



Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038

Nuclear Department

March 22, 1990

NTC-90-3053

Mr. T. Timothy Martin
Regional Administrator
U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

Dear Mr. Martin:

EXAMINATION REVIEW COMMENTS - HOPE CREEK LICENSE EXAMINATION

Attached are comments on questions used on the written examination administered at Hope Creek Generating Station on March 20, 1990. These comments have been developed following the examination. They are in addition to comments provided by Messrs. Sparks, Wynn, and Gott during the pre-examination review conducted on March 19, 1990.

While this review allows for discussion and correction of some problems, its limited scope and duration cannot hope to totally validate the written examination. From this standpoint, use of multiple choice questions that have not been piloted to ensure their ability to measure minimum competency based on item reliability and discrimination can only lead to additional challenges to the examination process.

An additional variation in preparing for and taking the written examination is driven by having or not having access to the Technical Specifications. Recent examinations have allowed use of this reference, and training emphasis has shifted accordingly. More emphasis has been placed on assessment of plant conditions with use of the Technical Specifications to determine appropriate Limiting Condition of Operation and Action Statement, and less on recall of information contained in this reference.

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PDR ADDCK 05000354
V PDR

The Energy People

Mr. T. Timothy Martin

-2-

3/22/90

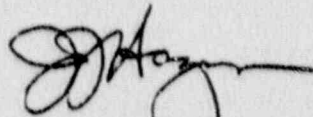
The following format has been used to document specific comments:

- A. NRC question, answer, and reference;
- B. facility comment including a recommendation for resolution;
and
- C. support documentation.

These comments are presented in the same order as originally numbered on the SRO examination.

If you have any questions, comments, or need additional information, please call G. Mecchi, (609) 339-3857, or W. Gott, (609) 339-3769. They will provide the requested information or will see that you are contacted by the appropriate person.

Sincerely yours,



J. J. Hagan
General Manager -
Hope Creek Operations

Attachment

A.

QUESTION: 017 (1.00)

If MCC 10B446 experiences a fault and loses its 480 VAC power, WHICH of the following statements is true?

- a. RPS Bus A will lose power in 5 seconds.
- b. RPS Bus B will lose power in 5 seconds.
- c. RPS Bus A will lose power in less than 2 seconds.
- d. RPS Bus B will lose power in less than 2 seconds.

ANSWER: 017 (1.00)

c.

[1.00]

REFERENCE:

- 1. LP 302H-000.00H-022-06
Obj. 3, 4
- 2. none
- 3. KA 212000 K601/3.8
212000K601 ..(KA's)

B. QUESTION #17

THERE ARE NO CORRECT ANSWERS PROVIDED ON THE ANSWER KEY. THEREFORE, THIS QUESTION SHOULD BE DELETED FROM THE EXAM. THE ATTACHED HCGS REFERENCES CLEARLY STATE THAT THE OUTPUT VOLTAGE AND FREQUENCY OF THE RPS MG SET WILL BE MAINTAINED IF INPUT VOLTAGE IS RESTORED WITHIN TWO SECONDS.

C. REFERENCE DOCUMENTS:

HC.OP-SO.SB-0001, REACTOR PROTECTION SYSTEM OPERATION, PAGE 4, SECTION 3.2.5

LESSON PLAN 302H-000.00H-022-06, REACTOR PROTECTION SYSTEM, PAGE 17

- 3.2.2 If the electrical lineup cannot be completed as required, the SNSS/NSS will determine whether the system should not be placed in service or standby, as required.
- 3.2.3 The Synchronous Generator of the Motor Generator Set is rated for 18.75 KVA, 15 KW, 1800 RPM, 1 phase, 60 HZ, 120 volts, 0.8 power factor and 156 full load amperes.
- 3.2.4 The output power of the Motor Generator continues uninterrupted if input power is restored within two seconds.
- 3.2.5 The output voltage and frequency of the Motor Generator will not drop more than 5% if input is restored within two seconds. Restoration will not exceed five seconds.
- 3.2.6 If frequency drops below 54.0 Hz, the Generator output breaker will auto-open. The breaker has to be reclosed manually.

3.3 Interlocks

- 3.3.1 Manual reset of a Full Scram is inhibited for 10 seconds after initiation to ensure Control Rods drive to the FULL IN position.
- 3.3.2 Reactor Protection System Scram setpoints are summarized in Table SB-001.
- 3.3.3 RPS Bus Power Sources are interlocked such that only one Alternate Feed A or B can supply a RPS Bus at a time.

TABLE SB-001

Variable	Set Point	Auto Bypass
Reactor Vessel Low Water Level	12.5" (Level 3)	No
Reactor High Pressure	1037 psig	No
Main Steam Line High Radiation	3X Full Power Background	No
Drywell High Pressure	1.68 psig	No
Manual (Pushbuttons)	N/A	No

INSTRUCTIONAL CONTENT:

KEY/AIDS	
	<p>d. Should scram be required from outside the control room, the eight circuit breakers above would de-energize both the A and B solenoids for all 4 groups.</p>
FIG 4	<p>e. Power Supply for RPS bus A (B)</p>
Obj. 2	<p>1) Normal: RPS M-G set A (B)</p>
	<p>2) Alternate: MCC 10B491 (MCC10B131) via a 480/120 VAC transformer</p>
	<p>2. RPS M-G set A (B) 1AG401 (1BG401)</p>
	<p>High-inertia motor-generator provides constant, stable, 120 VAC, 60 Hz electrical power for each RPS bus.</p>
	<p>a. Induction Motor</p>
	<p>1) 3-phase, 480 VAC, 25HP motor</p>
FIG 4	<p>2) Power supplies</p>
Obj. 3	<p>a) For M-G set A: MCC 10B446</p>
	<p>b) For M-G set B: MCC 00B484</p>
	<p>b. Synchronous Generator</p>
	<p>1) Single phase 120VAC, 60Hz</p>
	<p>2) Produces 18.75 KVA</p>
Obj. 4	<p>c. Flywheel</p>
	<p>The flywheel is located between the motor and generator and is used to couple their shafts together. The purpose of the flywheel is to allow the generator to continue to produce output power during temporary interruptions (less than 2 seconds) of input power to the motor.</p>
	<p>d. Instrumentation and Controls</p>
FIG 5	<p>Each M-G set has a local control panel mounted on the M-G set.</p>

A.

QUESTION: 033 (1.00)

The reactor is operating at 50% power. HPCI initiates and injects. Compared to the steady state value at 50% power, WHICH ONE of the following statements is correct for initial parameter change.

- a. Reactor pressure will increase
- b. Total steam flow increases
- c. Reactor water level decreases
- d. Reactor power decreases

ANSWER: 033 (1.00)

d.

[1.00]

REFERENCE:

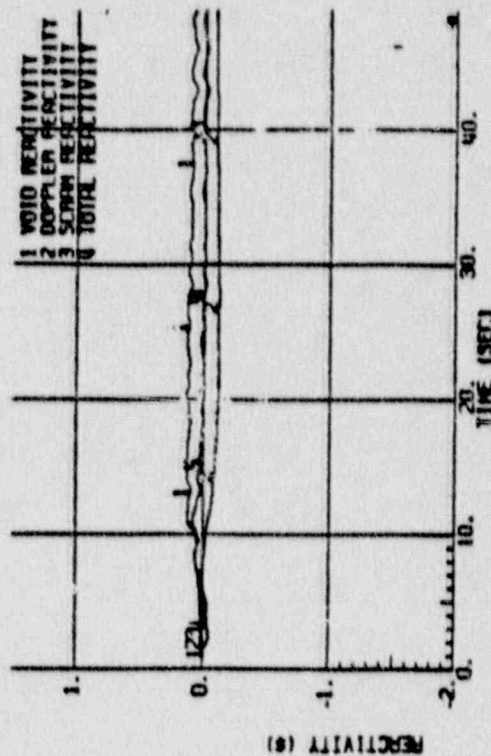
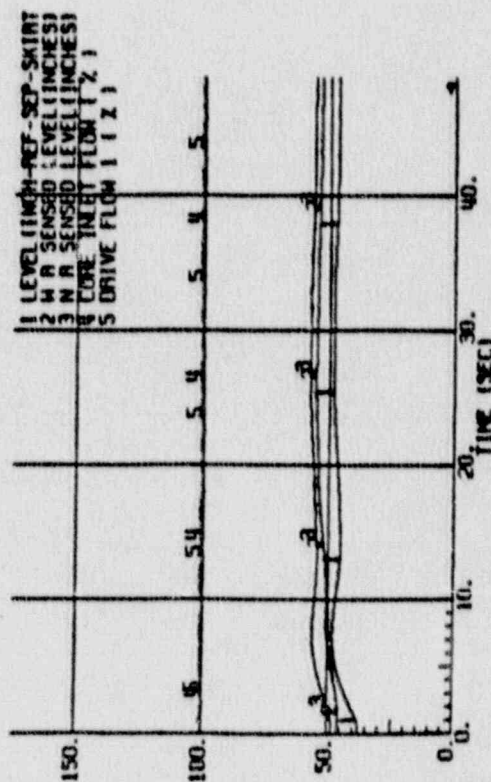
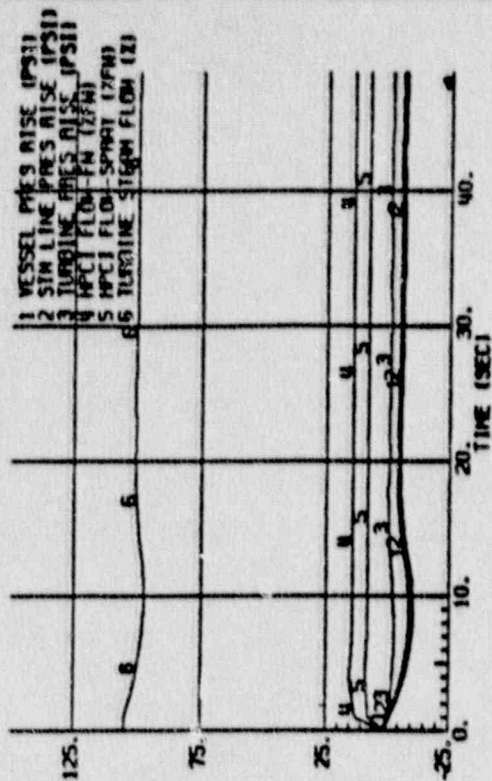
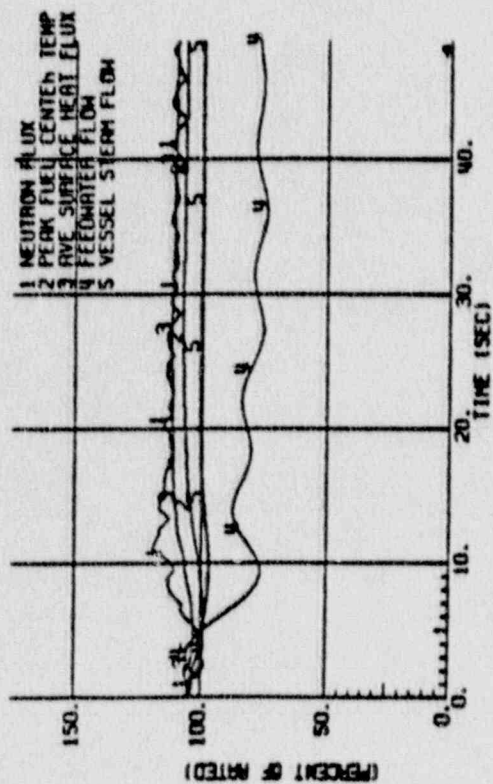
- 1. LP 302HC-00.00-026-04
Obj. 10, 12
- 2. none
- 3. KA 206000 K102/4.1 K103/3.8
206000K102 206000K103 .. (KA's)

B. QUESTION #33

REQUEST THAT THE ANSWER KEY BE CHANGED TO ACCEPT CHOICE B, "TOTAL STEAM FLOW INCREASES". WHEN THE HPCI SYSTEM INITIATES, REACTOR PRESSURE WILL INITIALLY DECREASE AS STEAM IS UTILIZED FOR HPCI SYSTEM STARTUP. ADMITTEDLY, THE EHC SYSTEM WILL RESPOND TO REDUCE STEAM FLOW TO THE MAIN TURBINE AND THEREBY MAINTAIN PRESSURE. BUT **TOTAL** (VESSEL) STEAM FLOW WILL HAVE INSTANTANEOUSLY INCREASED AS THIS PARALLEL FLOW PATH BECOMES AVAILABLE. THE SUBSEQUENT, SHORTLIVED PRESSURE REDUCTION AND ADDITIONAL FLASHING (VOIDING) OF VESSEL INVENTORY CAN ONLY OCCUR FOLLOWING THE STEAM FLOW INCREASE. THEREFORE, CHOICE "B" WOULD BE THE MOST APPROPRIATE SELECTION FOR INITIAL PARAMETER CHANGE.

C. REFERENCE DOCUMENT:

HCGS UFSAR FIGURE 15.5-1



INADVERTENT STARTUP OF HPCI PUMP

KT1 RM04 HPA C01 91 DRF 672C-12

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
HOPE CREEK NUCLEAR GENERATING STATION

INADVERTENT HPCI PUMP STARTUP

UPDATED FSAR

FIGURE 15.5-1

A.

QUESTION: 045 (1.50)

STATE THREE (3) conditions or signals that could cause a Gaseous Radwaste System Recombiner train isolation. Include setpoints if applicable.

ANSWER: 045 (1.50)

1. recombimer outlet temperature high (.25), 900 degrees F (.25)
2. feed gas cooler condenser outlet temperature high (.25), 200 degrees F (.25)
3. recombimer strip heater control not in operate (.50)
4. manual pushbutton (.50)

[any 3 of 4]

REFERENCE:

1. LP 302H-000.00H-054-04
Obj. 13a, b
2. none
3. KA 271000 A301/3.3 K408/3.3
271000K408 271000A301 ..(KA's)

B. QUESTION #45

REQUEST THAT THE ANSWER KEY BE MODIFIED AS FOLLOWS:

1. ADDITION OF " HYDROGEN CONCENTRATION HIGH" AS AN ACCEPTABLE RECOMBINER TRAIN ISOLATION SIGNAL.
2. ACCEPT "RECOMBINER HEAT(ER) OFF" AS AN ALTERNATIVE TO THE EXISTING EXAM KEY RESPONSE "RECOMBINER STRIP HEATER CONTROL NOT IN OPERATE".

PLANT DOCUMENTATION SUPPORTS BOTH OF THE ABOVE REQUESTED CHANGES.

C. REFERENCE DOCUMENTS:

OP-AB.ZZ-128, OFF GAS SYSTEM MALFUNCTION

- 4.6 If the Main Steam Supply to the Feed Gas Preheater is lost establish Auxiliary Steam to the preheater if possible.
- 4.7 If reactor power is greater than 5% of rated and flow through the Off Gas System is lost and cannot be re-established, REDUCE the Reactor Recirculation Pumps to minimum speed, SCRAM the reactor and implement procedure OP-EO.22-100(Q).
- 4.8 Prior to placing an isolated off gas train back in service, ensure that dilution air is being supplied to that train.

