U. S. NUCLEAR REGULATORY COMMISSION
OPERATING LICENSING EXAMINATION REPORT

Examination Report Nos.	92-02 (OL) Limerick Unit 1 92-02 (OL) Limerick Unit 2 92-01 (OL) Peach Bottom Unit 2 92-01 (OL) Peach Bottom Unit 3
Facility Docket Nos.	50-352/353 50-277/278
Facility License Nos.	DPR-44 DPR-56 NPF-39 NPF-85
Licensee:	Philadelphia Electric Company Nuclear Group Headquarters Correspondence Control Desk P.O. Box 195 Wayne, Pennsylvania 19087-0195
Facilities:	Limerick Generating Station Units 1 and 2 Peach Bottom Atomic Power Station Units 2 and 3
Examination Dates:	January 13-15, 1992
Examiners:	D. Odland, Examiner, Sonalyst D. Florek, Senior Operations Engineer

Chief Examiner: Jeff Williams — 3/4/92
J. Williams, Sr. Operations Engineer — Date
BWR Section, Operations Branch, DRS

Approved By: Richard J Conte — 3/4/92
Richard J. Conte, Chief, BWR Section — Date
Operations Branch, DRS

EXAMINATION SUMMARY: SEE NEXT PAGE

PEACH BOTTOM/LIMERICK FUEL HANDLING

EXAMINATION SUMMARY

Initial examinations were administered to seven senior reactor operator candidates limited to fuel handling (LSRO). Six of the seven candidates passed all portions of the examination. One candidate failed the operating portion for Limerick.

The LSRO training program for Limerick and Peach Bottom was recently combined into a single program and exhibited several weaknesses. Differences between plants had a negative impact on some lesson plans. This was because the lesson plan did not track actual plant practices. LSRO responsibilities were not well defined at Limerick and differ from those at Peach Bottom. Examples of candidate training that did not track the task to training matrix or qualification manuals were found. General plant knowledge was found to be weak at the site where the candidates had not worked. The training program split the onsite time requirements between sites which may not have allowed enough time for the LSRO to become knowledgeable at the "new" site.

DETAILS

1.0 Introduction

The NRC Examiners administered initial examinations to seven senior reactor operator limited to fuel handling (LSRO) candidates. The examinations were for dual licenses for Peach Bottom Atomic Power Station Units 2 and 3 and Limerick Generating Station Units 1 and 2. The examinations were administered in accordance with NUREG 1021, Examiner Standards, Revision 6 and Draft Chapter ES-701, dated August 1, 1991. The results are summarized below:

	PASS/FAIL
WRITTEN:	7/0
OPERATING:	6/1*
OVERALL:	6/1*

*One candidate failed the operating portion of the examination at Limerick and passed the operating examination at Peach Bottom.

2.0 Preexamination Activities

The facility reviewed the examination in the Regional Office on January 2, 1992. Representatives from Peach Bottom, Limerick and corporate training staff were on the facility review team. On January 13, 1992, the JPMs were validated at Limerick. Facility staff involved with these reviews signed security agreements to ensure examination integrity.

3.0 Examination Related Findings

The following is a summary of the strengths and weaknesses noted during examination administration. This information is being provided to aid the licensee in upgrading their training program.

3.1 Program Weaknesses

There were a number of procedures used for JPMs that the candidates had not seen before. Without exception, these procedures were either listed in the task to training matrix, covered in lesson plans or in the qualification manual.

The task to training matrix was missing key tasks such as LPRM replacement and checkout of the fuel preparation machine.

What the candidates were taught did not always agree with plant practice. This was caused by differences in plant practices between Peach Bottom and

Limerick. Comments on the written examination question number six illustrates this point.

The LSRO responsibilities are not the same at each site and are not well defined at Limerick.

Facility JPM performance standards were not adequate in a number of cases. For example, to close a valve, a grating had to be removed, but this was not mentioned in the JPM.

There was no standard method for performing a refuel bridge checkout. Each candidate had their own ideas about the scope of the inspection or checkout.

There was no standard method for performing an LSRO shift turnover at Limerick.

Copies of the alarm response procedures for local panels on the Limerick refuel floor were not being maintained at the panels.

Reference materials placed on the refuel floor at each site for the examination were missing key references.

At Limerick, there were problems with work conflicts on the refuel floor. Unnecessary stress was placed on the candidates because of the large numbers of workers on the refuel floor waiting for the examination to be completed so they could begin work.

The limited availability of the refuel bridge at Limerick resulted in undesirable changes in the examination.

The candidates were notably weaker in LSRO activities at the plant where they were not assigned.

Candidates tested late in the day were required to wait for hours. This had the potential to add stress unnecessarily.

3.2 Written Section

No facility generic strengths or weaknesses, based on individual results, were identified in the written examination.

3.3 Walk-through Section

The following facility generic strengths and weaknesses were noted during the operating examination.

Strengths

Candidates knowledge in the following areas were considered to be strong:

Health Physics practices
Housekeeping
Emergency Plans
Security
Emergency Actions during fuel handling events

Weaknesses

The candidates were weak in their ability to use electrical drawings.

Candidates' knowledge on systems not directly associated with fuel handling equipment was weak. This weakness includes very basic knowledge of control room radiation monitors and SRMs.

The candidates were weak in their knowledge and ability to use inverse multiplication plots to predict criticality.

The candidates' knowledge of technical specifications was weak.

Several candidates could not locate the key for bypassing the Boundary Zone Computer.

4.0 Conclusions

Differences between plant design, procedures, and responsibilities caused some training and examination problems. Differences were not always highlighted. In some cases, lesson plans did not follow plant practice at either site.

LSRO tasks and responsibilities were not always clearly defined. This is a critical initial step of a systems approach to training.

The training that the candidates received did not correlate well with the task to training matrix and qualification manual in some cases.

Attachment 4

Exit Attendees

January 22, 1992

Philadelphia Electric Company

George Beck, NESD Manager - Licensing Section
Edward Bright, Senior Instructor, NTD
Steven Carr, Sr., LOT Lead Instructor, LGS
Vince Cwietniewicz, Superintendent - Training, LGS
Jay Doering, Plant Manager, LGS
Richard Helt, Consultant
Charles Lauletta, Training Supervisor, NTD
Dennis McClellan, Supervisor - Operator Training, PBAPS
Thomas Niessen, Jr., Superintendent - Operations, PBAPS
Glenn Stewart, Licensing Engineer
William Texter, Superintendent - Reactor Servicing, NTD

U. S. Nuclear Regulatory Commission

Lee Bettenhausen, Chief, Operations Branch, DRS
Herb Williams, Senior Operations Engineer, DRS

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Nuclear Regulatory Commission
Operator Licensing
Examination

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date of examination.

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

EXAMINEE'S NAME: _____

FACILITY: Limerick 1 & 2

REACTOR TYPE: BWR-GE4

DATE ADMINISTERED: 92/01/13

INSTRUCTIONS TO CANDIDATE:

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires a final grade of at least 80%. Examination papers will be picked up three (3) hours after the examination starts.

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

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

_____
Candidate's Signature

A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

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

MULTIPLE CHOICE

001	a	b	c	d	____
002	a	b	c	d	____
003	a	b	c	d	____
004	a	b	c	d	____
005	a	b	c	d	____
006	a	b	c	d	____
007	a	b	c	d	____
008	a	b	c	d	____
009	a	b	c	d	____
010	a	b	c	d	____
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035	a	b	c	d	____
036	a	b	c	d	____
037	a	b	c	d	____
038	a	b	c	d	____
039	a	b	c	d	____

040 MATCHING

a ____

b ____

c ____

d ____

A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

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

MULTIPLE CHOICE

041 a b c d ___

042 MATCHING

a ___

b ___

c ___

d ___

MULTIPLE CHOICE

043 a b c d ___

044 a b c d ___

045 a b c d ___

046 a b c d ___

047 a b c d ___

048 a b c d ___

049 a b c d ___

050 a b c d ___

051 a b c d ___

052 a b c d ___

053 a b c d ___

054 a b c d ___

055 a b c d ___

056 a b c d ___

057 a b c d ___

058 a b c d ___

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

NRC RULES AND GUIDELINES FOR LICENSE EXAMINATIONS

During the administration of this examination the following rules apply:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

17. There is a time limit of three (3) hours for completion of the examination.

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

QUESTION: 001 (1.00)

WHICH ONE (1) of the following describes the conditions that require notification of the NRC within 1 hour due to excessive radiation exposure?

a. When a pregnant female, limited to 500 mRem for the entire term, exceeds twice the limit (1000 mRem)

b. When a single TLD badge reading is greater than 1000 mRem whole body exposure

c. When a contaminated individual is transported to an off site medical facility for treatment

d. When an individual has been exposed to a skin dose greater that 150 Rem

QUESTION: 002 (1.00)

An "emergency" repair is required during a weekend.

