTEMS (38%) AND PLANT-WIDE GENERIC RESPONSIBILITIES (10%)

REFERENCE

1. Oconee: OP-OC-SPS-IC-ICS. p. 35.

015000K304 ..(KA's)

ANSWER 3.11 (1.00)

(c.) [+1.0]

REFERENCE

1. Oconee: OP-OC-CP-C, p. 10 of 55. L.O. 7.

[illegible] ..(KA's)

ANSWER 3.12 (2.00)

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

[+0.5] each

REFERENCE

1. Oconee: OP-OC-SPS-SY-RCS. pp. 12 and 13. L.O. 1a.

002000K109 [illegible] 002000[illegible] ..(KA's)

ANSWER 3.13 (1.50)

a. increase [+0.5]

b. The steaming rate is reduced after the initial effect [+0.5] because of the reduced steam generator level [+0.5].

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

3. PLANT SYSTEMS (38%) AND PLANT-WIDE GENERIC RESPONSIBILITIES (10%)

REFERENCE

1. Oconee: Lesson Plan, OP-OC-S-S-CM-SG, p. 11 of 22.

055010K101 059000K103 059000A211 ..(KA's)

ANSWER 3.14 (2.50)

a. 1. Keowee Emergency Startup Channels 1. DIA
2. Main Feedwater Bus Monitor Relay 2. DIB
3. EHC Control 3. KI
4. Transformer Lockout Relays 4. KX
5. Load Shed Relays 5. KU
6. CCW, Condensate Lockout Relays [0.1 EACH]
7. Multistator Systems
8. 230 Breaker Shunt Trip
9. Units 1 & 2 Main Panel Board

~~Any six (6) at [+0.10] each; max [+1.50]~~

b. 1. Prevent over rating a charger (1 charger cannot carry loads of two buses simultaneously) [+0.5].

2. Prevent both batteries from being affected by single fault [+0.5].

REFERENCE

1. Oconee: Lesson Plan OP-OC-ELE-DCD, "DC power Distribution," pp. 15-21.

063000K102 063000K301 063000K402 ..(KA's)

ANSWER 3.15 (1.00)

(b.) [+1.0]

REFERENCE

1. Oconee: OP-OC-SPS-CM-KHG, p. 28, L.O. 1.q, r, s, t.

064000K402 ..(KA's)

***** CATEGORY A CONTINUED ON NEXT PAGE *****

ANSWER 3.16 (1.00)

(c.) [+1.0]

REFERENCE

1. Oconee: PT/O/A/230/01, Enclosure 13.4, p. 4.

073000A101 072000A401 ..(KA's)

ANSWER 3.17 (3.00)

a. The gas space in the CFT does not have enough volume to hold the proper amount of water into the reactor vessel [1.0] ~~following CFT actuation. [+0.5].~~

b. 1. Increase sampling frequency [+0.5] to determine boron concentration [+0.5].

2. Sample the CFT after it is drained [+0.5] to determine tank activity level [+0.5].

3. Periodically add boron to the CFT [+0.5] to compensate for dilution [+0.5].

Any two (2) precautions and corresponding reasons: max. [+2.0]

REFERENCE

1. Oconee: Lesson Plan. OP-OC-PNS-CFS, "Core Flood System," pp. 7-20.

006000K602 006020A107 006000G015 ..(KA's)

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

ANSWER 3.19 (2.00)

a. 1. Minimum separation between assemblies. [+0.5]
2. Neutron poisons inserted between assemblies. [+0.5]

b. Design allows natural circulation flow from the bottom of the rack to the top of the SFP if cooling is lost. [+1.0]

REFERENCE

1. Oconee: Lesson Plan, OP-OC-FH-FHS, "Fuel Handling Systems," pp. 15 and 16.

033000K303 033000K405 ..(KA's)

ANSWER 3.19 (1.00)

(TRANSAMMER GT-S)

Only for the Lee Gas Turbine [+0.5], simultaneously closing the breakers [normal] units could cause a voltage drop sufficient to trip breakers and/or damage equipment [+0.5].

REFERENCE

1. Oconee: AP/1/A/1700/11, p. 6A.

[illegible] ..(KA's)

ANSWER 3.20 (1.00)

(b.) [+1.0]

REFERENCE

1. Oconee: OP-OC-IC-RCI, pp. 23 and 24.

016000A201 ..(KA's)

***** CATEGORY 3 CONTINUED ON NEXT PAGE *****

ANSWER 3.21 (2.00)

a. 2/3 [+0.25] ES RB pressure channels [+0.5] reach 10 psig [+0.25].

b. Due to the lower available NPSH for the RBS pumps from the RBES [+1.0].

REFERENCE

1. Oconee: OP-OC-PNS-BS, pp. 8-10.

026000K402 026020A202 026000G012 ..(KA's)

ANSWER 3.22 (2.00)

a. 3 [+0.5]

b. 1 [+0.5]

c. 2 [+0.5]

d. 4 [+0.5]

REFERENCE

1. Oconee: Lesson Plans, Vol. V, OP-OC-IC-RPS, p. 17-24.

012000K402 015000K405 ..(KA's)

ANSWER 3.23 (1.00)

(d.) [+1.0]

REFERENCE

1. Oconee: Lesson Plans, Vol. III, OP-OC-SPS-IC-ICS, L.O. 1.s, and OP-OC-SPS-PRT-NT.

016000A201 ..(KA's)

(***** CONTINUED ON NEXT PAGE *****)

ANSWER 3.24 (1.00)

a. all three (3) units [+0.5]

b. Units 2 and 3 [+0.5]

REFERENCE

1. Oconee: OP-OC-SPS-SY-HPI, pp. 36 and 37, L.O. 3.q.

003000K404 ..(KA's)

ANSWER 3.25 (1.0)

a. There will exist [+0.5] due to removal of the 125 psi bias signal from the heater pressure setpoint [+0.5].

b. Tave decrease, PZR level decreases and RCS pressure decreases ~~[+0.25]~~ for each direction
0.5 EACH MAX 1.5

REFERENCE

1. Oconee: Lesson Plans, Vol. VI, OP-OC-013, p. 7, L.O. 5.

2. OP/A/1102/02, Reactor Trip Recovery.

041020K105 ..(KA's)

ANSWER 3.26 (1.00)

Quench tank pressure [+0.5] stops increasing [+0.5].