5.0 DISCUSSION

- 5.1 The Mechanical Vacuum Pump should not be used to maintain condenser vacuum when steam is being admitted to the Main Condenser and reactor power is greater than 5% of rated.
- 5.2 The Off Gas Recombiner Train isolates on the following conditions:
- a. Recombiner high outlet temperature
 - b. Feed gas cooler condenser high outlet temperature
 - c. Recombiner heat off
 - d. Hydrogen concentration high
- 5.3 The Off Gas System is designed to withstand the effects of an internal hydrogen explosion.
- 5.4 Nitrogen can be supplied to the Off Gas System to extinguish an internal fire or purge the system of hydrogen.
- 5.5 On loss of steam to the Feed Gas Preheater, it will cool down and the recombiner will eventually isolate if no operator action is taken.
- 5.6 Upon a loss of power or instrument air, the Off Gas System valves fail safe (isolate) to prevent an uncontrolled release.

A.

QUESTION: 065 (1.00)

SELECT the appropriate emergency classification based on the following information.

During refueling, the refuel floor SRO reports that a fuel bundle has been dropped. The Refuel Floor Exhaust Duct Radiation Monitors R9627, R9628 and R9629 are reading 1500 times normal. Projected whole body dose rates for the release at the Minimum Exclusion Area are 250 mr/hr for 40 minutes.

- a. Unusual Event
- b. Alert
- c. Site Area Emergency
- d. General Emergency

ANSWER: 065 (1.00)

c.

[1.00]

SENIOR REACTOR OPERATOR

Page 112

REFERENCE:

- 1. LP 215-002H-00-03
Obj. 3.1
- 2. Hope Creek Event Classification Guide, Sections 5 and 7
- 3. KA 295023 G002/4.5 294001 A116/4.7
294001A116 295023G002 ..(KA's)

B. QUESTION #65

REQUEST THAT THE EXAM KEY BE CHANGED TO INDICATE THAT CHOICE B "ALERT" IS THE CORRECT RESPONSE. THE USE OF THE WORDS "PROJECTED WHOLE BODY DOSE RATES" IMPLIES THAT FIELD TEAM MEASUREMENTS ARE NOT AVAILABLE. THIS IS THE LOGICAL CONCLUSION WHICH CAN BE MADE BASED UPON THE ORGANIZATION OF THE HCGS ECG. UNDER THESE CONDITIONS THE RELEASE LIMITS FOR SITE AREA EMERGENCY ARE NOT MET AND THE CORRECT EVENT CLASSIFICATION WOULD BE AT THE ALERT LEVEL. FOR SITE AREA EMERGENCY TO BE A CORRECT RESPONSE, THE QUESTION SHOULD HAVE INDICATED THAT THE STATED RELEASE RATES WERE "MEASURED" AT THE MEA AND NOT "PROJECTED".

C. REFERENCE DOCUMENTS:

HCGS EVENT CLASSIFICATION GUIDE

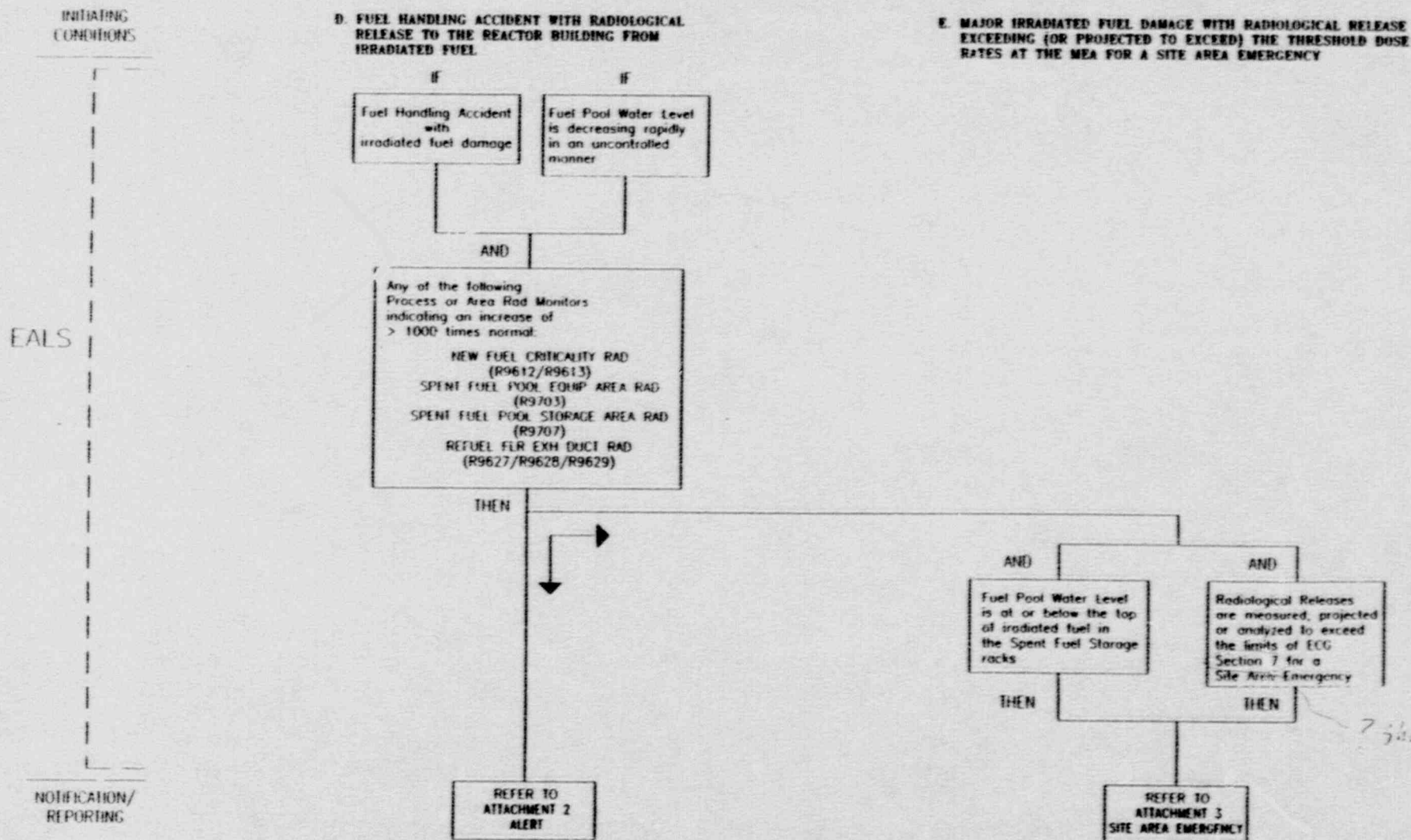
SECTION 5, PAGE 2

SECTION 7, PAGE 3

SECTION 5

FUEL DAMAGE / DEGRADED CORE IRRADIATED OR SPENT FUEL DAMAGE

ECG
SECTION 5
Pg. 2 of 2

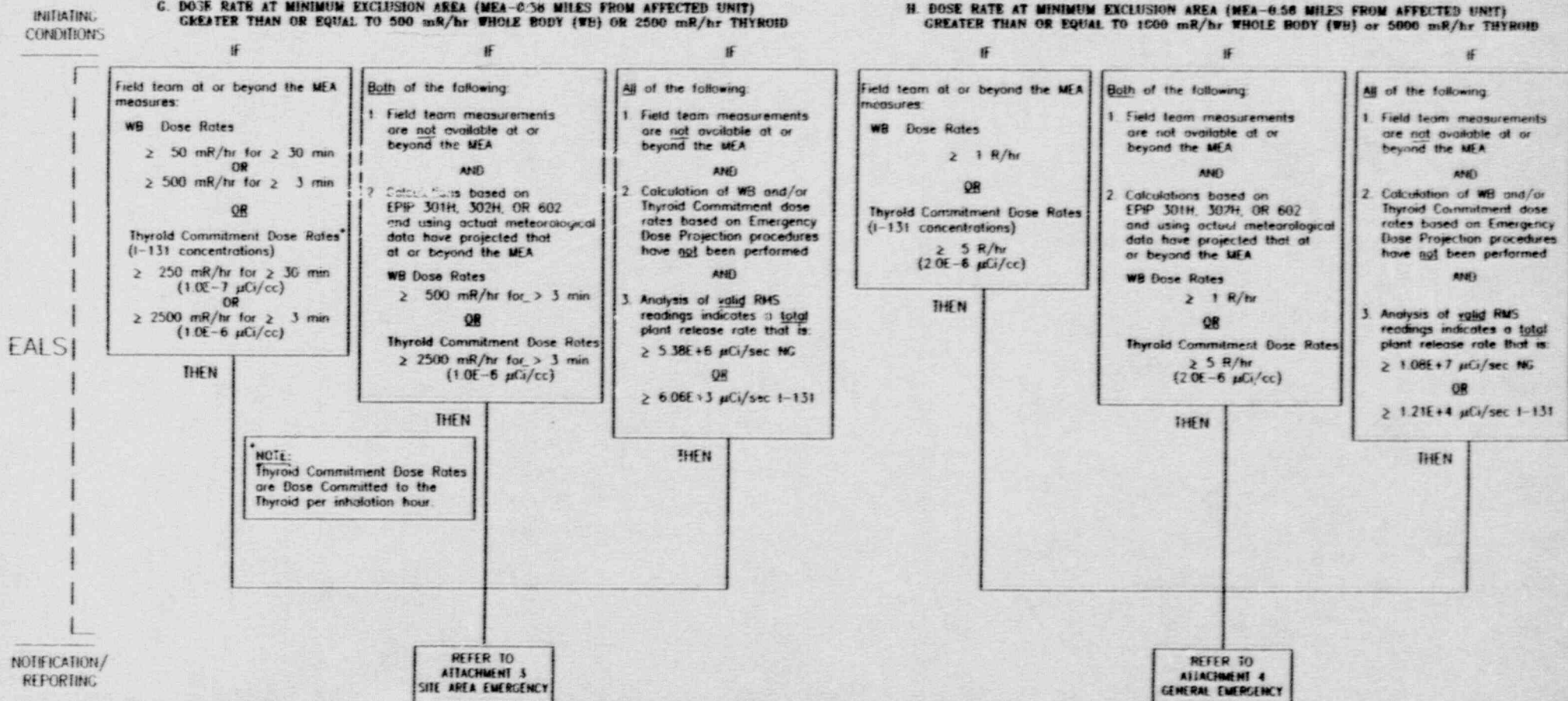


SECTION 7

RADIOLOGICAL RELEASES / OCCURRENCES

ECG
SECTION 7
Pg. 3 of 5

NOTE: Action levels listed are for valid RMS channel indications. The validity of the indications should be confirmed by sample analysis or other means as necessary.



A.

QUESTION: 069 (1.00)

OP-EO.ZZ-102, "Drywell Pressure Control", states that the drywell shall be vented irrespective of off-site radioactive release when specified conditions have been met. SELECT the conditions that require drywell venting from those listed below.

- a. Drywell pressure reaches 55 psig.
- b. Drywell pressure cannot be maintained less than 55 psig.
- c. Drywell pressure reaches 65 psig.
- d. Drywell pressure cannot be maintained below 65 psig.

ANSWER: 069 (1.00)

d.

[1.00]

REFERENCE:

- 1. LP 302H-000.00H-126B-04
Obj. 6
- 2. OP-EO.ZZ-102
- 3. KA 295024 K307/4.0
295024K307 .. (KA's)

B. QUESTION #69

REQUEST THAT THIS QUESTION BE DELETED FROM THE EXAMINATION ON THE BASIS THAT EITHER THERE IS NOT A CORRECT ANSWER LISTED AS A POSSIBLE CHOICE, OR BOTH COULD BE CORRECT. THE EOP STEP REFERRED TO IN THIS QUESTION IS PREDICATED ON THE VALUE OF SUPPRESSION CHAMBER PRESSURE AND NOT DRYWELL PRESSURE. ADMITTEDLY, THE DIFFERENTIAL PRESSURE BETWEEN THE DRYWELL AND THE SUPPRESSION CHAMBER COULD BE SMALL, BUT USING THE SUPPRESSION CHAMBER VALUE IS STRESSED DURING ALL FACETS OF LICENSED OPERATOR TRAINING. IN ADDITION, THE PROCEDURE REFERRED TO AS "DRYWELL PRESSURE CONTROL" DOES NOT EXIST. THE CORRECT PROCEDURE IS OP-EO.ZZ-102, "PRIMARY CONTAINMENT CONTROL".

C. REFERENCE DOCUMENTS:

OP-EO.ZZ-102B, PRIMARY CONTAINMENT CONTROL, STEPS DW/P-9, DW/P-11.