WHICH ONE (1) of the following describes the time that must be allotted to perform the pre-job ALARA reviews before the job can begin?

a. Sufficient time for the HP technician providing coverage or issuing the RWP to brief the lead group supervisor of area conditions and make recommendations for reducing exposure

b. Sufficient time for all personnel in the ALARA group to have been notified of the job and the precautions to be taken

c. Not more than 2 hours, provided the ALARA physicist has been notified of the "emergency" and the anticipated man-rem exposure

d. Not more than 4 hours, even though all members of the ALARA group have not been contacted concerning the nature of the emergency

QUESTION: 003 (1.00)

WHAT is the PURPOSE of the ALARA program?

a. To sensitize personnel to the importance of reducing exposure to ionizing radiation

b. To reduce contamination associated with maintenance and modification of radioactive components

c. To establish an administrative program that would document personnel exposure to radiation more accurately

d. To reduce personnel exposure to ionizing radiation to levels that can be attained through reasonable efforts

QUESTION: 004 (1.00)

The level of activity in a fuel support piece decays from 3.2 curies to 2.4 curies in one week (168 hours).

WHICH ONE (1) of the following is the decay constant for the isotopes on the fuel support piece?

a. 4.76 E-7/sec

b. 8.00 E-7/sec

c. 2.80 E-6/sec

d. 1.15 E-5/sec

QUESTION: 005 (1.00)

At Limerick an accessible space has radiation levels such that exposures are greater than 35 mRem in any hour but less than 100 mRem/hr at 18 inches.

WHICH ONE (1) of the following describes the complete posting requirements for this space?

a. "Caution Radiation Area"

b. "Caution Radiation Area" and "RWP Required For Entry"

c. "Caution High Radiation Area"

d. "Caution High Radiation Area And RWP Required For Entry"

QUESTION: 006 (1.00)

A 35 year old maintenance mechanic with an accumulated lifetime dose of 74.00 Rem has been assigned to work on the Reactor Vessel head, where the dose rate is 650 mRem/hr. His dose for the current quarter is 1500 mRem and his dose to date this year, including the current quarter's dose, is 4000 mRem. He has approval from the Superintendent - Plant services, Senior Health Physicist, and Plant Manger to exceed a quarterly dose of 2000 mRem and an annual dose of 4000 mRem. But he has NOT received approval from the Vice President to exceed the administrative dose limit.

WHICH ONE (1) of the following describes the length of time he may work in the above area?

a. 1.54 hours

b. 1.19 hours

c. 0.76 hours

d. 0.42 hours

QUESTION: 007 (1.00)

During Reactor Head tensioning in preparation for start up after refueling, it becomes known that one of the maintenance workers will likely exceed 1500 mRem exposure for the quarter.

WHICH ONE (1) of the following describes the individuals, in addition to the Senior Health Physicist, that must approve an individual to exceed 1500 mRem whole body exposure in the quarter?

a. Department Senior Engineer and Plant Manager

b. Department Senior Engineer and Superintendent - Plant Services

c. Shift Supervisor and Superintendent - Plant Services

d. Shift Supervisor and Plant Manager

QUESTION: 008 (1.00)

WHICH ONE (1) of the following describes the PRIMARY method for limiting personnel exposure on the refuel platform during core off load?

a. Limiting exposure time through administrative limits on working hours

b. Adding distance from the source by using the main hoist and grapple to move fuel

c. Adding shielding by working under water to off load the core

d. Adding shielding to the underside of the refueling platform

QUESTION: 009 (1.00)

A worker on the refueling floor cuts his hand on a sharp object. By applying direct pressure, the bleeding stops and he is able to continue working.

WHAT action should he take?

a. Continue working but do not get the injured hand wet.

b. Continue working and notify his supervisor and the Health Physics technicians.

c. Immediately put a clean rubber glove on the hand and notify the Health Physics technicians.

d. Leave the area immediately and notify the Health Physics technicians.

QUESTION: 010 (1.00)

After removing the vessel head insulation at Limerick Unit 1 in preparation for refueling, the Reactor Vessel (R. flange temperature is measured at 75 degrees F. The head is bolted in place.

WHICH ONE (1) of the following describes the action that should be taken?

a. Restore RV head flange temperature to greater than 80 degrees F within 30 minutes and begin de-tensioning the RV head bolting studs.

b. Restore RV head flange temperature to greater than 110 degrees F within 30 minutes and begin de-tensioning the RV head bolting studs.

c. Restore RV head flange temperature to greater than 80 degrees F within 30 minutes and perform an engineering evaluation of RV structural integrity.

d. Restore RV head flange temperature to greater than 110 degrees F within 30 minutes and perform an engineering evaluation of RV structural integrity.

QUESTION: 011 (1.00)

WHICH ONE (1) of the following describes core orifice location and the purpose of core orificing?

a. Located in the lower tie plate; provide maximum flow to fuel bundles in the central region

b. Located in the fuel support pieces; provide even flow distribution throughout the core

c. Located in the incore guide tube; provide additional flow to the peripheral fuel bundles

d. Located in the fuel support pieces; provide turbulent flow to promote better heat transfer

QUESTION: 012 (1.00)

WHAT is the purpose of the Jet Pumps?

a. To overcome stratification in the lower head at low power levels thereby reducing thermal stress in that area

b. To provide additional flow during accident conditions to prevent the core from overheating during the recovery phase

c. To provide forced flow through the reactor to yield higher reactor power output than would be possible with natural circulation

d. To overcome fluid inertia and ensure flow proceeds along the correct path in spite of the natural circulation head

QUESTION: 013 (1.00)

WHICH ONE (1) of the following components provide LATERAL SUPPORT for the fuel bundles?

a. The core shroud, core plate and top guide

b. The fuel support castings and control rod guide tubes

c. The shroud support and the core plate

d. The top guide, incore guide tubes and control rod stub tube

QUESTION: 014 (1.00)

How is SHUTDOWN MARGIN defined?

a. The amount of reactivity that the reactor is or could be made subcritical from its present condition.

b. The reactivity associated with the excess fuel which is added to the core beyond the minimum amount necessary for criticality.

c. The amount of reactivity that the reactor is subcritical due to the effects of poison buildup in the core.

d. The reactivity associated with the burnable and the fission product poisons in the core at shutdown.

QUESTION: 015 (1.00)

Given the following:

The reactor is shut down for refueling.
Fuel movement in the reactor vessel has been suspended temporarily.
The core is at 10,000 MWd/t.

WHAT is the change in reactivity if the water temperature changes from 90 degrees F to 120 degrees F? (See Figure 1, "Moderator Temperature Coefficient")

a. -3.0 E-4 delta-K/K

b -4.5 E-4 delta-K/K

c. -6.0 E-4 delta-K/K

d. -7.5 E-4 delta-K/K

QUESTION: 016 (1.00)

WHAT is the purpose of flux shaping and rod sequencing?

a. To lengthen the life of the control rods by reducing the maximum flux to which they are exposed

b. To reduce the wear on the control rod drive mechanisms and the control rods by minimizing required rod motion

c. To reduce the amount of entrained moisture in the steam entering the moisture separators by flattening core heat flux distribution

d. To lengthen the life of the core by evening out the fuel usage throughout the core

QUESTION: 017 (1.00)

A large motor, which had been running continuously for five days, is shut down at 10:15 AM for visual inspection. After being shut down for 20 minutes, an attempt is made to restart it. Motor current surges, but the motor does not start.

WHEN can another attempt be made to start the motor, and WHAT is the reason for the starting time?

a. 10:35 AM (immediately); Motors may be restarted if cooling water to the motor and/or bearings is adequate.

b. 10:35 AM (immediately); Two (2) start attempts are allowed before the motor must be allowed to cool down for one (1) hour.

c. 11:05 AM; The motor failed one start attempt and must be left to cool down for one-half (1/2) hour.

d. 11:35 AM; The motor failed one start attempt and must be left to cool down for one (1) hour.