REFERENCE

1. Oconee: OP-OC-SPS-CM-PZR, p. 17, L.O. 11.

007000A206 ..(KA's)

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

ANSWER 3.27 (2.00)

a. 1. radiolysis [+0.33]
2. corrosion (zinc, boric acid, steam-steel reactions) [+0.33]
3. zirc-water reaction [+0.33]
4. offgassing of dissolved hydrogen [+0.33]

[+1.0] for any three

b. Recombiner [+0.5] because it does not involve a radiological release to the environment [+0.5].

REFERENCE

1. [illegible]

028000G004 028000K503 ..(KA's)

ANSWER 3.28 (1.00)

(b.) [+1.0]

REFERENCE

1. Oconee: OMP 2-1, Reactor Operator Log, p. 1.

194001A106 ..(KA's)

ANSWER 3.29 (1.00)

d. (1.00)

REFERENCE

1. Oconee: BPS-13-BP-N, Examination Bank

194001A102 ..(KA's)

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

ANSWER 3.30 (1.00)

B

REFERENCE

BPS-84-BP, Oconee Exam Bank

194001K101 ..(KA's)

ANSWER 3.31 (1.00)

C

REFERENCE

BPS-85-BP, Oconee Exam bank

194001K102 ..(KA's)

ANSWER 3.32 (1.00)

(c.) [+1.0]

REFERENCE

1. Oconee: RP/0/V/100/16, Enclosure 4.1.

194001A116 ..(KA's)

ANSWER 3.33 (1.00)

(d.) [+1.0]

REFERENCE

1. Oconee: Station Directive 4.2.2, pp. 2 and 3.

194001K116 ..(KA's)

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

ANSWER 3.34 (1.00)

(b.) [+1.0]

REFERENCE

1. Oconee Nuclear Station Directive 2.2.2, Independent Verification, pp. 1-8.

194001K101 ..(KA's)

ANSWER 3.35 (1.25)

a. 5 [+0.25]

b. 2 [+0.25]

c. 1 [+0.25] and 3 [+0.25]

d. 6 [+0.25]

REFERENCE

1. Oconee: GET Handbook, pp. 14, 15, and 75.

194001K101 194001K102 ..(KA's)

ANSWER 3.36 (1.00)

a. 4
b. 1
c. 6
d. 2

[+0.25] each

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

REFERENCE

1. Oconee: General Employee Training, p. 2.

194001K104 ..(KA's)

ANSWER 3.37 (1.00)

a

REFERENCE

1. Oconee: WE-14-154

194001K104 ..(KA's)

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

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

QUESTION	VALUE	REFERENCE
1.01	1.00	9000630
1.02	1.00	9000631
1.03	1.00	9000636
1.04	1.00	9000637
1.05	1.00	9000638
1.06	1.00	9000639
1.07	1.00	9000641
1.08	1.00	9000650
1.09	1.00	9000632
1.10	1.50	9000633
1.11	2.00	9000634
1.12	1.50	9000635
1.13	1.00	9000640
1.14	1.00	9000642
1.15	1.00	9000643
1.16	2.00	9000644
1.17	1.00	9000645
1.18	1.00	9000646
1.19	1.00	9000647
1.20	1.00	9000648
1.21	1.00	9000649
1.22	1.00	9000651
	25.00	
2.01	1.00	9000652
2.02	2.00	9000653
2.03	1.00	9000654
2.04	1.00	9000655
2.05	1.50	9000656
2.06	1.00	9000657
2.07	3.50	9000658
2.08	1.00	9000659
2.09	1.00	9000660
2.10	2.00	9000661
2.11	1.50	9000662
2.12	1.00	9000663
2.13	1.00	9000664
2.14	1.50	9000665
2.15	1.00	9000666
2.16	1.25	9000667
2.17	1.00	9000668
2.18	2.00	9000669
2.19	1.00	9000670
2.20	1.00	9000671
	27.25	
3.01	1.00	9000672
3.02	1.00	9000673
3.03	2.00	9000674
3.04	1.00	9000675
3.05	1.00	9000676
3.06	1.00	9000677
3.07	1.00	9000678

QUESTION	VALUE	REFERENCE
3.08	1.00	9000679
3.09	1.00	9000680
3.10	1.00	9000681
3.11	1.00	9000682
3.12	2.00	9000683
3.13	1.50	9000684
3.14	2.50	9000685
3.15	1.00	9000686
3.16	1.00	9000687
3.17	3.00	9000688
3.18	2.00	9000689
3.19	1.00	9000690
3.20	1.00	9000691
3.21	2.00	9000692
3.22	2.00	9000693
3.23	1.00	9000694
3.24	1.00	9000695
3.25	2.50	9000696
3.26	1.00	9000697
3.27	3.00	9000698
3.28	1.00	9000699
3.29	1.00	9000700
3.30	1.00	9000701
3.31	1.00	9000702
3.32	1.00	9000703
3.33	1.00	9000704
3.34	1.00	9000705
3.35	1.25	9000706
3.36	1.00	9000707
3.37	1.00	9000708
	48.75	
	101.0	