PERFORM THE FOLLOWING:

- IRRESPECTIVE OF OFFSITE RADIOACTIVE RELEASE, VENT THE DRAWL USING OP-ED-22-918 UNTIL DRAWL AND SUPP CHAMBER H₂ CONCENTRATION IS BELOW 5% AND DRAWL AND SUPP CHAMBER O₂ CONCENTRATION IS BELOW 5%
- DEFEAT ISOLATION INTERLOCKS IF NECESSARY

PC/H-30

NO
CAN THE DRAWL BE VENTED

PC/H-31

YES

PC/H-26

INITIATE SUPP CHAMBER SPRAYS. USE ONLY THOSE AHR PUMPS NOT REQUIRED TO ASSURE ADEQUATE CORE COOLING BY CONTINUOUS OPERATION IN THE LPCI MODE

PERFORM THE FOLLOWING:

- IRRESPECTIVE OF OFFSITE RADIOACTIVE RELEASE, VENT THE SUPP CHAMBER USING OP-ED-22-918 UNTIL DRAWL AND SUPP CHAMBER H₂ CONCENTRATION IS BELOW 5% AND DRAWL AND SUPP CHAMBER O₂ CONCENTRATION IS BELOW 5%
- DEFEAT ISOLATION INTERLOCKS IF NECESSARY

PC/H-27

NO
CAN THE SUPP CHAMBER BE VENTED

PC/H-28

YES

INITIATE AND MAXIMIZE DRAWL PURGE FLOW (GS)

PC/H-29

NO
IS SUPP POOL LEVEL BELOW 125 IN

PC/H-32

YES

NO
ARE DRAWL TEMP AND PRESS BELOW CURVE DWP-P-1

PC/H-33

YES

SHUT DOWN RECIRC PUMPS (8B) AND DRAWL COOLING FANS (GT)

PC/H-34

INITIATE 1 LOOP OF DRAWL SPRAY AT RATED FLOW. USE ONLY AN AHR PUMP NOT REQUIRED TO ASSURE ADEQUATE CORE COOLING BY CONTINUOUS OPERATION IN THE LPCI MODE

PC/H-35

WHEN DRAWL OR SUPP CHAMBER H₂ CONCENTRATION CANNOT BE RESTORED BELOW 5%
AND DRAWL OR SUPP CHAMBER O₂ CONCENTRATION CANNOT BE RESTORED BELOW 5%
BUT ONLY IF SUPP POOL LEVEL IS BELOW 125 IN
THEN IRRESPECTIVE OF WHETHER ADEQUATE CORE COOLING IS ASSURED, INITIATE SUPP CHAMBER SPRAYS

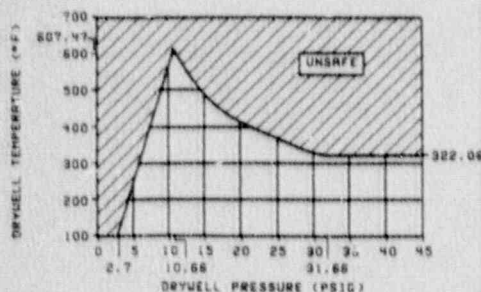
PC/H-36

IF DRAWL TEMP AND PRESS ARE BELOW CURVE DWP-P-1
AND SUPP POOL LEVEL IS BELOW 125 IN
THEN IRRESPECTIVE OF WHETHER ADEQUATE CORE COOLING IS ASSURED:
• SHUT DOWN RECIRC PUMPS (8B) AND DRAWL COOLING FANS (GT)
AND
• INITIATE DRAWL SPRAYS

PC/H-37

AND MAXIMIZE DRAWL FLOW (GS)

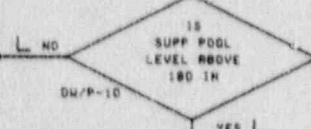
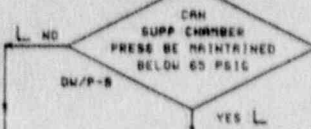
DRYWELL SPRAY INITIATION LIMIT CURVE DWP-P-1



OP-ED-22-102 B (9)	
PRIMARY CONTAINMENT CONTROL	
HOPE CREEK GENERATING STATION	
REV 3	REV DATE 10/27/89

MAINTAIN SUPP CHAMBER PRESS BELOW 65 PSIG

DU/P-8



BEFORE SUPP CHAMBER PRESS REACHES 65 PSIG
THEN IRRESPECTIVE OF OFFSITE RADIOACTIVE RELEASE, VENT THE SUPP CHAMBER USING OP-ED.22-918 TO RESTORE AND MAINTAIN SUPP CHAMBER PRESS BELOW 65 PSIG. DEFERT ISOLATION INTERLOCKS IF NECESSARY

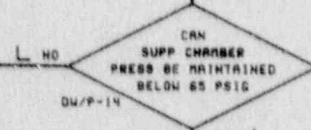
DU/P-12



DU/P-13

BEFORE SUPP CHAMBER PRESS REACHES 65 PSIG
THEN IRRESPECTIVE OF OFFSITE RADIOACTIVE RELEASE, VENT THE DRWL USING OP-ED.22-918 TO RESTORE AND MAINTAIN SUPP CHAMBER PRESS BELOW 65 PSIG. DEFERT ISOLATION INTERLOCKS IF NECESSARY

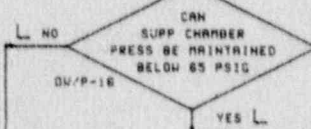
DU/P-11



DU/P-14

WHEN SUPP POOL LEVEL IS BELOW 180 IN
THEN INITIATE SUPP CHAMBER SPRAYS IRRESPECTIVE OF WHETHER ADEQUATE CORE COOLING IS ASSURED

DU/P-15



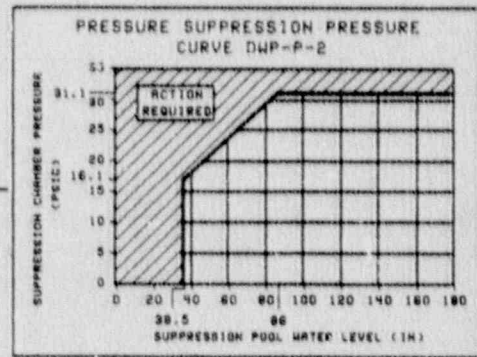
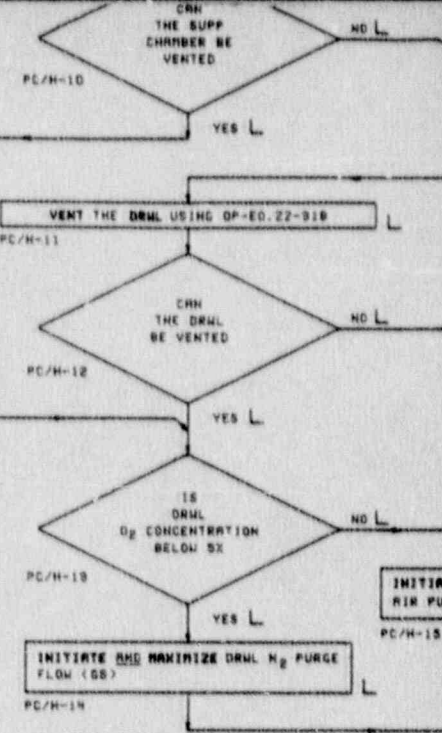
DU/P-16

WHEN SUPP POOL LEVEL IS BELOW 125 IN AND DRWL TEMP AND PRESS ARE BELOW CURVE DWP-P-1
THEN SHUT DOWN RECIRC PUMPS (88) AND DRWL COOLING FANS (87) AND INITIATE DRWL SPRAYS IRRESPECTIVE OF WHETHER ADEQUATE CORE COOLING IS ASSURED

DU/P-17

CONTINUE TO MONITOR AND CONTROL PRIMARY CONTAINMENT PRESS

DU/P-18



102B

A. QUESTION: 070 (1.00)

During a plant shutdown with reactor pressure at 65 psig it is discovered that the Shutdown Cooling System can not be placed in service and the recirculation pumps are not available. In accordance with OP-IO.ZZ-004(Q), "Shutdown From Rated Power to Cold Shutdown", you direct the reactor operator to maintain reactor water level [CHOOSE ONE]...

- a. at the top of the steam dryer
- b. at the bottom of the predryer
- c. at the top of the main steam lines
- d. at the bottom of the steam separator

ANSWER: 070 (1.00)

b. [1.00]

REFERENCE:

- 1. LP 302HC-000.00H-11.2D-01
Obj. 8
- 2. OP-IO.ZZ-004(Q)
- 3. KA 295021 K301/3.4
295021K301 ..(KA's)

B. QUESTION #70

REQUEST THAT THIS QUESTION BE DELETED FROM THE EXAM. WHILE THE WORDING IN CHOICE B "AT THE BOTTOM OF THE PREDRYER" IS FOUND IN THE OPERATING PROCEDURE, THE OMISSION OF "(80 INCHES ON LI-R605-B21 REACTOR LEVEL SHUTDOWN RANGE)" CREATES UNNECESSARY AMBIGUITY. THE COMMAND TO MAINTAIN REACTOR VESSEL LEVEL AT THE BOTTOM OF THE PREDRYER WOULD NOT BE AN ACCEPTABLE COMMUNICATION DURING A DYNAMIC SCENARIO. OPERATIONS PERSONNEL HAVE BEEN TRAINED TO INCREASE VESSEL LEVEL TO 80 INCHES ON THE SHUTDOWN RANGE. SHUTDOWN RANGE LEVEL INDICATION IS AVAILABLE IN THE CONTROL ROOM BUT THERE IS NO CORRESPONDING IDENTIFIER TO INDICATE LEVEL IS AT THE BOTTOM OF THE PREDRYER.

C. REFERENCE DOCUMENTS:

OP-AB.ZZ-142, LOSS OF SHUTDOWN COOLING

- 4.2 If RHR shutdown cooling cannot be established, ensure forced circulation in the core utilizing Reactor Recirculation pump(s).

NOTE 4.3

Main Steam Line flooding occurs at 118 inches.

- 4.3 If forced circulation can not be established, raise RPV level to the bottom of Predryer (80 inches on LI-R605-B21 REACTOR LEVEL SHUTDOWN RANGE) to ensure natural circulation.

NOTE 4.4

Alternate method of decay heat removal will depend on the amount of decay heat and current plant conditions.

CD-973B

- 4.4 Establish alternate method of decay heat removal (Attachment 1). Methods include:
- RWCU system, maximizing RACS to the non-regenerative heat exchangers.
 - Condensate transfer system via the ECCS injection lines.
 - Vessel Head Spray, to withdraw energy from the RPV, this will promote RPV mixing when water level is $\geq 80"$.
 - Maximize Fuel Pool Cooling when the vessel head is removed with the reactor cavity flooded.

CAUTION 4.5

Alternate Shutdown Cooling IAW OP-EO.22-205(Q) shall only be used when all other possibilities have been exhausted.

CD-950B

A.

QUESTION: 084 (1.00)

Which ONE of the following would NOT be a symptom associated with high reactor water level?

- a. Controlling level signal fails low.
- b. Reactor steam flow less than feed flow.
- c. Reactor Feed Pump Lockup.
- d. Decrease in reactor power.

ANSWER: 084 (1.00)

d.

[1.00]

REFERENCE:

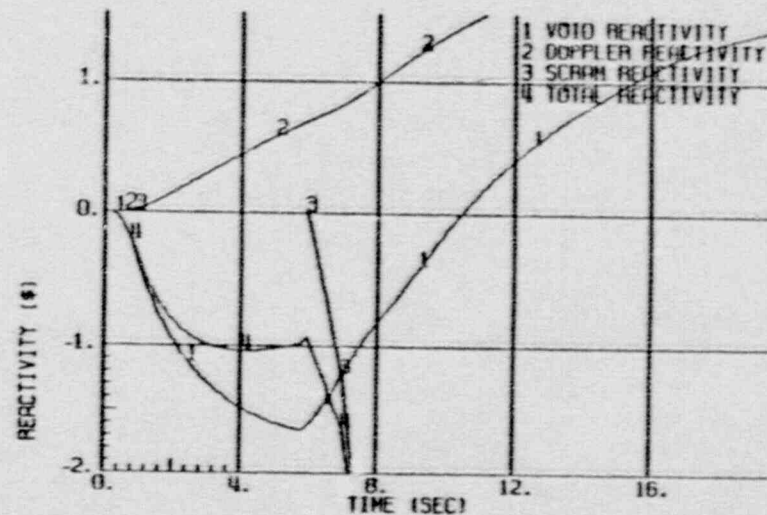
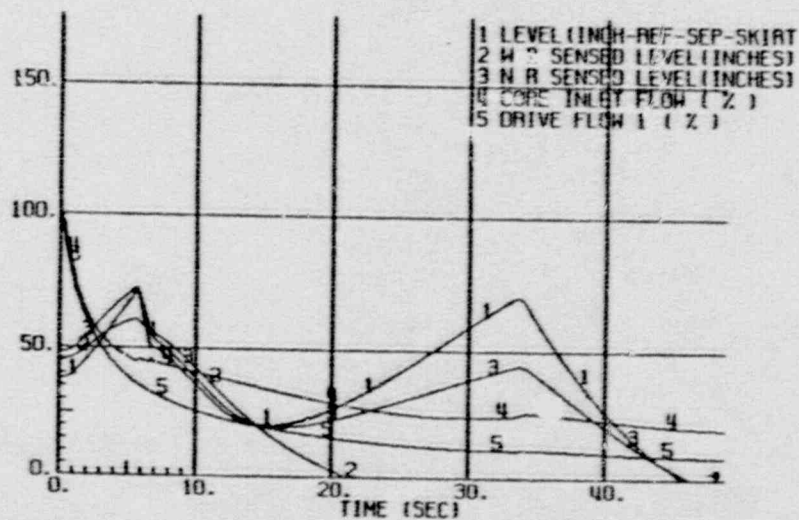
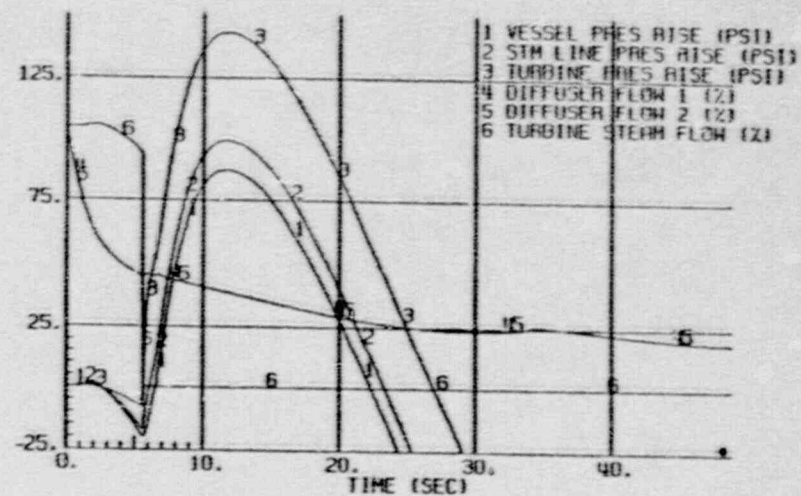
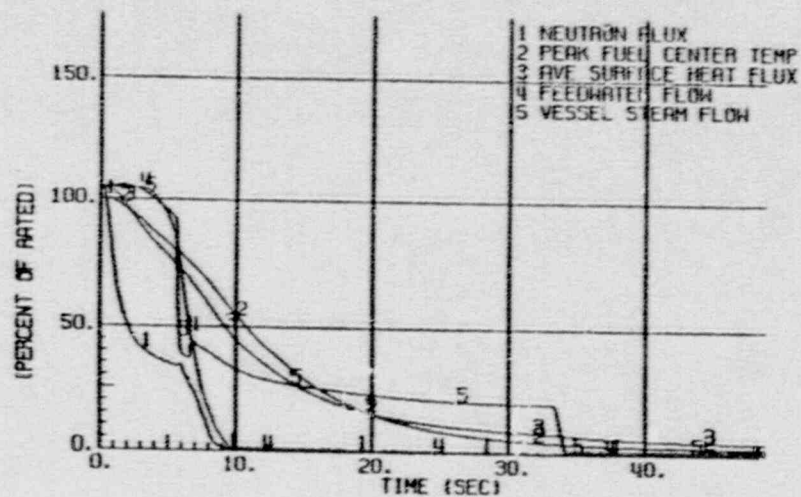
- 1. LP 302H-000.00H-000114-02
Obj. 1
- 2. OP-AB.ZZ-117(Q), Rev. 0
- 3. KA 295008 K202/3.8 K203/3.7 A201/3.9
295008A201 295008K203 295008K202 ..(KA's)

B. QUESTION #84

REQUEST THAT THIS QUESTION BE DELETED FROM THE EXAMINATION BECAUSE THERE ARE TWO POSSIBLE CORRECT ANSWERS. DEPENDING UPON THE INTERPRETATION OF THE EXAMINEE, EITHER CHOICE "C" OR "D" COULD BE CORRECT. THE QUESTION DID NOT ASK FOR SYMPTOMS BASED UPON OP-AB.ZZ-117. PLANT DYNAMIC RESPONSE TO CHOICES "A", "B", OR "D" WOULD RESULT IN INCREASING WATER LEVEL AND THEREFORE CHOICE "C" IS AN ACCEPTABLE RESPONSE IN ADDITION TO CHOICE "D". QUESTION AMBIGUITY WOULD WARRANT DELETION.