QUESTION: 018 (1.00)

Given the following Refuel Platform Console indications at Limerick:

Hoist Loaded light lit
Grapple Normal Up light lit
Boundary Zone Bypass light lit

WHICH ONE (1) of the following describes the controls for Bridge/Trolley motion?

a. The Bridge/Trolley can move at fast speed in any direction within the Jog Zone.

b. The Bridge/Trolley can move at fast speed out of the Jog Zone.

c. The Bridge/Trolley can move at jog speed in any direction within the Exclusion Zone.

d. The Bridge/Trolley can move at jog speed out of the Exclusion Zone.

SENIOR REACTOR OPERATOR

QUESTION: 017 (1.00)

A large motor, which had been running continuously for five days, is shut down at 10:15 AM for visual inspection. After being shut down for 20 minutes, an attempt is made to restart it. Motor current surges, but the motor does not start.

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b. The Bridge/Trolley can move at fast speed out of the Jog Zone.

c. The Bridge/Trolley can move at jog speed in any direction within the Exclusion Zone.

d. The Bridge/Trolley can move at jog speed out of the Exclusion Zo

STION: 019 (1.00)

SELECT the choice that completes the following statement.

During refueling operations, the reactor cavity weirs are normally adjusted _____ than the fuel pool weirs in order to ensure that _____.

a. lower; suspended solids flow into the reactor cavity where they can be removed in the Reactor Water Cleanup System.

b. lower; fuel bundles stored in the fuel pool remain covered in the event of a leak in the RHR System.

c. higher; suspended solids flow into the fuel pool where they can be removed in the Fuel Pool Cooling and Cleanup System.

d. higher; fuel bundles in the fuel pool remain covered in the event of a leak in the Fuel Pool Cooling and Cleanup System.

QUESTION: 020 (1.00)

During removal of an LPRM string, a Fuel Floor Area Radiation Monitor alarms. The LPRM string has been re-submerged, but the alarm has NOT cleared.

In accordance with ON-120, Fuel Handling Problems, WHICH ONE (1) of the following actions should be taken?

a. Submerge the LPRM to the bottom of the Spent Fuel Pool and call Health Physics to initiate a survey of the area.

b. Immediately evacuate the refueling floor; and notify the Shift Supervisor, Health Physics and Reactor Engineering.

c. Suspend fuel handling operations and all operations with the potential for draining the reactor vessel or refueling pool.

d. Manually shut down and isolate Reactor Building normal ventilation and manually initiate the Standby Gas Treatment System.

QUESTION: 017 (1.00)

A large motor, which had been running continuously for five days, is shut down at 10:15 AM for visual inspection. After being shut down for 20 minutes, an attempt is made to restart it. Motor current surges, but the motor does not start.

WHEN can another attempt be made to start the motor, and WHAT is the reason for the starting time?

a. 10:35 AM (immediately); Motors may be restarted if cooling water to the motor and/or bearings is adequate.

b. 10:35 AM (immediately); Two (2) start attempts are allowed before the motor must be allowed to cool down for one (1) hour.

c. 11:05 AM; The motor failed one start attempt and must be left to cool down for one-half (1/2) hour.

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QUESTION: 018 (1.00)

Given the following Refuel Platform Console indications at Limerick:

Hoist Loaded light lit
Grapple Normal Up light lit
Boundary Zone Bypass light lit

WHICH ONE (1) of the following describes the controls for Bridge/Trolley motion?

a. The Bridge/Trolley can move at fast speed in any direction within the Jog Zone.

b. The Bridge/Trolley can move at fast speed out of the Jog Zone.

c. The Bridge/Trolley can move at jog speed in any direction within the Exclusion Zone.

d. The Bridge/Trolley can move at jog speed out of the Exclusion Zone.

QUESTION: 021 (1.00)

During the transfer of a fuel assembly from the Fuel Storage Pool to the Unit 2 core, the GRAPPLE ENGAGED indicator light goes off.

WHICH ONE (1) of the following describes the required actions?

a. Lower the assembly to approximately six (6) inches from the fuel pool floor and notify the Shift Superintendent.

b. Double verify the grapple engaged (Platform Operator and Fuel Handling Supervisor), load the assembly into the core and notify maintenance for repair.

c. Return the assembly to a safe condition location in the Fuel Storage Pool and then notify the Shift Superintendent.

d. Cease all Refueling Platform operations and contact the Shift Superintendent.

QUESTION: 022 (1.00)

During core loading operations at Limerick, fuel assembly orientation is being verified.

For an individual fuel cell, WHICH ONE (1) of the following is an indication of correct fuel assembly orientation?

a. The spacer buttons are adjacent to each other at the center of the fuel cell.

b. The channel fasteners are adjacent to each other at the center of the fuel cell.

c. The orientation boss number can be read while looking towards the center of the fuel cell.

d. The plain "DOG EAR" bosses are adjacent to each other at the center of the fuel cell.

QUESTION: 023 (1.00)

Refueling operations are in progress. During an instrument surveillance, an Instrument Technician inadvertently causes a High Drywell pressure signal on an UNBYPASSED channel.

SELECT the response below that completes the following statement.

Reactor Building Ventilation _____ and SBGT _____ in order to _____ _____.

a. remains running; remains in standby; protect personnel from extremes of temperature

b. isolates; starts automatically; protect personnel from extremes of temperature

c. isolates; starts automatically; provide a controlled, elevated release point

d. remains running; remains in standby; provide a controlled, elevated release point

QUESTION: 024 (1.00)

A core offload is in progress at Unit 2.

Given the following conditions:

No dunking chambers are installed.
SRM indications are:

SRM A	5 cps	Quadrant I
SRM B	2 cps	Quadrant III
SRM C	3 cps	Quadrant II
SRM D	4 cps	Quadrant IV

Following the removal of a fuel bundle in Quadrant II, the count rate on SRM C DROPPED to 2 cps. The count rates on the other SRMs remain unchanged.

WHICH ONE (1) of the following describes the impact of this condition on core off loading? (See Figure 2, Core Coordinate Map)

a. Core off load may continue in Quadrant I, but not in Quadrant IV.

b. Core off load may continue in Quadrant II, but not in Quadrant III.

c. Core off load may continue in Quadrant I, but not in Quadrant III.

d. Core off load may continue in Quadrant II, but not in Quadrant IV.

QUESTION: 025 (1.00)

Limerick Surveillance Procedure ST-6-107-630-1, Core Alteration Testing for Off Loading, Shuffling and Reloading the Core, verifies the alignment of the "match marks" for the NORMAL UP switch and the mast on the Main Hoist.

WHICH ONE (1) of the following is the reason for this verification?

a. Verify that the fuel assembly will have adequate clearance for a fuel assembly while passing through the "cattle chute."

b. Verify that the fuel assembly will clear the reactor vessel flange while moving in and out of the core.

c. Verify that the fuel assembly will always remain properly submerged below normal water level.

d. Verify that the fuel assembly will clear the fuel racks while moving in and out of the fuel pool.

QUESTION: 026 (1.00)

During refueling operations on Peach Bottom, Shutdown Cooling is in service prior to removing the reactor head.

WHICH ONE (1) of the following describes conditions that will result in an automatic isolation of the Shutdown Cooling System?

a. High reactor pressure (50 psig) or low reactor water level (0 inches)

b. High reactor pressure (50 psig) or low reactor water level (12.5 inches)

c. High drywell pressure (+2 psig) or low reactor water level (12.5 inches)

d. High drywell pressure (+2 psig) or low reactor water level (0 inches)

SENIOR REACTOR OPERATOR

QUESTION: 027 (1.00)

With a core offload in progress at Peach Bottom, Fuel Pool temperature is controlled by:

a. Adding heat exchangers as necessary up to two subsystems and throttling the fuel pool cooling heat exchanger outlet valve.

b. Adding heat exchangers as necessary up to three subsystems and throttling the fuel pool cooling heat exchanger outlet valve.

c. Adding heat exchangers as necessary up to two subsystems and throttling the service water inlet valve to the fuel pool cooling heat exchanger.

d. Adding heat exchangers as necessary up to three subsystems and throttling the service water inlet valve to the fuel pool cooling heat exchanger.