C. REFERENCE DOCUMENTS:

HCGS USFAR FIGURE 15.3-2"TRIP OF TWO RECIRCULATION PUMPS"



TWO RECIRCULATION PUMP TRIP

KT1 RM04 TPA C01 52 DRF 672C-12

UPDATED FSAR

FIGURE 15.3.2

TRIP OF TWO RECIRCULATION PUMPS

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
HOPE CREEK NUCLEAR GENERATING STATION

REVISION 0
APRIL 11, 1988

ATTACHMENT 3

NRC Resolution of Facility Written Comments on the Examination

QUESTION 017

NRC Resolution: Comment partially accepted. The question tests knowledge of the RPS MG set power supply and the purpose of the MG set flywheel. Because of the lack of clarity in the training material in describing the time interval in which the flywheel maintains electrical power within specified limits, answers "a" or "c" will be accepted. The answer key has been changed accordingly.

QUESTION 033

NRC Resolution: Comment accepted. The answer key was revised to indicate "b" as the correct answer. Unclear wording resulted in misinterpretation of this question. This type of problem should be identified during the pre-examination review.

QUESTION 045

NRC Resolution: Comment partially accepted. The alternate wording for the isolation associated with the heater is accepted. High hydrogen concentration will not be accepted as a correct answer, because the reference provided with the facility comment is an out-of-date abnormal procedure (OP-AB.ZZ-128, "Off Gas System Malfunction", Rev. 2). The current version of the procedure (Rev. 3) does not indicate that the recombiner train isolates on high hydrogen concentration. None of the reference material provided for preparation of the examination, including drawings, lesson plans, and system operating procedures, support the facility proposed resolution.

QUESTION 065

NRC Resolution: Comment accepted. The answer key was revised to indicate "b" as the correct answer.

QUESTION 069

Deleted

NRC Resolution: Comment accepted. The question has been deleted. The title of the procedure and wording of the answers were taken from the lesson plan: LP 302H-000.000H-126B-04, OP-EO-ZZ-102 Drywell Pressure Control

Section. The training material should be revised to provide accurate information. This type of problem should be identified during the pre-examination review.

QUESTION 070

Deleted

NRC Resolution:

Comment accepted.

QUESTION 084

NRC Resolution:

Comment partially accepted. Either answer "c" or "d" will be accepted. The answer key has been changed accordingly.

ATTACHMENT 4

SIMULATION FACILITY FIDELITY REPORT

Facility Licensee: Public Service Electric and Gas Company
P.O. Box 236
Hancocks Bridge, New Jersey 08038

Facility Licensee Docket No.: 50-354

Facility License No.: NPF-57

Operating Tests Administered on March 21-22, 1990

During the conduct of the simulator portion of the operating tests, no problems were observed.

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U. S. NUCLEAR REGULATORY COMMISSION
SENIOR REACTOR OPERATOR LICENSE EXAMINATION
REGION 1

FACILITY: Hope Creek 1

REACTOR TYPE: BWR-GE4

DATE ADMINISTERED: 90/03/20

CANDIDATE:

Master

INSTRUCTIONS TO CANDIDATE:

Points for each question are indicated in parentheses after the question. To pass this examination, you must achieve an overall grade of at least 80%. Examination papers will be picked up four and one half (4 1/2) hours after the examination starts.

NUMBER QUESTIONS	TOTAL POINTS	CANDIDATE'S POINTS	CANDIDATE'S OVERALL GRADE (%)
87	100.00 22 48.05%		

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:

1. Cheating on the examination means an automatic denial of your application and could result in more severe penalties.
2. After the examination has been completed, you must sign the statement on the cover sheet indicating that the work is your own and you have not received or given assistance in completing the examination. This must be done after you complete the examination.
3. Restroom trips are to be limited and only one 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.
4. Use black ink or dark pencil only to facilitate legible reproductions.
5. Print your name in the blank provided in the upper right-hand corner of the examination cover sheet.
6. Fill in the date on the cover sheet of the examination (if necessary).
7. You may write your answers on the examination question page or on a separate sheet of paper. USE ONLY THE PAPER PROVIDED AND DO NOT WRITE ON THE BACK SIDE OF THE PAGE.
8. If you write your answers on the examination question page and you need more space to answer a specific question, use a separate sheet of the paper provided and insert it directly after the specific question. DO NOT WRITE ON THE BACK SIDE OF THE EXAMINATION QUESTION PAGE.
9. Print your name in the upper right-hand corner of the first page of answer sheets whether you use the examination question pages or separate sheets of paper. Initial each of the following answer pages.
10. Before you turn in your examination, consecutively number each answer sheet, including any additional pages inserted when writing your answers on the examination question page.
11. If you are using separate sheets, number each answer and skip at least 3 lines between answers to allow space for grading.
12. Write "Last Page" on the last answer sheet.
13. Use abbreviations only if they are commonly used in facility literature. Avoid using symbols such as < or > signs to avoid a simple transposition error resulting in an incorrect answer. Write it out.

14. The point value for each question is indicated in parentheses after the question. The amount of blank space on an examination question page is NOT an indication of the depth of answer required.
15. Show all calculations, methods, or assumptions used to obtain an answer.
16. Partial credit may be given. Therefore, ANSWER ALL PARTS OF THE QUESTION AND DO NOT LEAVE ANY ANSWER BLANK. NOTE: partial credit will NOT be given on multiple choice questions.
17. Proportional grading will be applied. Any additional wrong information that is provided may count against you. For example, if a question is worth one point and asks for four responses, each of which is worth 0.25 points, and you give five responses, each of your responses will be worth 0.20 points. If one of your five responses is incorrect, 0.20 will be deducted and your total credit for that question will be 0.80 instead of 1.00 even though you got the four correct answers.
18. If the intent of a question is unclear, ask questions of the examiner only.
19. When turning in your examination, assemble the completed examination with examination questions, examination aids and answer sheets. In addition, turn in all scrap paper.
20. To pass the examination, you must achieve an overall grade of 80% or greater.
21. There is a time limit of (4 1/2) hours for completion of the examination. (or some other time if less than the full examination is taken.)
22. When you are done and have turned in your examination, leave the examination area as defined by the examiner. If you are found in this area while the examination is still in progress, your license may be denied or revoked.

QUESTION: 001 (1.00)

The unit is operating at full power when the Reactor Engineer reports to you that the Minimum Critical Power Ratio (MCPR) is 1.030. Your immediate action is to ...[CHOOSE ONE].

- a. commence a reactor shutdown.
- b. insert rods per direction of the Reactor Engineer to increase MCPR to greater than 1.04.
- c. insert rods per direction of the Reactor Engineer to increase MCPR to greater than 1.07.
- d. no action is required since reactor pressure is greater than 800 psig and core flow is greater than 10% of rated.

QUESTION: 002 (1.00)

The "A" CRD pump motor has a yellow tag on it. This tag provides the following information to the operator: [CHOOSE ONE]

- a. Caution must be used when working on the motor.
- b. The motor is safe to work on.
- c. There is an abnormal condition associated with the motor.
- d. Operation of the pump is prohibited.

QUESTION: 003 (1.00)

In accordance with SA-AP.ZZ-015(Q), "Station Safety Tagging Program", WHICH ONE of the following persons is authorized to request a tag be removed from a piece of equipment?

- a. On duty Senior Nuclear Shift Supervisor
- b. Persons on the Approved Tagging List
- c. Persons named on the tag
- d. Operations Manager

QUESTION: 004 (1.00)

In accordance with OP-AP.ZZ-108, "Removal and Return of Equipment to Service", a valid independent verification ^{on a closed gate valve} can be performed ... [CHOOSE ONE].

- a. at the same time by two different persons
- b. at different times by the same person
- c. at different times by two different persons
- d. by two different methods by the same person

QUESTION: 005 (1.00)

OP-AP.ZZ-108, "Removal and Return of Equipment to Service", allows exceptions to the requirement for hands on verification. WHICH ONE of the following is NOT an authorized exception?

- a. When functional testing that tests the entire affected portion of the system is performed.
- b. When personnel hazards are present.
- c. When positive valve position indication is provided in the Control Room.
- d. When exposure rates of greater than 100 mr/hr are present.

QUESTION: 006 (1.00)

Which ONE of the following statements correctly describes the method for performing a second verification on a LOCKED OPEN valve in accordance with OP-AP.ZZ-109, "Equipment Operational Control?"

- a. Unlock the locking device and attempt to move the handwheel or operator in the open direction.
- b. Verify the locking device is properly installed and attempt to move the handwheel or operator in the open direction.
- c. Unlock the locking device and attempt to move the handwheel or operator in the closed direction.
- d. Verify the locking device is properly installed and attempt to move the handwheel or operator in the closed direction.

QUESTION: 007 (1.00)

An equipment operator attempts to close a circuit breaker but the breaker fails to close. WHICH ONE of the following is correct in accordance with OP-AP.ZZ-109, "Equipment Operational Control?"

- a. One additional attempt to close the breaker is allowed prior to performing an inspection.
- b. Two additional attempts to close the breaker are allowed prior to performing an inspection in an emergency situation.
- c. The breaker cubical must be inspected before attempting to close the breaker.
- d. Two additional attempts to close the breaker are allowed if no damage or flags were identified when the breaker cubical was inspected.

QUESTION: 008 (1.00)

On-The-Spot-Changes (OTSCs) can NOT be made to WHICH ONE of the following types of procedures according to SA-AP.22-032, "Review and Approval of Station Procedures and Procedure Revisions"?

- a. Emergency Operating Procedures
- b. Station Administrative Procedures
- c. Surveillance Test Procedures
- d. Integrated Operating Procedures

QUESTION: 009 (2.50)

For each of the conditions listed in Column A, SELECT the type of controlled area from Column B. Items from Column B may be used once, more than once, or not at all.

Column A	Column B
a. 6000 dpm/100 cm ² beta-gamma (loose)	1. Exclusion Area
b. 300 mr/hr	2. Locked High Radiation Area
c. 2000 mr/hr	3. Radiation Area
d. 10 REM/hr	4. High Contamination Area
e. 10 mR/hr	5. High Radiation Area
	6. Contamination Area
	7. Airborne Radioactivity Area

QUESTION: 010 (1.50)

[FILL IN THE BLANKS]

In accordance with SA-AP.ZZ-046(Q), "Radiological Access Control Program", a worker leaving _____ shall perform a whole body frisk which should take at least _____ seconds with the probe held about _____ from the surface being monitored. The background reading should be no more than _____. If the count rate is _____ or the frisker alarms notify _____.

QUESTION: 011 (1.00)

In accordance with SA-SD.ZZ-15, "Control of Compressed Gas Cylinders", WHICH ONE of the following is NOT a safe handling practice?

- a. Valves on hydrogen bottles shall not be cracked to blow out the valve.
- b. Before connecting a regulator to an oxygen bottle, the valve shall be opened and closed immediately.
- c. Only approved adapters shall be used for interchanging cylinders.
- d. Before a regulator is removed from a cylinder valve, the cylinder valve shall be closed and the gas released from the regulator.

QUESTION: 012 (1.00)

WHICH ONE of the following is NOT an item that must be checked before starting a condensate pump to ensure equipment and personnel safety?

- a. Discharge valve is open
- b. Shaft is free to rotate
- c. Oil at proper level in sight glass
- d. Cooling water is available

QUESTION: 013 (1.00)

With respect to electrical safety equipment practices WHICH ONE of the following is NOT a true statement?

- a. Rubber gloves shall be worn for removing potential transformer fuses.
- b. Rubber gloves shall be tested before starting the first job of the day.
- c. The Neon Tube Test Stick shall be used for voltage detection on 7.2 KV equipment and above.
- d. Dielectric footwear shall be worn when performing electrical switching on voltages of 7.2 KV and above.

QUESTION: 014 (1.00)

In accordance with OP-AP.ZZ-002(Q), "Conduct of Operations", a Site Fire Brigade will normally consist of ... [Choose ONE]

- a. 6 qualified brigade members from the Site Protection Organization.
- b. 6 qualified brigade members which can include the STA.
- c. 5 qualified brigade members from the Operations Department.
- d. 5 qualified brigade members of the Plant Staff.

QUESTION: 015 (1.00)

If the RSP-C399 Channel E transfer switch on the Remote Shutdown Panel is placed in EMERGENCY, the status of the SRVs is as follows: [CHOOSE ONE]

- a. F, H and M SRVs are inoperable from the Main Control Room.
- b. F, H and M SRVs are operable from both the Main Control Room and the Remote Shutdown Panel.
- c. A, and E SRVs are inoperable from the Remote Shutdown Panel.
- d. A, and E SRVs are inoperable from the Main Control Room.

QUESTION: 016 (1.00)

The bases for the thermal overload protection bypass circuits on Core Spray motor operated valves (MOV) is ...[CHOOSE ONE].

- a. To protect valve motors from thermal overloads.
- b. To allow periodic testing of the MOV's.
- c. To ensure the valve performs its safety function.
- d. To limit the potential for electrical fires.

QUESTION: 017 (1.00)

If MCC 10B446 experiences a fault and loses its 480 VAC power, WHICH of the following statements is true?

- a. RPS Bus A will lose power in 5 seconds.
- b. RPS Bus B will lose power in 5 seconds.
- c. RPS Bus A will lose power in less than 2 seconds.
- d. RPS Bus B will lose power in less than 2 seconds.

QUESTION: 018 (3.00)

For each parameter listed in Column A, SELECT all the groups from Column B that use this parameter to generate an isolation signal for any or all of the valves in that group. Each group may be used once, more than once, or not at all.

COLUMN A

- a. Drywell pressure
high high [1.68 psig]
- b. Reactor Vessel Water
Level 1 [-129"]
- c. Main Steam Line Rad
high high [3x]
- d. Reactor Vessel Water
Level 2 [-38"]
- e. Main Steam Line Pressure
low [756 psig]
- f. Reactor Building Exhaust
Rad high [1N3 microcuries
per cc]

COLUMN B

- 1. Group 1 [MSIV,MSL
drain and sealing
system]
- 2. Group 2 [Reactor
Recirc water
sample system]
- 3. Group 8 [Torus
water cleanup
system]
- 4. Group 10 [Drywell
coolers]
- 5. Group 11 [Recirc
pump seal water]
- 6. Group 12 [Contain-
ment atmospheric
control system]
- 7. Group 16 [Reactor
auxiliaries cool-
ing system]

QUESTION: 019 (1.00)

While operating at 100% power, a Safety Relief Valve (SRV) fails open. Which ONE of the following is NOT a METHOD to reclose the SRV in accordance with OP-AB.ZZ-121(Q), "Failed Open Safety/Relief Valve?"

- a. Push the SRV OPEN and CLOSE pushbuttons several times.
- b. Remove SRV fuses.
- c. Reduce pressure set.
- d. Reduce instrument gas pressure.

QUESTION: 020 (2.00)

For each of the Emergency Diesel Generators listed in Column A, SELECT all of the loads from Column B that are supplied by that diesel. All items ^{from Column B} should be used once.

Column A (D/G)	Column B (load)
a. Diesel Generator A	1. Control Room Chiller A
b. Diesel Generator B	2. CRD pump B
c. Diesel Generator C	3. Reactor Bldg. Exhaust Fan C
d. Diesel Generator D	4. RCIC
	5. Emergency Instrument Air Compressor
	6. HPCI

QUESTION: 021 (1.00)

When operating at power the wide range level indicator reads _____ the narrow range indicator. WHICH of the following correctly completes this statement?

- a. about 7 inches below
- b. about 7 inches above
- c. about 3 inches above
- d. about the same as

QUESTION: 022 (1.00)

The RHR pump starting sequence after receipt of a LOCA with offsite power available is: [CHOOSE ONE]

- a. A and C RHR pumps start immediately and the B and D pumps start after a 5 second time delay.
- b. A and B RHR pumps start immediately and the C and D pumps start after a 5 second time delay.
- c. A, B, C, and D pumps start as soon as bus voltage is established.
- d. C and D RHR pumps start immediately and the A and B pumps start after a 15 second time delay.

QUESTION: 023 (1.00)

Concerning the Safety Auxiliaries Cooling System (SACS), temperature control system, WHICH ONE of the following parameters is maintained constant when the heat load on the SACS system changes?

- a. SACS heat exchanger SACS water outlet temperature
- b. SACS heat exchanger SACS water inlet temperature
- c. SACS heat exchanger service water outlet temperature
- d. SACS heat exchanger SACS water differential temperature

QUESTION: 024 (1.00)

The Standby Liquid Control System has automatically initiated. WHICH ONE of the following conditions would you NOT expect to see?

- a. Pump AP208 start light on
- b. Squib valve continuity light on
- c. RWCU isolation valve BG-MVF001 closed
- d. Pump and Squib valve keylock switch in "OFF" position

QUESTION: 025 (1.00)

A FRVS Vent Fan has automatically started. WHICH ONE of the following signals ^{alone} could have ^{directly} caused the fan to start?

- a. Drywell temperature of 135 degrees F
- b. Refuel Floor Exhaust isolation (PCIS)
- c. Low flow on the FRVS fan in AUTO
- d. Reactor vessel water level of -38 inches

QUESTION: 026 (1.00)

OP-SO.BB-002(Q), "Reactor Recirculation System Operation" requires the operator to adjust the speed demand signal on the master controller and the loop controller for the associated recirc pump prior to resetting a runback. SELECT the statement that correctly describes this action.

- a. The speed demand on the master controller should be greater than the speed demand on the loop controller.
- b. The speed demand on the loop controller must be matched to the runback setpoint to allow the runback to be reset.
- c. The speed demand on the loop controller should be matched to the speed demand on the master controller to ensure recirculation pump speeds are matched.
- d. The speed demand on the master controller and the loop controller should be lower than the runback setpoint.

QUESTION: 027 (1.00)

The 30% speed limiter on the recirculation pumps is actuated by which ONE of the following conditions?

- a. Total feedwater flow greater than 75% and secondary condensate pump trip signal present.
- b. Total feedwater flow greater than 75% and primary condensate pump trip signal present.
- c. Total feedwater flow greater than 65% and secondary condensate pump trip signal present.
- d. Total feedwater flow greater than 65% and primary condensate pump trip signal present.

QUESTION: 028 (1.00)

WHICH ONE of the following conditions will NOT cause an APRM INOP Trip?

- a. APRM output less than 4%
- b. 12 LPRM inputs to an APRM Channel
- c. Channel mode switch in POWER
- d. Any module in the instrument drawer is unplugged

QUESTION: 029 (1.00)

If the APRM Gain Adjustment Factor (GAF) is 0.99 ...
[CHOOSE ONE].

- a. the indicated power is greater than the actual thermal power
- b. a non-conservative condition exists
- c. the APRM gain should be adjusted
- d. the indicated power should be compared with the power determined by a heat balance

QUESTION: 030 (1.00)

The following plant conditions exist at $T = 0$:

Reactor water level	-135 inches
Reactor pressure	900 psig
Drywell pressure	1.2 psig
All ECCS pumps	running
MSIV's	closed

WHICH ONE of the following is TRUE concerning ADS initiation?

- a. ADS will not initiate until drywell pressure increases above 1.68 psig.
- b. ADS will initiate at $T = 105$ seconds.
- c. ADS will initiate at $T = 405$ seconds.
- d. ADS will initiate at $T = 645$ seconds.

QUESTION: 031 (1.00)

The bases for the Main Steam Line Radiation Limiting Safety System Setting is to detect... [CHOOSE ONE].

- a. corrosion products in the reactor coolant
- b. high reactor coolant activity
- c. gross fuel clad failure
- d. abnormally high area radiation levels

QUESTION: 032 (2.00)

The emergency diesel generators started automatically following loss of voltage on the emergency buses concurrent with an ECCS actuation signal. After two minutes, the "B" diesel generator trips. LIST FOUR diesel generator TRIP SIGNALS that could have caused this trip. (Setpoints not required and assume no operator action.)

QUESTION: 033 (1.00)

The reactor is operating at 50% power. HPCI initiates and injects. Compared to the steady state value at 50% power, WHICH ONE of the following statements is correct for initial parameter change.

- a. Reactor pressure will increase
- b. Total steam flow increases
- c. Reactor water level decreases
- d. Reactor power decreases

QUESTION: 034 (1.00)

When the HPCI Turbine Trip pushbutton is depressed, which of the following valves does NOT close? [CHOOSE ONE]

- a. HPCI pump minimum flow valve (HV-F012)
- b. HPCI pump discharge valve to Core Spray (HV-F006)
- c. HPCI pump discharge isolation valve (HV-F007)
- d. HPCI pump discharge valve to Feedwater (HV-8278)

QUESTION: 035 (1.00)

Reactor vessel STEAM CARRYUNDER... [CHOOSE ONE].

- a. causes an increase in indicated water level.
- b. decreases as reactor water level decreases.
- c. increases jet pump NPSH.
- d. reduces core inlet subcooling.

QUESTION: 036 (1.00)

Increasing reactor power from 60% to 70% using only control rods will ... [CHOOSE ONE].

- a. decrease flow in the higher powered fuel channels only.
- b. increase flow in the lower powered fuel channels only.
- c. increase flow in the higher powered fuel channels only.
- d. provide an insignificant change in flow in the fuel channels.

QUESTION: 037 (1.00)

The scram dump valves ...[CHOOSE ONE].

- a. open to supply pressurized water to the bottom of the drive piston.
- b. open to exhaust water from the top of the drive piston.
- c. open to exhaust air from the diaphragm operated SDV vent and drain valves.
- d. open to exhaust air from the diaphragm operator of the scram inlet and outlet valves.

QUESTION: 038 (1.00)

The Backup Scram Valves are ... [CHOOSE ONE].

- a. normally energized and will de-energize upon a RPS scram signal.
- b. aligned such that two valves in series, one from each RPS trip channel, must actuate to vent the scram air header.
- c. designed such that both RPS channels must trip in order for any one of the valves to actuate.
- d. powered from the RPS Buses A and B.

QUESTION: 039 (1.00)

WHICH of the following effects would throttling closed the CRD Drive/Cooling Water Pressure Control Valve produce?
[CHOOSE ONE]

- a. Decreases the control rods insertion time on a scram.
- b. Increases the control rod withdrawal speed.
- c. Increases the cooling water flow to each CRDM.
- d. Decreases the seal flow to the Recirculation Pumps.

QUESTION: 040 (1.00)

Technical Specifications allow the Main Steam Line (MSL) Radiation Monitor setpoints to be adjusted when the Hydrogen Water Chemistry Injection (HWCI) system is in service. WHICH ONE of the following statements is TRUE concerning the relationship between the MSL Radiation Monitor setpoints and the HWCI system?

- a. MSL Radiation Monitor setpoints must be adjusted prior to placing the HWCI system in service to account for the expected increase in N-16 in the reactor coolant.
- b. MSL Radiation Monitor setpoints do not need to be adjusted if the HWCI system is placed in service after reactor power is raised above 20%.
- c. MSL Radiation Monitor setpoints must be adjusted to minimize the effects of a Control Rod Drop Accident when the HWCI system is in operation.
- d. MSL Radiation Monitor setpoints do not need to be reset to normal if reactor power is reduced to below 10% immediately following termination of hydrogen injection.

QUESTION: 041 (1.00)

A signal is generated that automatically closes HV-F004 (RWCU Outboard Isolation Valve) but HV-F001 (RWCU Inboard Isolation Valve) stays open. WHICH ONE of the following conditions could have caused the isolation?

- a. Redundant Reactivity Control System actuation.
- b. RWCU pump room high ambient temperature.
- c. "A" SLC pump start.
- d. Non-regenerative heat exchanger high outlet temperature.

QUESTION: 042 (1.50)

To start the recirculation pump in an idle loop with the other loop operating requires: [FILL IN THE BLANKS]

- a. coolant temperature difference between reactor vessel steam space and bottom head drain line to be no greater than _____.
- b. coolant temperature difference between the two loops to be no greater than _____.
- c. flow rate in the operating loop to be no greater than _____.

QUESTION: 043 (1.00)

WHICH ONE of the following conditions in the Main Steam Line (MSL) Radiation Monitoring System will initiate automatic actions or isolations? Note: Alarms are not considered automatic actions.

- a. MSL Radiation downscale.
- b. MSL Radiation HIGH.
- c. Detector high current.
- d. Detector high voltage power supply low.

QUESTION: 044 (1.00)

The purpose of the Gaseous Radwaste System pretreatment and post treatment radiation monitors is to ... [CHOOSE ONE].

- a. determine the efficiency of the treatment system.
- b. detect fuel failure.
- c. isolate the effluent stream should system malfunctions occur.
- d. measure the radioactive release rate.

QUESTION: 045 (1.50)

STATE THREE (3) conditions or signals that could cause a Gaseous Radwaste System Recombiner train isolation. Include setpoints if applicable.

QUESTION: 046 (1.00)

F006A (Shutdown cooling suction valve) is to be opened in preparation for commencing shutdown cooling. Which ONE of the following valves does NOT have to be closed to open F006A?

- a. HV-F017A (RHR LPCI Injection Valve)
- b. HV-F027A (Torus Spray isolation)
- c. HV-F004A (RHR pump suction -LPCI mode)
- d. HV-F024A (Test return valve)

QUESTION: 047 (1.00)

An alarm is received on the Fire Protection Status Panel, 10C671. To acknowledge and silence this alarm you would...(CHOOSE ONE).

- a. type ALM and the alpha-numeric identified by the light and printed message
- b. type ACK and the alpha-numeric identified by the light and printed message
- c. type SIL and the alpha-numeric identified by the light and printed message
- d. type BAK and the alpha-numeric identified by the light and printed message

QUESTION: 048 (1.00)

A TIP trace is being taken when an instrument technician error causes actuation of the NSSSS Channel A manual isolation switch. Which ONE of the following correctly describes the response of the TIP system?

- a. The TIP Shear Valve automatically fires to cut the detector cable and seal the guide tube.
- b. The TIP Guide Tube Ball Valve automatically closes, cutting the detector cable and sealing the guide tube.
- c. The TIP detectors not in the "in-shield" position will automatically be withdrawn to their "in-shield" position.
- d. No automatic actions occur when only one channel isolation switch is actuated.

QUESTION: 049 (1.00)

Which ONE of the following conditions would require entry into OP-EO.ZZ-101, "RPV Control"?

- a. Reactor power level of 5% and reactor steam dome pressure of 1025 psig.
- b. Reactor power level of 3% and drywell pressure of 1.72 psig.
- c. Reactor power level of 3% and MSIV's closed.
- d. Reactor power level unknown and drywell temperature of 137 degrees F.

QUESTION: 050 (1.00)

Which ONE of the following conditions would require entry into OP-EO.ZZ-102, "Primary Containment Control"?

- a. Suppression Pool level of 78.0 inches.
- b. Suppression Pool temperature of 90 degrees F.
- c. Primary Containment hydrogen concentration of 3.5%.
- d. Primary Containment oxygen concentration of 2.5%.

QUESTION: 051 (1.00)

Procedure OP-EO.ZZ-101(Q), "Reactor/Pressure Vessel (RPV) Control", step RC-4 requires concurrent execution of the reactor power, RPV water level, and RPV pressure control legs. The bases for concurrent execution is... [CHOOSE ONE]

- a. The parameters are interrelated.
- b. Each parameter is independent of the others.
- c. These three parameters provide RPV protection.
- d. This eliminates operator errors in judgement.

QUESTION: 052 (1.00)

The "Minimum Zero Injection RPV Water Level" referred to in the bases for OP-EO.ZZ-201, "Alternate Level Control" is the ...[CHOOSE ONE].

- a. lowest RPV water level at which adequate core cooling is assured without steam cooling.
- b. lowest RPV water level at which adequate core cooling is assured using steam cooling alone.
- c. lowest RPV water level using steam cooling which precludes clad temperatures from exceeding 2200 degrees F.
- d. lowest RPV water level which allows steam cooling to occur.

QUESTION: 053 (1.00)

The Control Room must be abandoned due to the presence of toxic gas. You direct the operators to perform the Immediate Operator Actions per OP-AB.ZZ-129(Q), "High Radiation, Smoke or Toxic Gases in the Control Room Air Supply", and OP-AB.ZZ-130(Q), "Control Room Evacuation". Which ONE of the following is NOT an IMMEDIATE OPERATOR ACTION required by these procedures?

- a. Scram the reactor
- b. Trip the turbine
- c. Verify that the Control Room Ventilation isolates
- d. Place the Control Room Emergency Filtration System in operation

QUESTION: 054 (1.00)

OP-EO.ZZ-102A, "Primary Containment Control", step SP/L-7 requires a reactor scram if suppression pool level cannot be maintained above 55 inches. CHOOSE the ONE correct statement regarding this level.

- a. At this level concern with uncovering the drywell-to-suppression chamber downcomers is raised.
- b. At this level concern with uncovering the SRV T-quenchers is raised.
- c. At this level concern with uncovering the HPCI turbine exhaust discharge line is raised.
- d. At this level the heat capacity of the suppression pool is inadequate.

QUESTION: 055 (1.00)

In accordance with technical specifications with the reactor in _____, the minimum reactor vessel water level is _____. CHOOSE the set of conditions that correctly completes this statement.