QUESTION: 028 (1.00)

During refueling operations on Limerick Unit 2, the following plant conditions exist:

80 fuel bundles in the vessel
Reactor head removed
Water level is greater than 22 feet above the reactor flange
Spent Fuel Pool gates removed
LPCI loop "C" & "D" are INOPERABLE for maintenance
RHR loop "A" & "B" are in service in SHUTDOWN COOLING mode
Core Spray System is INOPERABLE

The Control Room informs the Fuel Handling Director that the reactor cavity level is at 20 feet.

WHICH ONE (1) of the following actions and reasons are applicable to this condition?

a. No action needs to be taken, since ECCS is not required to be operable in OPCON 5 when the reactor head and fuel pool gates are removed and water level is greater than 22 feet above the vessel flange.

b. No action needs to be taken, since in OPCON 5 an RHR pump can be removed from service for up to two (2) hours out of any eight (8) hour period.

c. Suspend all core alterations and all operations with the potential for draining the vessel, since at least one low pressure ECCS pump OR one RHR pump must be operable.

d. Suspend all core alterations and all operations with the potential for draining the vessel, since at least one low pressure ECCS pump AND one RHR pump must be operable.

QUESTION: 029 (1.00)

During refueling operations at Limerick Unit 2, the decision has been made to fill the Fuel Pool directly from the Unit 1 CST using hoses.

WHICH ONE (1) of the following describes the precaution that must be observed in filling the Fuel Pool in this manner?

The lowest portion of the hoses must NOT extend below:

a. The top of the fuel racks to ensure that a line rupture during filling will not cause an unplanned draining to below the top of the fuel racks.

b. The top of the fuel racks to ensure that radioactive debris on the floor of the pool is not stirred up during the filling process.

c. The elevation of the lowest fuel siphon break to ensure that a line rupture during filling will not cause an unplanned draining to below the top of the fuel racks.

d. The elevation of the lowest fuel siphon break to ensure that radioactive debris on the floor of the pool is not stirred up during the filling process.

QUESTION: 030 (1.00)

One of the refueling requirements at Limerick is to check out the "one-rod-out" interlock for the Reactor Manual Control System within 24 hours prior to control rod withdrawal.

The Reactor Mode Switch is in REFUEL.

WHICH ONE (1) of the following describes the "one-rod-out" interlock?

a. A selected rod is withdrawn to position 48 at which time a rod block is received.

b A selected rod is withdrawn to position 02 at which time a rod block is received.

c. A selected rod is withdrawn to position 48. A second rod is selected and generates a rod block when it is withdrawn to position 02.

d. A selected rod is withdrawn to position 02. A second rod cannot be selected.

QUESTION: 031 (1.00)

A full core offload at Limerick Unit 1 has been completed and the Spent Fuel Pool Gates are installed. It has become necessary to operate RHR in the Fuel Pool Cooling Assist mode. Information tags have been placed on the Shutdown Cooling Suction Isolation Valves, HV-51-1F008 and HV-51-1F009, to prevent them opening while RHR is cooling the Fuel Pool.

WHICH ONE (1) of the following adverse effects could result from opening these valves in this mode of operation?

a. Draining the reactor vessel

b. Draining the Spent Fuel Pool

c. "Short circuit" of the RHR heat exchanger

d. Cavitation of the RHR pumps

QUESTION: 032 (1.00)

Preparations for core offload and refueling are being made at Peach Bottom 2. The Reactor Vessel head has been removed and core flood up is in progress when refueling bellows leakage is reported.

WHICH ONE (1) of the following describes the consequences of this leakage?

a. Loss of level in the Spent Fuel Pool may result in an increase in the general area dose rate on the Refuel Floor.

b. Loss of level in the Reactor Well may result in an increase in the general area dose rate on the Refuel Floor.

c. Loss of level in the Spent Fuel Pool may result in loss of suction to the Fuel Pool Cooling Pumps.

d. Loss of level in the Reactor Well may result in loss of suction to the Fuel Pool Cooling Pumps.

QUESTION: 033 (1.00)

The Mode switch at Peach Bottom in the REFUEL position.

WHICH ONE (1) of the following conditions will initiate a Control Rod Block?

a. Refuel platform over the core and grapple not full up

b. Refuel platform over the core and frame mounted hoist not full up

c. Refuel platform over the fuel pool and grapple loaded (>485 pounds)

d. Refuel platform over the fuel pool and frame mounted hoist loaded (>400 pounds)

QUESTION: 034 (1.00)

During core loading, a fuel bundle in the fuel pool has just been grappled in preparation for movement to another location in the fuel pool. Rod 30-35 is at position 48 in preparation for a CRDM change out. The reactor mode switch is in the STARTUP position.

The follo ing is the status of the indicators on the Left Hand Controller Console.

The "GRAPPLE ENGAGED" light is on.
The "GRAPPLE NORMAL UP" light is on.
The "SLACK CABLE" light is on.
The "GRAPPLE FULL DOWN" light is off.
The "HOIST JAM" light is off.

The main hoist will not raise because:

a. All control rods are not fully inserted.

b. The load cell force switch for SLACK CABLE is activated.

c. The reactor mode switch is in the STARTUP position.

d. The limit switch for NORMAL UP is activated.

QUESTION: 035 (1.00)

Core reload is in progress at Limerick Unit 1. During the reload of a fuel bundle, the control room operator reports a significant rise in the SRM count rate while the fuel bundle is still partially inserted into its location.

WHICH ONE (1) of the following describes operator actions for this occurrence?

a. Complete inserting the fuel bundle into the core and contact the Reactor Engineer.

b. Stop inserting the bundle and evacuate the Refuel Floor.

c. Raise the fuel bundle so it clears the upper grid and evacuate the Refuel Floor.

d. Raise the fuel bundle and return it to its previous location in the Spent Fuel Pool.

QUESTION: 036 (1.00)

During refueling at Limerick Unit 1, the Boundary Zone Computer becomes inoperable and is BYPASSED.

WHICH ONE (1) of the following describes a duty of the second qualified refueling platform operator?

a. Ensure that the platform, trolley and hoist are operated at JOG SPEED at all times.

b. Ensure that the platform is aligned with the Reactor Cavity Gate when operating in other than JOG SPEED.

c. Ensure that the fuel grapple is RELEASED only when irradiated fuel is properly seated in the core.

d. Ensure that the platform and trolley are moved only when the Main Hoist is NORMAL UP.

QUESTION: 037 (1.00)

WHICH ONE (1) of the following would be classified as Special Nuclear Material in accordance with the Limerick Administrative Procedures?

a. An irradiated fuel channel with the fuel bundle removed

b. A Local Power Range Monitor (LPRM) string

c. A control rod removed from the core following power operations

d. A radium source used in the plant for radiography.

QUESTION: 038 (1.00)

Fuel transfer is in progress from the Reactor to the Fuel Pool.

SELECT the choice which completes the following statement.

The fuel grapple must be verified latched onto the fuel assembly bail by the _____ and the _____.

a. Fuel Handling Director; Shift Reactor Engineer

b. Platform Operator; Shift Reactor Engineer

c. Platform Operator; Fuel Handling Director

d. Fuel Handling Director; Second Qualified Operator

QUESTION: 039 (1.00)

Refueling preparations are in progress with the reactor vessel head removed and a partial load of fuel in the vessel.

WHICH ONE (1) of the following is a core alteration?

a. Withdrawal of Source Range Monitor

b. Removal of an LPRM string

c. Conduct of a TIP trace

d. Removal of a jet pump nozzle

QUESTION: 040 (2.00)

SELECT the fuel assembly piece in Column II that corresponds to the letter in Column I (See Figure 3). (Note: Items in Column II may be used once, more than once, or not at all.)

(4 required at 0.5 each)

Column I (Figure Designator)	Column II (Fuel Assembly Piece)
_____ a.	1. Lifting Bail
_____ b.	2. Channel Fastener
_____ c.	3. Channel Spacer Button
_____ d.	4. Channel Clip
	5. Orientation Boss

QUESTION: 041 (1.00)

WHICH ONE (1) of the following conditions does NOT require entry into the Emergency Plan, EP-101?

a. Water loss below fuel level in the Fuel Pool

b. Spent fuel damage resulting in a Refueling Floor area ventilation isolation

c. Radiation levels of 300 mrem/hr from an LPRM string that is near the surface of the water

d. Observation of major damage to spent fuel

QUESTION: 042 (2.00)

Operations are being performed in accordance with Fuel Handling Procedure FH-105, Core Component Movement, Core Transfers.