- a. STARTUP, 366.3 inches above level zero
- b. HOT SHUTDOWN, 312 inches above vessel zero
- c. COLD SHUTDOWN, 366.3 inches above vessel zero
- d. REFUEL, 312 inches above level zero

QUESTION: 056 (1.00)

WHICH of the following statements describes WHY all control rods are checked to be inserted to or beyond notch 02 during implementation of the EOPs?

- a. To verify reactor power is less than 3%.
- b. To ensure the reactor will remain shutdown during cooldown.
- c. To determine if the SCRAM can be reset.
- d. To confirm that SBLC injection is not needed.

QUESTION: 057 (1.00)

OP-EO.ZZ-100(Q), "Reactor Scram", step S-2 requires the operator to place the MODE SWITCH in SHUTDOWN. STATE the TWO purposes for this action.

QUESTION: 058 (1.00)

Drywell pressure is 1.3 psig and increasing. In accordance with OP-AB.ZZ-201(Q), "Drywell High Pressure/Loss of Drywell Cooling", WHICH one of the following is an appropriate IMMEDIATE OPERATOR ACTION?

- a. Isolate drywell cooling.
- b. Terminate drywell inerting.
- c. Isolate instrument gas.
- d. Ensure the reactor scrams.

QUESTION: 059 (2.00)

When all of the Remote Shutdown Panel Transfer Switches are placed in the Emergency position, TRIPS and AUTOMATIC STARTS are bypassed on selected components and systems. LIST ALL the COMPONENTS and SYSTEMS that are affected by the transfer.

QUESTION: 060 (1.00)

In accordance with OP-AP.ZZ-002(Q), "Conduct of Operations," WHICH ONE of the following conditions would require that the reactor be shutdown? Assume reactor power is 100% unless otherwise noted.

- a. Following a recirculation pump trip, reactor power is 30% of rated and core flow is 35% of rated.
- b. The reactor is at 50% power with one recirculation pump out of service and the latest P-1 indicates the MCPR is 1.07.
- c. Following a transient that resulted in a peak reactor steam dome pressure of 1035 psig, an I&C technician reports that calibration errors have been found in pressure transmitters PT-N078 A, B, C & D. The errors resulted in the transmitters reading higher than actual.
- d. Main Steam Line Radiation levels are increasing and it appears they will reach the scram setpoint in approximately one hour.

QUESTION: 061 (2.00)

PROVIDE the reactor pressure setpoint for the Trip/Actuation conditions listed below.

- a. ADS Safety Relief function _____ psig
- b. Lowest Safety Relief Valves _____ psig
- c. RRCS High Pressure Actuation _____ psig
- d. RPS High Pressure Scram _____ psig

QUESTION: 062 (3.00)

For each of the component or system exhausts listed in Column A, SELECT the ventilation exhaust point from Column B that is the release path for the exhaust. The ventilation exhaust points in Column B may be used once, more than once, or not at all.

Column A	Column B
a. Gaseous Radwaste	1. South Stack
b. Turbine Bldg. Exhaust	2. North Stack
c. Filtration, Recirculation and Ventilation Exhaust	3. Reactor Building Vent
d. Solid Radwaste Exhaust	4. Turbine Building Vent
e. Chem Lab Exhaust	
f. Mechanical Vacuum Pump Discharge	

QUESTION: 063 (2.00)

All low pressure ECCS pumps are running, and five (5) SRVs are open.

An accident has occurred and OP-EO.22-201, "Alternate Level Control" is being performed. For each of the conditions in Column A, SELECT the ^{ONE} appropriate action from Column B that should be performed. The actions in Column B may be used once, more than once, or not at all.

Column A

- a. RPV water level cannot be determined
- b. RPV water level is increasing
- c. RPV water level drops below -129 inches
- d. Primary Containment water level cannot be maintained below 93 feet

Column B

- 1. Exit EO-201 and enter EO-101, "RPV Control"
- 2. Exit EO-201 and enter EO-206, "RPV Flooding"
- 3. Exit EO-201 and enter EO-207, "Rx Level/Power Control"
- 4. Terminate injection from sources outside Primary Containment
- 5. Emergency Depressurize
- 6. Inhibit ADS

QUESTION: 064 (1.00)

The unit is operating at 100% power when the operator notices a decreasing feedwater temperature and increasing reactor power. In accordance with OP-AB.ZZ-118(Q), "Loss of Feedwater Heaters", WHICH ONE of the following is an IMMEDIATE OPERATOR ACTION?

- a. Runback recirculation flow to reduce thermal power to 90%.
- b. Maximize Feedwater heating.
- c. Insert rods to reduce thermal power to 90%.
- d. Enter OP-AB.ZZ-300, "Reactor Power Oscillations".

QUESTION: 065 (1.00)

SELECT the appropriate emergency classification based on the following information.

During refueling, the refuel floor SRO reports that a fuel bundle has been dropped. The Refuel Floor Exhaust Duct Radiation Monitors R9627, R9628 and R9629 are reading 1500 times normal. Projected whole body dose rates for the release at the Minimum Exclusion Area are 250 mr/hr for 40 minutes.

- a. Unusual Event
- b. Alert
- c. Site Area Emergency
- d. General Emergency

QUESTION: 066 (1.00)

SELECT the appropriate emergency classification based on the following information.

A confirmed sample analysis indicates that gaseous release rates have been $3.0\text{E}+4$ microcuries/second Noble Gases and $3.0\text{E}+2$ microcuries/second I-131 for the past 30 minutes.

- a. Unusual Event
- b. Alert
- c. Site Area Emergency
- d. No classification required

QUESTION: 067 (1.00)

Step RC/Q-6 of OP-EO.ZZ-101, "Reactor/Pressure Vessel (RPV) Control", directs the operator to enter OP-EO.ZZ-207, "Level/Power Control" and execute it concurrently with WHICH of the following?

- a. RC/Q, RC/L, and RC/P legs
- b. RC/Q and RC/L legs
- c. RC/L and RC/P legs
- d. RC/Q and RC/P legs

QUESTION: 068 (1.00)

OP-EO.22-101, "RPV Pressure Control", Step RC/P-11 directs the operator to stabilize RPV pressure below 1037 psig with the main turbine bypass valves. WHICH ONE of the following statements is NOT a bases for this pressure limit?

- a. The step eliminates further SRV operation.
- b. The step implies bypassing isolation sig..als to the MSIV's as necessary.
- c. The step preserves the heat capacity of the suppression pool.
- d. The step simplifies RPV level control.

QUESTION: 069 (1.00)

deleted

OP-EO.22-102, "Drywell Pressure Control", states that the drywell shall be vented irrespective of off-site radioactive release when specified conditions have been met. SELECT the conditions that require drywell venting from those listed below.

- a. Drywell pressure reaches 55 psig.
- b. Drywell pressure cannot be maintained less than 55 psig.
- c. Drywell pressure reaches 65 psig.
- d. Drywell pressure cannot be maintained below 65 psig.

QUESTION: 070 (1.00)

deleted

During a plant shutdown with reactor pressure at 65 psig it is discovered that the Shutdown Cooling System can not be placed in service and the recirculation pumps are not available. In accordance with OP-IO.22-004(Q), "Shutdown From Rated Power to Cold Shutdown", you direct the reactor operator to maintain reactor water level [CHOOSE ONE]...

- a. at the top of the steam dryer
- b. at the bottom of the predryer
- c. at the top of the main steam lines
- d. at the bottom of the steam separator

QUESTION: 071 (1.00)

During 100% power operations, the Off Gas Recombiner Train automatically isolates. In accordance with OP-AB.ZZ-128(R), "Off Gas System Malfunction", WHICH ONE of the following is an Immediate Operator Action?

- a. Determine if an explosion or fire has occurred in the system.
- b. Remove the steam jet air ejector from service.
- c. Maximize circulating water flow.
- d. Place the standby recombining train in service.

QUESTION: 072 (1.00)

In accordance with OP-AB.ZZ-105(Q), "Loss of CRD Regulating Function", which ONE of the following conditions requires the operator to manually scram the reactor?

- a. Reactor pressure is 860 psig and more than one accumulator alarm is present.
- b. Reactor pressure is 860 psig and charging water header pressure can not be restored within 20 minutes.
- c. Reactor pressure is 980 psig and more than one accumulator alarm present.
- d. Reactor pressure is 980 psig and charging water header pressure can not be restored within 20 minutes.

QUESTION: 073 (1.00)

Following a main generator load rejection at full power, a reactor scram is initiated to reduce reactor power in anticipation of a ...[CHOOSE ONE]

- a. reactor water level increase.
- b. reactor water level decrease.
- c. reactor pressure increase.
- d. reactor pressure decrease.

QUESTION: 074 (1.00)

Which ONE of the following conditions would NOT require entry into OP-EO.ZZ-103, "Reactor Building Control?"

- a. Reactor Building Differential Pressure of 0.5 inches of water.
- b. RADIATION MONITORING ALARM/TBL alarm window lit due to high rad levels in the vicinity of the Reactor Cleanup Demineralizer System Equipment.
- c. Refuel Floor HVAC Exhaust Radiation levels of 1.1 E-4 microcuries per ml.
- d. CRD Pump Room water level above the Max Normal Floor Level.

QUESTION: 075 (1.00)

Following a trip of both recirculation pumps, there is a potential for thermal hydraulic instability. SELECT the statement that correctly describes the indications of thermal hydraulic instability in accordance with OP-AB.ZZ-300(Q), "Reactor Power Oscillations".

- a. The APRM's oscillating at greater than 5% peak to peak or periodic LPRM upscale or downscale alarms.
- b. The APRM's oscillating at greater than 10% peak to peak or periodic LPRM upscale or downscale alarms.
- c. The APRM's oscillating at greater than 5% peak to peak and periodic LPRM upscale and downscale alarms.
- d. The APRM's oscillating at greater than 10% peak to peak and periodic LPRM upscale and downscale alarms.

QUESTION: 076 (1.00)

WHICH of the following statements correctly describes the plant response to a jet pump failure?

- a. Reactor power decreases and recirculation drive flow increases.
- b. Reactor power increases and recirculation drive flow increases.
- c. Reactor power increases and recirculation drive flow decreases
- d. Reactor power decreases and recirculation drive flow decreases.

QUESTION: 077 (1.00)

OP-EO.22-103, "Secondary Containment Control", requires a rapid depressurization of the RPV if the Maximum Safe Operating Temperature is exceeded for more than one area. SELECT the BASES for this depressurization.

- a. Based on rejecting the energy from the RPV to the suppression pool.
- b. Based on the potential for inoperable safety related equipment and loss of secondary containment integrity.
- c. Based on protecting personnel from high temperature environments while operating equipment.
- d. Based on the potential for fire damage to equipment, instrumentation and controls.

QUESTION: 078 (1.00)

The plant is operating at 100% power, when a complete loss of instrument air occurs. CHOOSE the ONE statement below that correctly describes the expected system response. Loss of instrument air will...

- a. cause a slow closure of the Inboard MSIV's.
- b. cause condenser vacuum to decrease and trip the Gaseous Radwaste System.
- c. cause the hydrogen-oxygen injection valves to fail "as is".
- d. cause a loss of CRD flow.

QUESTION: 079 (1.00)

OP-EO.ZZ-102, "Primary Containment Control", step SP/L-7 directs the operator to maintain suppression pool level below 125 inches. WHICH ONE of the following correctly describes the bases for this limit?

- a. Opening an SRV above this limit could result in exceeding the hydrodynamic loading capability of the SRV tailpipe and T-quencher.
- b. Level is maintained below this limit to ensure that the suppression chamber-to-drywell vacuum breakers are not submerged.
- c. Above this level suppression chamber sprays are no longer effective.
- d. Above this level the capability of the primary containment vent is no longer effective.

QUESTION: 080 (1.00)

Actions to mitigate reactor power oscillations at high power/low flow conditions are taken to prevent exceeding WHICH of the following thermal limits?

- a. MCPR
- b. LHGR
- c. APLHGR
- d. PCIOMR

QUESTION: 081 (1.00)

As stated in OP-AB.ZZ-145(Q), "Stator Cooling Malfunction", upon loss of stator cooling water flow, the operator is to ... [CHOOSE ONE]

- a. trip the main turbine
- b. runback the recirculation flow
- c. insert control rods
- d. enter OP-AB.ZZ-300, "Reactor Power Oscillations"

QUESTION: 082 (2.00)

For each of the automatic actions in Column A, SELECT the appropriate condenser vacuum setpoint from Column B. Each value in Column B may be utilized once, more than once, or not at all.

COLUMN A

COLUMN B

- | | |
|---------------------------|---------------------|
| a. MSIV Closure | 1. 4.5 inches Hg A |
| b. Main Turbine Trip | 2. 5.8 inches Hg A |
| c. Bypass Valve Closure | 3. 7.5 inches Hg A |
| d. Reactor Feed Pump Trip | 4. 10.0 inches Hg A |
| | 5. 21.5 inches Hg A |
| | 6. 22.9 inches Hg A |

QUESTION: 083 (1.00)

OP-EO.ZZ-103, "Reactor Building Control", step RB/T-9, requires isolating all systems discharging into an area that exceeds its Maximum Normal Operating Temperature with several exceptions. WHICH ONE of the following is NOT one of those exceptions?

- a. Systems required to protect primary containment integrity
- b. Systems required to shutdown the reactor
- c. Systems required to provide cooling water for equipment protection
- d. Systems required to suppress a fire

QUESTION: 084 (1.00)

Which ONE of the following would NOT be a symptom associated with high reactor water level?

- a. Controlling level signal fails low.
- b. Reactor steam flow less than feed flow.
- c. Reactor Feed Pump Lockup.
- d. Decrease in reactor power.

QUESTION: 085 (1.00)

A malfunction of the 125 VDC System occurs. Based upon OP-AB.ZZ-150(Q), "125 VDC System Malfunction", WHICH ONE of the following would you expect to occur?

- a. Inability to operate RCIC components.
- b. Turbine Generator EBOP trip/trouble.
- c. Reactor Recirculation MG Set Emergency Lube Oil Pump trip/trouble.
- d. Inability to operate electrical breakers.

QUESTION: 086 (1.00)

The Level 8 trip signal is provided to ... [CHOOSE ONE].

- a. prevent damage to SRV's from potential two phase flow
- b. trip the HPCI/RCIC turbines to prevent turbine blade damage.
- c. trip the reactor feedpump turbine to prevent overfilling the reactor vessel.
- d. protect the MSIV's from water damage.

QUESTION: 087 (1.00)

WHICH of the following is the bases for the Technical Specification limit on drywell average air temperature?

- a. Safety equipment inside the drywell has not been environmentally qualified for higher temperatures.
- b. The drywell cooling equipment has been designed for operation below the Tech Spec limit.
- c. To keep from exceeding containment design temperature during a LOCA.
- d. Is consistent with the safety analysis for a transient with stuck open safety valve.