MATCH the position titles in Column I to the applicable responsibilities in Column II (Note: Items in Column II may be used once, more than once, or not at all.)

(4 required at 0.5 each)

Column I (Position)	Column II (Responsibility)
_____a. Reactor Engineer	1. Directs and supervises the actions of the Platform Operator
_____b. Job Leader	2. Informs the Control Room of the completion of each step in the CCTAS
_____c. Fuel Handling Director	3. Maintains and updates the certification records of the Refueling Platform Operators
_____d. Refueling Platform Operator	4. Supervises the personnel involved in core component transfers, except the Platform Operators
	5. Prepares the Core Component Transfer Authorization Sheet

QUESTION: 043 (1.00)

Preparations for refueling are in progress at Peach Bottom Unit 2. Reactor flood up is complete and the Spent Fuel Pool gates have been removed.

SELECT the answer below that completes the following statement.

An unexplained decrease in Reactor water level of _____ requires initiation of FH-74, notification of Shift Management, and evacuation of _____ from the Refuel Floor.

a. one foot or more; all personnel

b. one foot or more; all non-essential personnel

c. two feet or more; all non-essential personnel

d. two feet or more; all personnel

QUESTION: 044 (1.00)

During a refueling outage on Unit 2, a Refueling Platform Operator has worked the following hours:

Friday	1600 to 0400
Saturday	1200 to 2400
Sunday	0800 to 1600
Monday	0800 to 1600
Tuesday	0800 to 2400
Wednesday	0800 to 2000

WHICH ONE (1) of the statements below identifies the violations of the Overtime Guidelines which occurred?

a. The operator worked more than 16 hours in 48 on Friday and Saturday.

b. The operator worked more than 16 hours in 24 on Saturday.

c. The operator worked more than 12 hours in 24 on Tuesday.

d. The operator worked more than 24 hours in 48 on Tuesday and Wednesday.

QUESTION: 045 (1.00)

Preparations are being made for core offload at Limerick Unit 1. Per GP-6.1, step 3.5.5 the Shutdown Cooling Injection Valve, HV-51-1F015A is throttled to achieve 6000 gpm flow.

WHAT is the purpose of throttling flow in the Shutdown Cooling System in preparation for core alterations?

a. Ensure the RHR pumps have sufficient net positive suction head

b. Reduce flow interference while removing fuel bundles from the core

c. Minimize in-core instrumentation vibration after fuel assembly removal

d. Ensure that reactor coolant temperature does not decrease too low during core off load

QUESTION: 046 (1.00)

Refueling is in progress with the Reactor Well flooded and the Fuel Pool Gates removed.

WHICH ONE (1) of the following actions must be suspended on the loss of secondary containment integrity?

a. Removal of a jet pump nozzle

b. LPRM replacement

c. Channeling new fuel in the Spent Fuel Pool

d. Adding water to the Spent Fuel Pool with hoses

QUESTION: 047 (1.00)

SELECT the choice that completes the following statement.

A "heavy load" is a load greater than _____ pounds that is suspended over _____.

a. 485; spent fuel

b. 485; fuel shipping cask area

c. 1200; spent fuel

d. 1200; fuel shipping cask area

QUESTION: 048 (1.00)

WHICH ONE (1) of the following describes the interlocks associated with the fuel preparation machines?

a. Limit switches (only) limit upward travel to ensure that fuel in the machine is below the top of the fuel racks and remains covered during a loss of water from the fuel pool.

b. Limit switches (only) limit upward travel to prevent lifting the assembly too high and causing excessive exposure to operators.

c. Limit switches and mechanical stops limit upward travel to ensure that fuel in the machine is below the top of the fuel racks and remains covered during a loss of water from the fuel pool.

d. Limit switches and mechanical stops limit upward travel to prevent lifting the assembly too high and causing excessive exposure to operators.

QUESTION: 049 (1.00)

Core off load is in progress at Limerick Unit 1 when a DOWNSCALE alarm is received on one of the Spent Fuel Pool Area Radiation Monitors. Investigation reveals that the Radiation Monitor is inoperable.

WHICH ONE (1) of the following describes the actions to be taken?

a. Continue fuel movement and initiate actions to ensure that an area survey is completed once per 24 hours with portable monitoring instrumentation.

b. Continue fuel movement and initiate actions to place a portable continuous monitor with the same alarm setpoint is operable in the vicinity of the installed monitor.

c. Suspend fuel movement until an area survey is completed and ensure that an area survey is completed once per 48 hours with portable monitoring instrumentation.

d. Suspend fuel movement until a portable continuous monitor with the same alarm setpoint is operable in the vicinity of the installed monitor.

QUESTION: 050 (1.00)

During preparations for refueling, a crew is channeling new fuel in the fuel preparation machine on Peach Bottom 3. "Fuel Storage Pool High Level" alarm is received on 30C075 (B-1) and the "Fuel Pool Cooling & Cleanup System Trouble" alarm is received in the Control Room.

WHICH ONE (1) of the following describes the concern for the correction of this condition?

a. Rising water may overflow into the Spent Fuel Cask Storage Pit through the skimmer drains.

b. Rising water may overflow into the ventilation system at the Spent Fuel Pool.

c. Rising water may carry radioactive materials to the surface of the Spent Fuel Pool.

d. Rising water may impede the ability of operators to channel the fuel in the fuel preparation machine.

QUESTION: 051 (1.00)

A spent fuel bundle was loaded in the Fuel Preparation Machine when a loss of level occurred in the Spent Fuel Pool. The spent fuel bundle in the machine is partially uncovered, however the fuel storage racks remain covered with water. The area radiation monitor alarmed and the Refueling Floor was evacuated. During the evacuation, one of the workers fell and hit his head. He is now lying near the Fuel Preparation Machine.

WHICH ONE (1) of the following describes the Emergency Exposures that may be authorized by the Emergency Director?

a. 5 Rem to lower the Fuel Preparation Machine and 75 Rem to attend to the injured worker

b. 5 Rem to lower the Fuel Preparation Machine and 50 Rem to attend to the injured worker

c. 25 Rem to lower the Fuel Preparation Machine and 75 Rem to attend to the injured worker

d. 25 Rem to lower the Fuel Preparation Machine and 50 Rem to attend to the injured worker

QUESTION: 052 (1.00)

SELECT the choice that completes the following statement.

The Reactor Building is maintained at _____ by ensuring that the ventilation system fans _____ more air than is _____ to the Reactor Building.

a. -0.25 inches wg; exhaust; supplied

b. -0.25 inches wg; supply; exhausted

c. +0.25 inches wg; supply; exhausted

d. +0.25 inches wg; exhaust; supplied

QUESTION: 053 (1.00)

Surveillance Procedure ST-6-107-630-1, Core Alteration Testing for Offloading, Shuffling and Reloading the Core, has been performed and Tables 1, 2, & 3 completed. (See Figures 4, 5, & 6)

WHICH ONE (1) of the following describes the "Most Limiting Core Alteration Start Time" on January 14th?

a. 0715

b. 0700

c. 0645

d. 0630

QUESTION: 054 (1.00)

During a core off load at Limerick Unit 1, it has become necessary to deviate from the Core Component Transfer Authorization Sheet (CCTAS).

SELECT the choice which completes the following statement.

The Fuel Handling Director must appropriately annotate the existing CCTAS or prepare a new CCTAS, and _____:

a. Continue CCTAS related activities while attempting to notify the Reactor Engineer.

b. Continue CCTAS related activities while attempting to notify the Shift Supervisor.

c. Suspend CCTAS related activities until Reactor Engineer approval of the changes has been obtained.

d. Suspend CCTAS related activities until Shift Supervisor approval of the changes has been obtained.

QUESTION: 055 (1.00)

Peach Bottom 3 Procedure SO 18.7.A-3, Transferring Fuel from the Fuel Pool to the Reactor, states that the refueling platform shall NOT be run at FAST speed unless the "GRAPPLE NORMAL UP" light is lit.

WHICH ONE (1) of the following describes the purpose of this precaution?

a. Prevents overloading the grapple.

b. Prevents bending the mast.

c. Prevents hitting the cattle chute with the fuel bundle.

d. Prevents running into the side of the fuel pool with the bundle.

QUESTION: 056 (1.00)

SELECT the choice that completes the following statement:

At Limerick, the FPCC Heat Exchanger pressure should be maintained greater than _____ psig to _____:

a. 30; prevent contaminated leakage into the SW system

b. 30; prevent low suction pressure pump trip

c. 20; prevent contaminated leakage into the SW system

d. 20; prevent low suction pressure pump trip

QUESTION: 057 (1.00)

SELECT the choice that completes the following statement.

When the RHR System is being used as a backup to the Fuel Pool Cooling System per S51.8.G, RHR pump flow must be maintained greater than 1500 gpm to prevent _____ because the minimum flow valve is closed to prevent _____.

a. Heat exchanger tube vibration; draining the Fuel Pool to the Suppression Pool.

b. Pump overheating; draining the Fuel Pool to the Suppression Pool.

c. Pump overheating; draining the Skimmer Surge Tank to the Suppression Pool.

d. Heat exchanger tube vibration; draining the Skimmer Surge Tank to the Suppression Pool.

QUESTION: 058 (1.00)

SELECT the choice that completes the following statement.

The grapple ENGAGE light is indicative of two _____ limit switches closing due to movement of the _____ grapple hook(s) into the latched position.

a. parallel connected; primary

b. series connected; primary

c. series connected; primary and secondary

d. parallel connected; primary and secondary

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

ANSWER: 001 (1.00)

d.

REFERENCE:

Lesson Plan LSRO-1760, Rev 0, LO 13, page 7 of 43
294001K105 [3.2/3.7]

294001K105 ..(KA's)

ANSWER: 002 (1.00)

a.

REFERENCE:

Lesson Plan LSRO 1760, Rev 0, LO 8, page 34 of 43
294001K104 [3.3/3.6]

294001K104 ..(KA's)

ANSWER: 003 (1.00)

d.

REFERENCE:

Lesson Plan LSRO-1760, Rev 0, LO 7, page 25 of 43
294001K104 [3.3/3.6]

294001K104 ..(KA's)

ANSWER: 004 (1.00)

a.

REFERENCE:

Lesson Plan LSRO-1705, Rev 0, LO 2, Page 5 of 33
294001K103 [3.3/3.8]

294001K103 ..(KA's)

ANSWER: 005 (1.00)

b.

REFERENCE:

Lesson Plan LSRO-1760, Rev 0, page 14ff of 33
Lesson Plan LSRO-1705, Rev 0, LO 3, page 18 of 33
294001K103 [3.3/3.8]

294001K103 ..(KA's)

ANSWER: 006 (1.00)

d. DP
c.

REFERENCE:

Lesson Plan LSRO-1706, Rev 0, LO 1/2
Lesson Plan LSRO-1705, Rev 0, LO 3, page 19 of 33
294001K103 [3.3/3.8]

294001K103 ..(KA's)

ANSWER: 007 (1.00)

b.

REFERENCE:

Lesson Plan LSRO-1705, Rev 0, LO 3, page 19 of 33
294001K103 [3.3/3.8]

294001K103 ..(KA's)

ANSWER: 008 (1.00)

d.

c

REFERENCE:

Lesson Plan LSRO-1705, Rev 0, LO 3, page 20 of 33
294001K103 [3.3/3.8]

294001K103 ..(KA's)

ANSWER: 009 (1.00)

d.

REFERENCE:

Lesson Plan LSRO-1705, Rev 0, LO 3, page 31 of 33
294001K103 [3.3/3.8]

294001K103 ..(KA's)

ANSWER: 010 (1.00)

c.

REFERENCE:

Technical Specification 3/4/4/6/1, page 3/4 4-18
Lesson Plan LSRO-0010, Rev 0, LO 12, page 39 of 43
290002G005 [3.3/4.1]

290002G005 ..(KA's)

ANSWER: 011 (1.00)

b.

REFERENCE:

Lesson Plan LSRO-0010, Rev 0, LO 8, page 38 of 43
290002K403 [3.2/3.3]

290002K403 ..(KA's)

ANSWER: 012 (1.00)

c.

REFERENCE:

Lesson Plan LSRO-0010, Rev 0, LO 7, page 26 of 43
290002G004 [3.2/3.3]

290002G004 ..(KA's)

ANSWER: 013 (1.00)

a.

REFERENCE:

Lesson Plan LSRO-0010, Rev 0, LO 10, page 11ff of 43
290002G004 [3.2/3.3]

290002G004 ..(KA's)

ANSWER: 014 (1.00)

a.

REFERENCE:

Lesson Plan GF-0190, Rev 0, LO 6, page 4 of 6
292002K110 [3.2/3.5]

292002K110 ..(KA's)

ANSWER: 015 DELETED

~~e.~~

SENIOR REACTOR OPERATOR

REFERENCE:

DELETED

Lesson Plan GF-0290A, Rev 0, LO 4, page 5 of 6
292002K111 [3.2/3.3]

292002K111 ..(KA's)

ANSWER: 016 (1.00)

d.

REFERENCE:

Lesson Plan GF-030, Rev 0, LO 10, page 9 of 15
292005K110 [2.8/3.3]

292005K110 ..(KA's)

ANSWER: 017 (1.00)

d.

REFERENCE:

Lesson Plan GF-0780, Rev 0, LO 6, page 18 of 23
~~291005K106~~ [~~2.9~~/3.1]
294001K106 [3.2/3.4]

check K/A.

291005K106 ..(KA's)

ANSWER: 018 (1.00)

c.

REFERENCE:

Lesson Plan LSRO-0760, Rev 0, LO 5, page 14ff
234000K502 [3.1/3.7]

234000K502 ..(KA's)

ANSWER: 019 (1.00)

c.

REFERENCE:

Lesson Plan LSRO-0750, Rev 0, LO 2, page 7 of 16
233000K406 [2.9/3.2]

233000K406 ..(KA's)

ANSWER: 020 (1.00)

b.

REFERENCE:

Lesson Plan LSRO-1550, Rev 0, LO 2
Limerick ONP ON-120, Fuel Handling Problems
295023G010 [3.8/3.9]

295023G010 ..(KA's)

ANSWER: 021 (1.00)

d.

REFERENCE:

S97.C.C, Transfer of Fuel from the Fuel Pool to the Reactor, Rev 10, page 6 of 12
Lesson Plan LSRO-0002, Rev 0, LO 9
295023G001 [3.3/4.2]

295023G001 ..(KA's)

ANSWER: 022 (1.00)

b.

REFERENCE:

Lesson Plan LSRO-0010, Rev 0, LO 11, page 25 of 43
234000K505 [3.0/3.7]

234000K505 ..(KA's)

ANSWER: 023 (1.00)

c.

REFERENCE:

Lesson Plan LSRO-0200, Rev 0, LO 1/2/4, page 4ff of 9
261000A211 [3.2/3.3]

261000A211 ..(KA's)

ANSWER: 024 (1.00)

c.

REFERENCE:

Technical Specification 3/4.9.2
Lesson Plan LSRO-0240, Rev 0, LO 6, page 4 of 8
215004G005 [3.2/3.9]

215004G005 ..(KA's)

ANSWER: 025 (1.00)

c.

REFERENCE:

Lesson Plan LSRO-0760, Rev 0, LO 6
Procedure ST-6-107-630-1, Core Alteration Testing for Offloading, Shuffling and Reloading the Core
234000K403 [3.4/4.2]

234000K403 ..(KA's)

ANSWER: 026 (1.00)

d.

REFERENCE:

Lesson Plan LSRO-0370, Rev 0, LO 6, page 10ff of 18
205000K402 [3.7/3.8]

205000K402 ..(KA's)

ANSWER: 027 (1.00)

d.

REFERENCE:

Lesson Plan LSRO-0750, Rev 0, LO 6, page 11 of 16
233000K403 [2.8/3.1]

233000K403 ..(KA's)

ANSWER: 028 (1.00)

c.

DELETED

REFERENCE:

Limerick Technical Specification 3.5.2
Lesson Plan LSRO-0370, Rev 0, LO 11
219000G011 [3.4/4.2]

219000G011 ..(KA's)

ANSWER: 029 (1.00)

c.

REFERENCE:

Procedure S.53.3.A, Direct Makeup to the Fuel Storage Pool, Rev 8
Lesson Plan LSRO-0002, Rev 0, LO 15
295023G007 [2.9/3.6]

295023G007 ..(KA's)

ANSWER: 030 (1.00)

d.