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

SENIOR REACTOR OPERATOR

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ANSWER: 001 (1.00)

a.

[1.00]

REFERENCE:

1. LP 302H-000.00H-110-04
Obj. 1, 2
2. Technical Specifications, section 2
3. KA 294001 A115/3.4
294001A115 ..(KA's)

ANSWER: 002 (1.00)

b.

[1.00]

REFERENCE:

1. LP 302H-000.00H-113-01 Obj. H.1.f
2. SA-AP.ZZ-015(Q), "Station Safety Tagging Program"
3. KA 294001 K102/4.5
294001K102 ..(KA's)

ANSWER: 003 (1.00)

c.

[1.00]

REFERENCE:

1. LP 302H-000.00H-113-01 Obj. H.3
2. SA-AP.ZZ-015, pg 17
3. KA 294001 K102/4.5
294001K102 ..(KA's)

ANSWER: 004 (1.00)

c.

[1.00]

REFERENCE:

1. LP 302HC-000.00-113C-00
Obj. 5
2. OP-AP.ZZ-108
3. KA 294001 K101/3.7
294001K101 ..(KA's)

ANSWER: 005 (1.00)

d.

[1.00]

REFERENCE:

1. LP 302HC-000.00-113C-00
Obj. 6
2. OP-AP.ZZ-108, pg 11
3. KA 294001 K101/3.7
294001K101 ..(KA's)

ANSWER: 006 (1.00)

d.

[1.00]

REFERENCE:

1. LP 302HC-000.00-113C-00
Obj. 10b
2. OP-AP.ZZ-109, pg 6
3. KA 294001 K101/3.7
294001K101 ..(KA's)

ANSWER: 007 (1.00)

c.

[1.00]

REFERENCE:

1. LP 302HC-000.00-113C-00
Obj. 17, 18
2. OP-AP.ZZ-109, pgs 8 and 9
3. KA 294001 K107/3.6
294001K107 ..(KA's)

ANSWER: 008 (1.00)

b. [1.00]

REFERENCE:

1. LP 302H-000.00H-113-01
Obj. C.1
2. SA-AP.ZZ-032
3. KA 294001 A101/3.4
294001A101 ..(KA's)

ANSWER: 009 (2.50)

- a. 6
- b. 5
- c. 2 (5)
- d. 1 (2,5)
- e. 3

[0.50 each]

REFERENCE:

1. LP 301HC-000.00-113i
Obj. 1
2. SA-AP.ZZ-046
3. KA 294001 K103/3.8
294001K103 ..(KA's)

ANSWER: 010 (1.50)

- a. the Radiation Control Area (RCA)
- b. 120
- c. 1/2 inch
- d. 300 cpm
- e. > 100 cpm above background
- f. Radiation Protection Personnel

[0.25 each]

REFERENCE:

- 1 LP 301HC-00.00-113i
Obj. 7, 8, 15, 16
- 2. SA-AP.ZZ-046(Q)
- 3 KA 294001 K103/3.8
294001K103 ..(KA's)

ANSWER: 011 (1.00)

c.

[1.00]

REFERENCE:

- 1. none
- 2. SA-SD.ZZ-15, "Control of Compressed Gas Cylinders,
Attachment 2, Section 3"
- 3. KA 294001 K109/3.8 K115/3.8
294001K115 294001K109 ..(KA's)

ANSWER: 012 (1.00)

a.

[1.00]

REFERENCE:

- 1. LP 302HC-000.00-113C-00
Obj. 20
- 2. OP-AP.ZZ-109 (para.5.5.3)
- 3. KA 294001 K106/3.4
294001K106 ..(KA's)

ANSWER: 013 (1.00)

d.

[1.00]

REFERENCE:

1. LP 302H-000.00H-65-06 (Attachment 1)
2. none
3. KA 294001 K107/3.6
294001K107 ..(KA's)

ANSWER: 014 (1.00)

a.

[1.00]

REFERENCE:

1. LP 301HC-00.00-0AP01-01
2. OP-AP.ZZ-002(Q)
3. KA 294001 K116/3.8
294001K116 ..(KA's)

ANSWER: 015 (1.00)

a.

[1.00]

REFERENCE:

1. LP 302H-000.00H-046-06
Obj. 5d
2. none
3. KA 239002 K405/3.7 A401/4.4
239002A401 239002K405 ..(KA's)

ANSWER: 016 (1.00)

c.

[1.00]

REFERENCE:

1. LP 302H-000.00H-027-07
Obj. 9c
2. none
3. KA 209001 A301/3.6
209001A301 ..(KA's)

ANSWER: 017 (1.00)

c. ~~a~~

[1.00]

REFERENCE:

1. LP 302H-000.00H-022-06
Obj. 3, 4
2. none
3. KA 212000 K601/3.8
212000K601 ..(KA's)

ANSWER: 018 (3.00)

- | | | |
|----------------|------------|-----------------------------|
| a. 1,3,4,5,6,7 | b. 1,4,5,7 | c. 1,2 |
| d. 1,2,3,6 | e. 1 | f. 1,3,6 [0.50 each letter] |

REFERENCE:

1. LP 302HC-000.00044 Obj. 8
2. KA 223002 K101/3.9 K106/3.2 K110/3.2 K119/2.9 A102/3.7
223002K110 223002K106 223002K101 ..(KA's)

ANSWER: 019 (1.00)

d.

[1.00]

REFERENCE:

1. LP 302H-000.00H-000114-02
Obj. 1
2. OP-AB.ZZ-121(Q)
3. KA 239002 A203/4.2
239002A203 ..(KA's)

ANSWER: 020 (2.00)

- | | |
|--------|-------------|
| a. 5,6 | [0.25 each] |
| b. 4 | [0.50] |
| c. 1 | [0.50] |
| d. 2,3 | [0.25 each] |

REFERENCE:

1. LP 302H-000.00H-066-09
Obj. 2, 3
2. none
3. KA 264000 K303/4.2
262001 K101/4.3
262001K101 264000K303 ..(KA's)

ANSWER: 021 (1.00)

- | | |
|----|--------|
| a. | [1.00] |
|----|--------|

REFERENCE:

1. LP 302HC-000.00-002-05
Obj. 9
2. none
3. KA 216000 K509/2.9 A301/3.4
216000A301 216000K509 ..(KA's)

ANSWER: 022 (1.00)

- | | |
|----|--------|
| b. | [1.00] |
|----|--------|

REFERENCE:

1. LP 302H-000.00H-028-07
Obj. 6
2. none
3. KA 203000 A302/3.9
203000A302 ..(KA's)

ANSWER: 023 (1.00)

a.

[1.00]

REFERENCE:

1. LP 302HC-000.00-080-3
Obj. 8
2. none
3. KA 264000 K607/3.9
264000K607 ..(KA's)

ANSWER: 024 (1.00)

b.

[1.00]

REFERENCE:

1. LP 302H-000.00H-023-06
Obj. 1
2. none
3. KA 211000 A109/4.1
211000A109 ..(KA's)

ANSWER: 025 (1.00)

d.

[1.00]

REFERENCE:

1. LP 302H-000.00H-042-05
Obj. 7
2. none
3. KA 261000 K401/3.8
261000K401 ..(KA's)

ANSWER: 026 (1.00)

d.

[1.00]

REFERENCE:

1. LP 302H-000.00H-020-08
Obj. 11
2. OP-SO.BB-002, Reactor Recirculation System Operation",
pgs 16 and 17
3. KA 202002 K402/3.0
202002K402 ..(KA's)

ANSWER: 027 (1.00)

b.

[1.00]

REFERENCE:

1. LP 302H-000.00H-020-08
Obj. 9
2. none
3. KA 202002 K108/3.2 K406/3.1
259001 K411/3.5
259001K411 202000K406 202002K108 ..(KA's)

ANSWER: 028 (1.00)

a.

[1.00]

REFERENCE:

1. LP 302H-000.00H-016-04
Obj. 8b
2. none
3. KA 215005 K401/3.7
215005K401 ..(KA's)

ANSWER: 029 (1.00)

a.

[1.00]

REFERENCE:

1. LP 302H-000.00H-016-04
Obj. 6
2. none
3. KA 215005 A107/3.4
215005A107 ..(KA's)

ANSWER: 030 (1.00)

C.

[1.00]

REFERENCE:

1. LP 302HC-000.00-029-06
Obj. 4
2. none
3. KA 218000 K501/3.8 A402/4.2
218000A402 218000K501 ..(KA's)

ANSWER: 031 (1.00)

C.

[1.00]

REFERENCE:

1. LP 302H-000.00H-110-04
Obj. 7
2. T. S. section 2.6
3. KA 212000 G006/4.3
272000 G006/3.7
272000G006 212000G006 ..(KA's)

ANSWER: 032 (2.00)

1. engine overspeed
 2. generator differential current
 3. generator overcurrent
 4. bus differential current
 5. low lube oil pressure
- [any 4 of 5 for 0.5 each]

REFERENCE:

1. LP 302H-000.00H-068-08
Obj. 7
2. none
3. KA 264000 K402/4.2
295003 A102/4.3 A201/3.7
295003A201 295003A102 264000K402 ..(KA's)

ANSWER: 033 (1.00)

b. d. ^{for 4/30/90}

Question deleted ^{for 6/18/90} - Wording of question caused confusion [1.00]

REFERENCE:

1. LP 302HC-00.00-026-04
Obj. 10, 12
2. none
3. KA 206000 K102/4.1 K103/3.8
206000K102 206000K103 ..(KA's)

ANSWER: 034 (1.00)

c.

[1.00]

REFERENCE:

1. LP 302H-000.00H-026-09
Obj. 7
2. none
3. KA 206000 K401/3.9 A108/4.0 A201/4.0 A412/3.9
206000A201 206000A108 206000K401 ..(KA's)

ANSWER: 035 (1.00)

d.

[1.00]

REFERENCE:

1. LP 302HC-000.00-002-05
Obj. 4d
2. none
3. KA 290002 K102/3.2 K115/3.5
290002K115 290002K102 ..(KA's)

ANSWER: 036 (1.00)

d.

[1.00]

REFERENCE:

1. LP 302H-000.00H-001-05
Obj. 8
2. none
3. KA 290002 K403/3.3
290002K403 ..(KA's)

ANSWER: 037 (1.00)

c.

[1.00]

REFERENCE:

1. LP 302H-000.00H-006-04
Obj. 11a, b, c & d, 3g
2. none
3. KA 201001 K406/3.9
201001K406 ..(KA's)

ANSWER: 038 (1.00)

c.

[1.00]

REFERENCE:

1. LP 302H-000.00H-006-04
Obj. 11a, b, c, d and f
2. none
3. KA 201001 K404/3.8 212000 K106/3.6
212000K106 201001K404 ..(KA's)

ANSWER: 039 (1.00)

b.

[1.00]

REFERENCE:

1. LP 302H-000.00H-006-04
Obj. 7
2. none
3. KA 201001 G007/3.7
201001G007 ..(KA's)

ANSWER: 040 (1.00)

a.

[1.00]

REFERENCE:

1. LP 302H-000.00H-225-00
Obj. 7i
2. none
3. KA 272000 G005/3.9 A207/2.8
272000A207 272000G005 ..(KA's)

ANSWER: 041 (1.00)

d.

[1.00]

REFERENCE:

1. LP 302HC-000.00-021-05
Obj. 6b
2. none
3. KA 204000 A303/3.6
204000A303 ..(KA's)

ANSWER: 042 (1.50)

- a. 145 degrees F
- b. 50 degrees F
- c. 50% of rated loop flow [0.50 each]

REFERENCE:

1. LP 302H-000.00H-019-08
Obj. 13, 19
2. OP-SO.BB-002, "Reactor Recirculation System Operation"
3. KA 202001 K410/3.4 G013/3.4
202001G013 202001K410 ..(KA's)

ANSWER: 043 (1.00)

- d. [1.00]

REFERENCE:

1. LP 302H-000.00H-221-02
Obj. 2a
2. none
3. KA 272000 A301/3.9
272000A301 ..(KA's)

ANSWER: 044 (1.00)

- a. [1.00]

REFERENCE:

1. LP 302H-000.00H-54-04
Obj. 11h
2. none
3. KA 271000 A307/3.6 A112/3.5
271000A112 271000A307 ..(KA's)

ANSWER: 045 (1.50)

1. recombiner outlet temperature high (.25), 900 degrees F (.25)
2. feed gas cooler condenser outlet temperature high (.25), 200 degrees F (.25)
3. recombiner strip heater control not in operate or Recombiner Heater off (.50)
4. manual pushbutton (.50)

[any 3 of 4]

REFERENCE:

1. LP 302H-000.00H-054-04
Obj. 13a, b
2. none
3. KA 271000 A301/3.3 K408/3.3
271000K408 271000A301 ..(KA's)

ANSWER: 046 (1.00)

a.

[1.00]

REFERENCE:

1. LP 302H-000.00H-028-07
Obj. 9a
2. none
3. KA 205000 K403/3.8 K502/2.9
205000K403 205000K502 ..(KA's)

ANSWER: 047 (1.00)

b.

[1.00]

REFERENCE:

1. LP 302HC-000.00-094-01
Obj. 7
2. OP-AR.QK-001
3. KA 286000 A401/3.2
286000A401 ..(KA's)

ANSWER: 048 (1.00)

c.

[1.00]

REFERENCE:

1. LP 302H-000.00H-018-05
Obj. 6
2. none
3. KA 215001 K401/3.5 A201/2.9
215001A201 215001K401 ..(KA's)

ANSWER: 049 (1.00)

b.

[1.00]

REFERENCE:

1. LP 302HC-000.00-124A-04 Obj. 2
302HC-000.00-124B-03 Obj. 2
2. OP-EO.ZZ-101
3. KA 295024 G011/4.5
295037 G011/4.7
295024G011 295037G011 ..(KA's)

ANSWER: 050 (1.00)

c.

[1.00]

REFERENCE:

1. LP 302HC-000.00-125A Obj. 2
 302HC-000.00-125B Obj. 2
 302HC-000.00-126C Obj. 2
2. OP-EO.ZZ-102
3. KA 295026 G011/4.6
 295029 G011/4.5
 295030 G011/4.5
 295026G011 295030G011 295029G011 ..(KA's)

ANSWER: 051 (1.00)

a. [1.00]

REFERENCE:

1. LP 302HC-000.00H-124A-05
 Obj. 6
2. OP-EO.ZZ-101(Q)
3. KA 295025 K209/3.9 K211/3.6
 295031 K103/4.1 K202/3.9
 295025K211 295025K209 ..(KA's)

ANSWER: 052 (1.00)

b. [1.00]

REFERENCE:

1. LP 302H-000.00H-129-05
 Obj. 4 & 5
2. OP-EO.ZZ-201
3. KA 295031 G007/4.0 K101/4.7 K304/4.3
 295031K304 295031K101 295031G007 ..(KA's)

ANSWER: 053 (1.00)

c. [1.00]

REFERENCE:

1. LP 302H-000.00H-000114-02
Obj. 1
2. OP-AB.ZZ-129(Q) OP-AB.ZZ-130(Q)
3. KA 295016 G010/3.6
295016G010 ..(KA's)

ANSWER: 054 (1.00)

a.