REFERENCE:

Lesson Plan LSRO-0760, Rev 0, LO 6
ST-6-047-370-1, Pre Control Rod Withdrawal Check, Rev 7, page 7 of 18
234000K402 [3.3/4.1]

234000K402 ..(KA's)

ANSWER: 031 (1.00)

a.

REFERENCE:

S51.8.G, RHR System Back Up to Fuel Pool Cooling, Rev 5
Lesson Plan LSRO-0750, Rev 0, LO 6, page 12ff of 16
205000K302 [3.2/3.3]

205000K302 ..(KA's)

ANSWER: 032 (1.00)

b.

REFERENCE:

Lesson Plan LSRO-0750, Rev 0, LO 2/8/11, page 14 of 16
233000A210 [2.9/3.3]

233000A210 ..(KA's)

ANSWER: 033 (1.00)

a.

REFERENCE:

Lesson Plan LSRO-0760, Rev 0, LO 6, page 28 of 51
234000K402 [3.1/4.1]

234000K402 ..(KA's)

ANSWER: 034 (1.00)

d.

REFERENCE:

Lesson Plan LSRO-0760, Rev 0, LO 6, page 31 of 51
234000K502 [3.1/3.7]

234000K502 ..(KA's)

ANSWER: 035 (1.00)

c.

REFERENCE:

CN-120, Fuel Handling Problems, Rev 1, page 1 of 3
Lesson Plan LSRO-1550, Rev 0, LO 2, page 2 of 12
295023G010 [3.8/3.9]

295023G010 ..(KA's)

ANSWER: 036 (1.00)

c.

REFERENCE:

Lesson Plan LSRO-0760, Rev 0, LO 8
Procedure S97.0.K, Rev 2, page 2 of 2
234000A201 [3.3/3.7]

234000A201 ..(KA's)

ANSWER: 037 (1.00)

b.

REFERENCE:

Lesson Plan LSRO-0001, Rev 0, LO 4, page 36 of 43
Procedure A-44, Procedure for Special Nuclear Material Accounting, Rev 5
294001K103 [3.3/3.8]

294001K103 ..(KA's)

ANSWER: 038 (1.00)

c.

REFERENCE:

Procedure S97.0.D, Transfer of Fuel from the Reactor to the Fuel Pool,
Rev 10, page 5 of 13
Lesson Plan LSRO-0002, Rev 0, LO 1
234000G001 [3.4/3.8]

234000G001 ..(KA's)

ANSWER: 039 (1.00)

b.

REFERENCE:

Lesson Plan LSRO-0002, Rev 0, LO 13, page 36 of 48
234000G011 [2.8/3.9]

234000G011 ..(KA's)

ANSWER: 040 (2.00)

a. 3
b. 1
c. 4
d. 2 (0.5 each)

REFERENCE:

Lesson Plan LSRO-0010, Rev 0, LO 11, page 25 of 43
234000K505 [3.0/3.7]

234000K505 ..(KA's)

ANSWER: 041 (1.00)

c.

REFERENCE:

S97.0.C, Transfer of Fuel from the Fuel Pool to the Reactor, Rev 10, page 3 of 12
Lesson Plan LSRO-0002, Rev 0
295023G011 [3.9/4.2]

295023G011 ..(KA's)

ANSWER: 042 (2.00)

a. 5
b. 4
c. 1
d. 2 (0.5 each)

REFERENCE:

Procedure FH-105, Core Component Movement - Core Transfers, Rev 11, page 2ff of 13
Lesson Plan LSRO-002, Rev 0, LO 1
234000G001 [3.4/3.8]

234000G001 ..(KA's)

ANSWER: 043 (1.00)

b.

REFERENCE:

Procedure FH-74, Rev 0, page 2 of 4
Lesson Plan LSRO-0002, Rev 0, LO 12
234000G002 [2.9/3.9]

234000G002 ..(KA's)

ANSWER: 044 (1.00)

d.

REFERENCE:

Lesson Plan LSRO-001, Rev 0, LO 4, page 29 of 43
294001A110 [3.6/4.2]

294001A110 ..(KA's)

ANSWER: 045 (1.00)

c.

REFERENCE:

Lesson Plan LSRO-0006, Rev 0, LO 3
Procedure GP-6.1, Rev 8, page 26 of 64
234000K102 [2.9/3.3]

234000K102 ..(KA's)

ANSWER: 046 (1.00)

b.

REFERENCE:

Lesson Plan LSRO-1550, Rev 0, LO 2, page 8 of 12
Procedure ON-111, Rev 3, page 2 of 2
290001G013 [3.6/3.5]

290001G013 ..(KA's)

ANSWER: 047 (1.00)

c.

REFERENCE:

NA-15H001, Control of Heavy Loads, Rev 0, page 5 of 21
Lesson Plan LSRO-0001, Rev 0, LO 4, page 35 of 43
234000K404 [2.8/3.3]

234000K404 ..(KA's)

ANSWER: 048 (1.00)

d. ~~b~~

REFERENCE:

Lesson Plan LSRO-0760, Rev 0, LO 4, page 7 of 51
234000K403 [3.4/4.2]

234000K403 ..(KA's)

ANSWER: 049 (1.00)

d.

REFERENCE:

Lesson Plan LSRO-0710, Rev 0, LO 5, page 6 of 7
Limerick Technical Specifications Table 3.3.7.1-1
272000G011 [3.1/4.2]

272000G011 ..(KA's)

ANSWER: 050 (1.00)

b.

REFERENCE:

Lesson Plan LSRO-0750, Rev 0, LO 4/11
ARC 30C075 B-1, Rev 0
233000G008 [3.2/3.2]

233000G008 ..(KA's)

ANSWER: 051 (1.00)

c.

REFERENCE:

Lesson Plan LSRO-1760, Rev 0, LO 2
ERP-670, Emergency Radiation Exposure Guidelines and Controls
294001K103 [3.3/3.8]

294001K103 ..(KA's)

ANSWER: 052 (1.00)

a.

REFERENCE:

Lesson Plan LSRO-0190, Rev 0, LO 5, page 5 of 6
290001K101 [3.3/3.5]

290001K101 ..(KA's)

ANSWER: 053 (1.00)

c.

REFERENCE:

Lesson Plan LSRO-0004, Rev 0, LO 4
Surveillance Procedure ST-6-107-630-1, Core Alteration Testing for Offloading, Shuffling and Reloading the Core, Rev 16
294001A102 [4.2/4.2]

294001A102 ..(KA's)

ANSWER: 054 (1.00)

c.

REFERENCE:

Procedure FH-605, Core Component Transfer Authorization Sheet Instructions, Rev 8, page 3 of 40
Lesson Plan LSRO-0002, Rev 0, LO 1
234000G001 [3.4/3.8]

234000G001 ..(KA's)

ANSWER: 055 (1.00)

b.

REFERENCE:

Procedure SO 18.7.A-3, Transferring Fuel from the Fuel Pool to the Reactor
Lesson Plan LSRO-006, Rev 0, LO 3
234000K501 [2.9/3.4]

234000K501 ..(KA's)

ANSWER: 056 (1.00)

a.

REFERENCE:

Procedure S10.8.A, Fuel Pool Service Water Booster Pump Startup, Normal Operation, and Shutdown, Rev 8, page 2 of 4
Lesson Plan LSRO-0006, Rev 0, LO 3
233000G010 [2.8/2.9]

233000G010 ..(KA's)

ANSWER: 057 (1.00)

c.

REFERENCE:

S51.8.G, RHR System Backup to Fuel Pool Cooling, Rev 5
LSRO-0006, Rev 0, LO 3
233000K102 [2.9/3.0]

233000K102 ..(KA's)

ANSWER: 058 (1.00)

c.