[1.00]

REFERENCE:

1. LP 302H-000.00H-125B-04
Objs. 3 and 6
2. OP-EO.ZZ-102A
3. KA 295030 A201/4.2
295030A201 ..(KA's)

ANSWER: 055 (1.00)

c.

[1.00]

REFERENCE:

1. LP 302H-000.00H-110-04 Obj. 1
LP 302HC-000.00-002-05, Fig 3
2. T.S. Safety Limit 2.1.4
3. KA 295031 G003/4.3
295031G003 ..(KA's)

ANSWER: 056 (1.00)

b.

[1.00]

REFERENCE:

1. LP 302H-000.00H-124B-05
Obj. 8
2. OP-OE.ZZ-101
3. KA 295015 K102/4.1 G007/3.5
295015K102 295015G007 ..(KA's)

ANSWER: 057 (1.00)

1. Inserts a backup scram signal in the RPS (which could terminate an ATWS event.) [0.5]
2. Bypasses the MSIV closure on low steam line pressure (which allows the MSIV's to remain open.) [0.5]

REFERENCE:

1. LP 302H-000.00H-123-04
Obj. 4
2. OP-EO.ZZ-100(Q)
3. KA 295006 G010/4.2
295006G010 ..(KA's)

ANSWER: 058 (1.00)

b. [1.00]

REFERENCE:

1. LP 302H-000.00H-00114-02
Obj. 1
2. OP-AB.ZZ-201(Q)
3. KA 295010 G010/3.9
295010G010 ..(KA's)

ANSWER: 059 (2.00)

1. Station Auxiliaries Cooling System (SACS) pumps B and D
2. Station Service Water System System (SSWS) pumps B and D.
3. Residual Heat Removal (RHR) System pump B
4. Reactor Core Isolation Cooling (RCIC) System [0.50 each]

('B' Reactor Pump trip on discharge valve closure)
(SRVs F, H, M)
(Chilled Water B)

REFERENCE:

1. LP 302HC-000.00-112H-00
Obj. 6
2. OP-IO.ZZ-008(Q)
3. KA 295016 A107/4.3
295016A107 ..(KA's)

ANSWER: 060 (1.00)

b. (Safety Limit Exceeded)

[1.00]

REFERENCE:

1. LP 302HC-000.00-116-01
Obj. 10
2. OP-AP.ZZ-002(Q)
3. KA 295006 G008/4.3
295006G008 ..(KA's)

ANSWER: 061 (2.00)

a. 1130 psig

b. 1108 psig

c. 1071 psig

d. 1037 psig

[0.50 each]

REFERENCE:

1. LP 302HC-00.00H-002-05
Obj. 7
LP 302H-000.00H-46-06
Obj. 5f
2. none
3. KA 295025 K201/4.1 K203/4.3 K205/4.2
295025K205 295025K203 295025K201 ..(KA's)

ANSWER: 062 (3.00)

a. 2 d. 2

b. 1 e. 2

c. 3 f. 1

[0.50 each]

REFERENCE:

1. LP 302H-000.00H-042-05
Obj's. 2, 14
LP 302H-000.00H-054-04
Obj's. 14, 15
2. FSAR 11.3, 9.4
3. KA 295017 K204/3.3 K302/3.9
288000 K102/3.4 K103/3.7 A204/3.8
288000K102 295017K302 295017K204 .. (KA's)

ANSWER: 063 (2.00)

- a. 2 c. 6
b. 1 d. 4 [0.50 each]

REFERENCE:

1. LP 302H-000.00H-129-05 Obj. 6
2. OP-EO.ZZ-201, "Alternate Level Control"
3. KA 295031 K208/4.3 G012/4.5 K201/4.4
295031G012 295031K208 295031K201 .. (KA's)

ANSWER: 064 (1.00)

- d. [1.00]

REFERENCE:

1. LP 302H-000.00H-000114-02
Obj. 1
2. OP-AB.ZZ-118(Q)
3. KA 295014 G010/3.9
295014G010 .. (KA's)

ANSWER: 065 (1.00)

- c. b. (Alert) [1.00]

REFERENCE:

1. LP 215-002H-00-03
Obj. 3.1
2. Hope Creek Event Classification Guide, Sections 5 and 7
3. KA 295023 G002/4.5 294001 A116/4.7
294001A116 295023G002 ..(KA's)

ANSWER: 066 (1.00)

b.

[1.00]

REFERENCE:

1. LP 215-002H-00-03
Obj. 3.1
2. Hope Creek Event Classification Guide, Section 7
3. KA 295038 G002/4.7 294001 A116/4.7
294001A116 295038G002 ..(KA's)

ANSWER: 067 (1.00)

d.

[1.00]

REFERENCE:

1. LP 302H-000.00H-124B-05
Obj. 8
2. OP-EO.ZZ-101
3. KA 295037 K303/4.5 G012/4.6
295037G012 295037K303 ..(KA's)

ANSWER: 068 (1.00)

b.

[1.00]

REFERENCE:

1. LP 302-H-000.00H-124C-05
Obj. 8
2. OP-EO.ZZ-101
3. KA 295025 G007/3.7
295025G007 ..(KA's)

SENIOR REACTOR OPERATOR

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ANSWER: 069 (1.00)

d.

OMIT
QUESTION

- Incorrect procedure titled
taken from Lesson Plan and
used.

[1.00]

REFERENCE:

1. LP 302H-000.00H-126B-04
Obj. 6
2. OP-Eo.ZZ-102
3. KA 295024 K307/4.0
295024K307 ..(KA's)

ANSWER: 070 (1.00)

b.

delebrated
due to facility
comment

[1.00]

REFERENCE:

1. LP 302HC-000.00H-11.2D-01
Obj. 8
2. OP-IO.ZZ-004(Q)
3. KA 295021 K301/3.4
295021K301 ..(KA's)

ANSWER: 071 (1.00)

c.

REFERENCE:

1. LP 302H-000.00H-00114-02
Obj. 1
2. OP-AB.ZZ-128(R)
3. KA 295002 G010/3.7
295002G010 ..(KA's)

ANSWER: 072 (1.00)

d.

[1.00]

REFERENCE:

1. LP 302HC-000.00-006
Obj. 14
2. OP-AB.ZZ-105(Q)
3. KA 295022 G010/3.5
295022G010 ..(KA's)

ANSWER: 073 (1.00)

c.

[1.00]

REFERENCE:

1. LP 302HC-000.00-48
Obj. 10b.
2. none
3. KA 295005 K101/4.1
295005K101 ..(KA's)

ANSWER: 074 (1.00)

c.

[1.00]

REFERENCE:

1. LP 302H-000.00H-127-06 Obj. 2
2. OP-EO.ZZ-103
3. KA 295033 G011/4.5
295034 G011/4.3
295035 G011/4.2
295036 G011/4.1
295035G011 295033G011 295034G011 ..(KA's)

ANSWER: 075 (1.00)

b.

[1.00]

REFERENCE:

1. LP 305HC-000.00-020-C51
302HC-000.00-020-C51
302H-000.00H-000114-2 Obj. 1
2. OP-AB.ZZ-300(Q)
3. KA 295001 K206/3.3 G011/4.2
295001G011 295001K206 ..(KA's)

ANSWER: 076 (1.00)

a.

[1.00]

REFERENCE:

1. LP 302H-000.00H-019-08
Obj. 20
2. OP-AB.ZZ-111(Q)
3. KA 295001 A205/3.4
295001A205 ..(KA's)

ANSWER: 077 (1.00)

b.

[1.00]

REFERENCE:

1. LP 302H-000.00H-127-06
Obj. 6
2. OP-EO.ZZ-103
3. KA 295032 K301/3.8
295032K301 ..(KA's)

ANSWER: 078 (1.00)

d.

[1.00]

REFERENCE:

1. LP 302H-000.00H-00114-02
Obj. 3
2. OP-AB.ZZ-131(Q)
3. KA 295019 K201/3.9
295019K201 ..(KA's)

ANSWER: 079 (1.00)

b.

[1.00]

REFERENCE:

1. LP 302H-000.00H-125B-04
Obj's. 2 and 6
2. OP-EO.ZZ-102(Q)
3. KA 295029 G007/3.9
295029G007 ..(KA's)

ANSWER: 080 (1.00)

a.

[1.00]

REFERENCE:

1. LP 302H-000.00H-000114-02
Obj. 3
2. OP-AB.ZZ-300(Q)
3. KA 295001 K104/3.3
295001K104 ..(KA's)

ANSWER: 081 (1.00)

d.

[1.00]

REFERENCE:

1. LP 302H-000.00H-000114-02
Obj. 1
2. OP-AB.ZZ-145(Q)
3. KA 295018 G005/3.5 G011/4.1
295018G011 295018G005 ..(KA's)

ANSWER: 082 (1.00)

- a. 5
- b. 3
- c. 6
- d. 4

[0.50
each]

REFERENCE:

1. LP 302HC-000.00-053
Obj. 11
2. OP-AB.ZZ-208(Q)
3. KA 295002 K302/3.4 K303/3.3 K304/3.6 K305/3.4
295002K304 295002K303 295002K302 ..(KA's)

ANSWER: 083 (1.00)

c. [1.00]

REFERENCE:

1. LP 302H-000.00H-127-06
Obj. 6
2. OP-EO.ZZ-103
3. KA 295032 K203/3.4 K208/3.9 G012/4.4
295032G012 295032K208 295032K203 ..(KA's)

ANSWER: 084 (1.00)

d. *accept ans C also 'feed pump lockup is not in itself a cause of high water level'* [1.00]

REFERENCE:

1. LP 302H-000.00H-000114-02
Obj. 1
2. OP-AB.ZZ-117(Q), Rev. 0
3. KA 295008 K202/3.8 K203/3.7 A201/3.9
295008A201 295008K203 295008K202 ..(KA's)

ANSWER: 085 (1.00)

d. [1.00]

REFERENCE:

1. LP 302H-000.00H-069-06
Obj. 7
2. OP-AB.ZZ-150(Q)
3. KA 295004 K203/3.3
295004K203 ..(KA's)

ANSWER: 086 (1.00)

C.

[1.00]

REFERENCE:

1. LP 302HC-000.00-002-05
Obj. 5d
2. none
3. KA 259001 A304/3.7 K109/3.8
295008 K202/3.8
259001K109 2259001A30 295008K202 .. (KA's)

ANSWER: 087 (1.00)

C.

[1.00]

REFERENCE:

1. LP 302HC-000.00-031-05
Obj. 6
2. T. S. Bases 3/4.6.1.7
3. KA 223001 G006/4.0
295012 G004/3.8
223001G006 295012G004 .. (KA's)

TEST CROSS REFERENCE

Page 1

QUESTION	VALUE	REFERENCE
001	1.00	9000001
002	1.00	9000002
003	1.00	9000003
004	1.00	9000004
005	1.00	9000005
006	1.00	9000006
007	1.00	9000007
008	1.00	9000008
009	2.50	9000009
010	1.50	9000010
011	1.00	9000011
012	1.00	9000012
013	1.00	9000013
014	1.00	9000014
015	1.00	9000015
016	1.00	9000016
017	1.00	9000017
018	3.00	9000018
019	1.00	9000019
020	2.00	9000020
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022	1.00	9000022
023	1.00	9000023
024	1.00	9000024
025	1.00	9000025
026	1.00	9000026
027	1.00	9000027
028	1.00	9000028
029	1.00	9000029
030	1.00	9000030
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037	1.00	9000037
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039	1.00	9000039
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042	1.50	9000042
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046	1.00	9000046
047	1.00	9000047
048	1.00	9000048
049	1.00	9000049
050	1.00	9000050
051	1.00	9000051
052	1.00	9000052
053	1.00	9000053

054

1.00

9000054

TEST CROSS REFERENCE

Page 2

QUESTION	VALUE	REFERENCE
055	1.00	9000055
056	1.00	9000056
057	1.00	9000057
058	1.00	9000058
059	2.00	9000059
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061	2.00	9000061
062	3.00	9000062
063	2.00	9000063
064	1.00	9000064
065	1.00	9000065
066	1.00	9000066
067	1.00	9000067
068	1.00	9000068
069	1.00	9000069
070	1.00	9000070
071	1.00	9000071
072	1.00	9000072
073	1.00	9000073
074	1.00	9000074
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076	1.00	9000076
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079	1.00	9000079
080	1.00	9000080
081	1.00	9000081
082	2.00	9000082
083	1.00	9000083
084	1.00	9000084
085	1.00	9000085
086	1.00	9000086
087	1.00	9000087

100.00-----
100.00

ATTACHMENT 3

NRC Resolution of Facility Written Comments on the Examination

QUESTION 017

NRC Resolution: Comment partially accepted. The question tests knowledge of the RPS MG set power supply and the purpose of the MG set flywheel. Because of the lack of clarity in the training material in describing the time interval in which the flywheel maintains electrical power within specified limits, answers "a" or "c" will be accepted. The answer key has been changed accordingly.

QUESTION 033

NRC Resolution: Comment accepted. The answer key was revised to indicate "b" as the correct answer. Unclear wording resulted in misinterpretation of this question. This type of problem should be identified during the pre-examination review.

QUESTION 045

NRC Resolution: Comment partially accepted. The alternate wording for the isolation associated with the heater is accepted. High hydrogen concentration will not be accepted as a correct answer, because the reference provided with the facility comment is an out-of-date abnormal procedure (OP-AB-ZZ-128, "Off Gas System Malfunction", Rev. 2). The current version of the procedure (Rev. 3) does not indicate that the recombiner train isolates on high hydrogen concentration. None of the reference material provided for preparation of the examination, including drawings, lesson plans, and system operating procedures, support the facility proposed resolution.

QUESTION 065

NRC Resolution: Comment accepted. The answer key was revised to indicate "b" as the correct answer.

QUESTION 069

Deleted

NRC Resolution: Comment accepted. The question has been deleted. The title of the procedure and wording of the answers were taken from the lesson plan: LP 302H-000.000H-126B-04, OP-EO-ZZ-102 Drywell Pressure Control

Section. The training material should be revised to provide accurate information. This type of problem should be identified during the pre-examination review.

QUESTION 070

Deleted

NRC Resolution:

Comment accepted.

QUESTION 084

NRC Resolution:

Comment partially accepted. Either answer "c" or "d" will be accepted. The answer key has been changed accordingly.

ATTACHMENT 4

SIMULATION FACILITY FIDELITY REPORT

Facility Licensee: Public Service Electric and Gas Company
P.O. Box 236
Hancocks Bridge, New Jersey 08038

Facility Licensee Docket No.: 50-354

Facility License No.: NPF-57

Operating Tests Administered on March 21-22, 1990

During the conduct of the simulator portion of the operating tests, no problems were observed.