SENIOR REACTOR OPERATOR

REFERENCE:

S97.0.E, Transfer of Fuel Within the Reactor, Rev 11, page 6 of 12
Lesson Plan LSRO-0760, Rev 0, LO 6
234000K502 [3.1/3.7]

234000K502 ..(KA's)

SENIOR REACTOR OPERATOR

A N S W E R K E Y

MULTIPLE CHOICE

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

a 3
b 1
c 4
d 2

A N S W E R K E Y

MULTIPLE CHOICE

041 c

042 MATCHING

a 5

b 4

c 1

d 2

MULTIPLE CHOICE

043 b

044 d

045 c

046 b

047 c

048 d, b

049 d

050 b

051 c

052 a

053 c

054 c

055 b

056 a

057 c

058 c

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

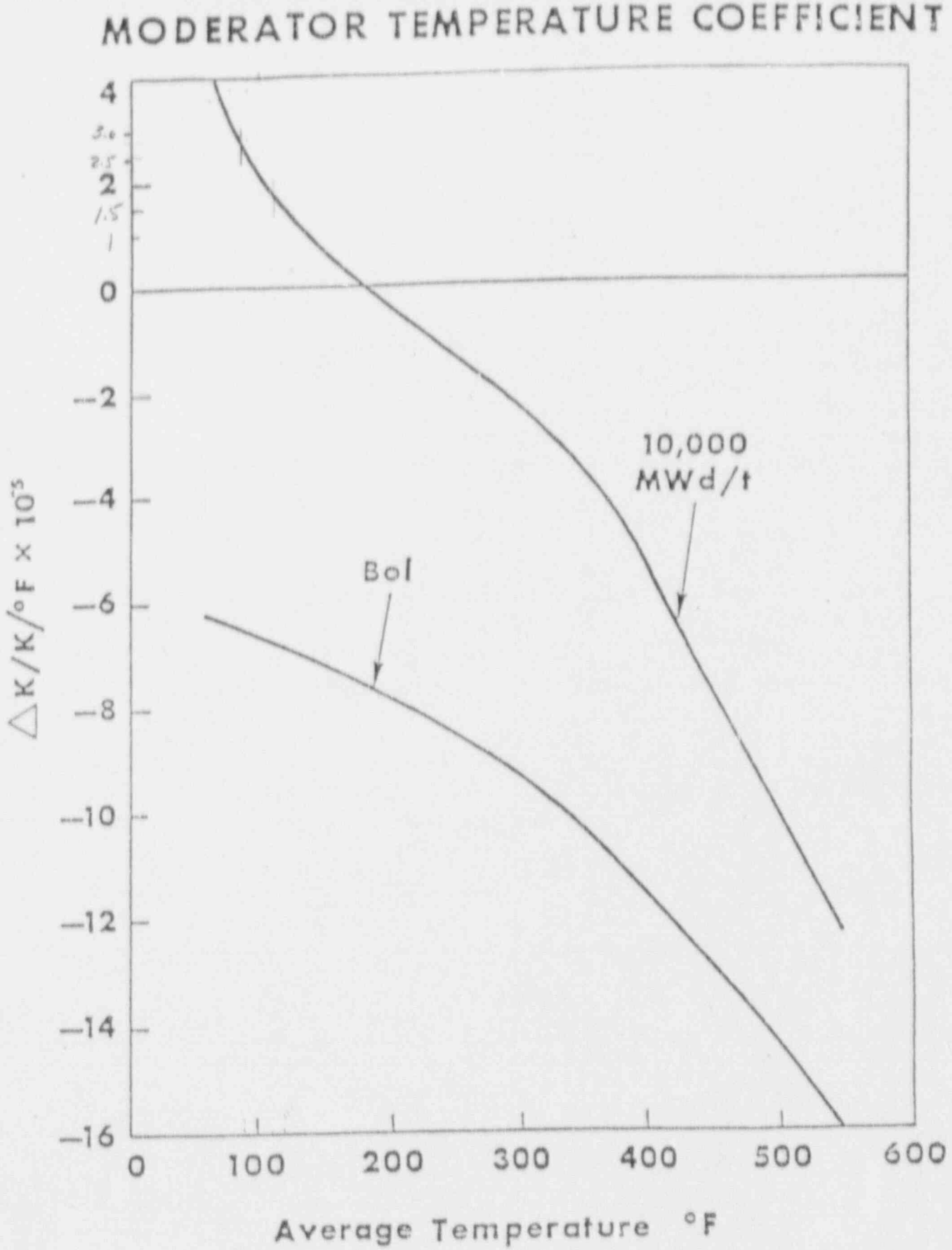
MODERATOR TEMPERATURE COEFFICIENT
4
3.5
2.5
2
1.5
1
0
−2
−4
−6
−8
−10
−12
−14
−16
ΔK/K/°F × 10⁻⁵
10,000
MWd/t
Bol
0
100
200
300
400
500
600
Average Temperature °F

FIGURE 1

SRM & IRM

CORE COORDINATE MAP

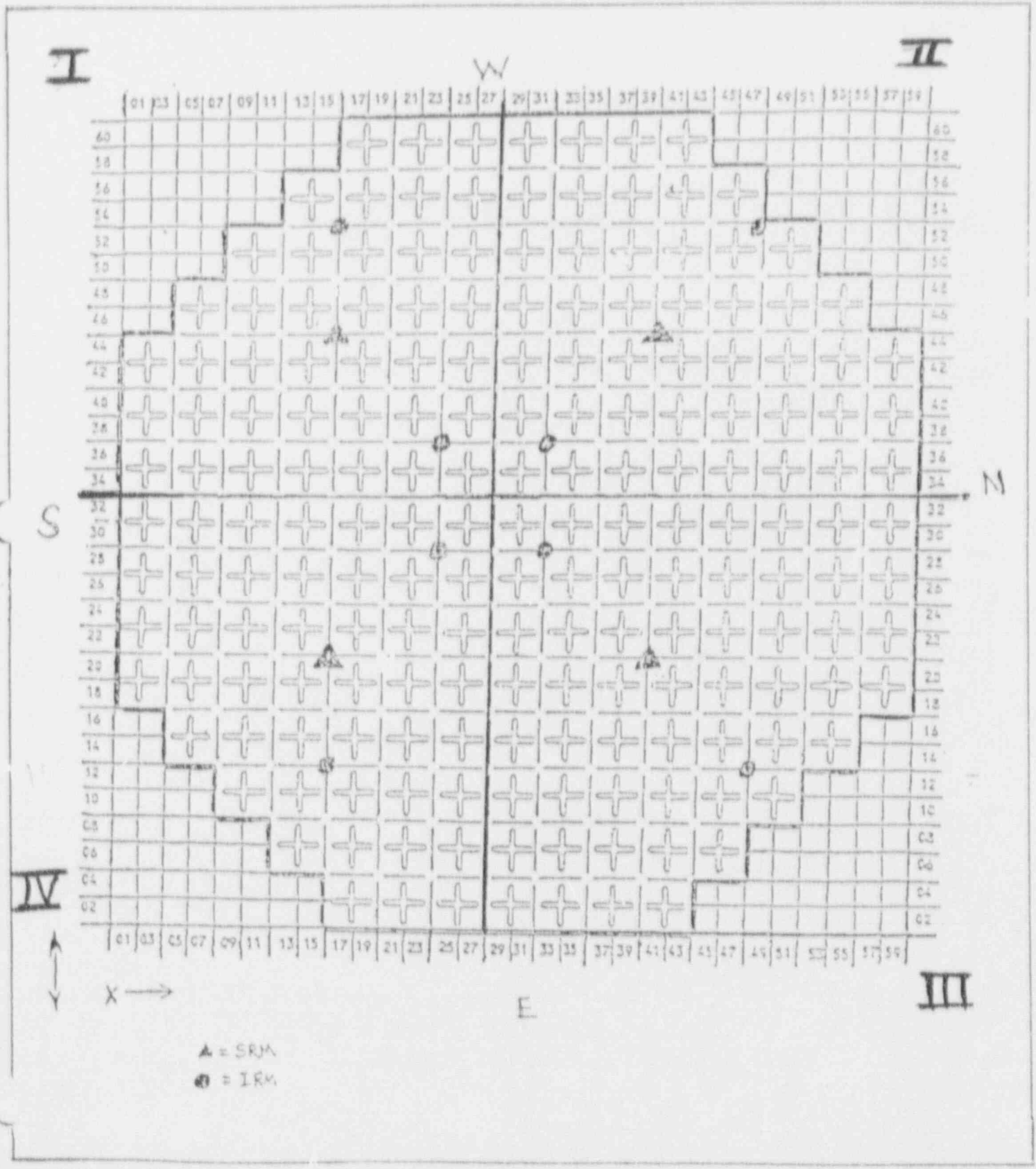

FIGURE 2

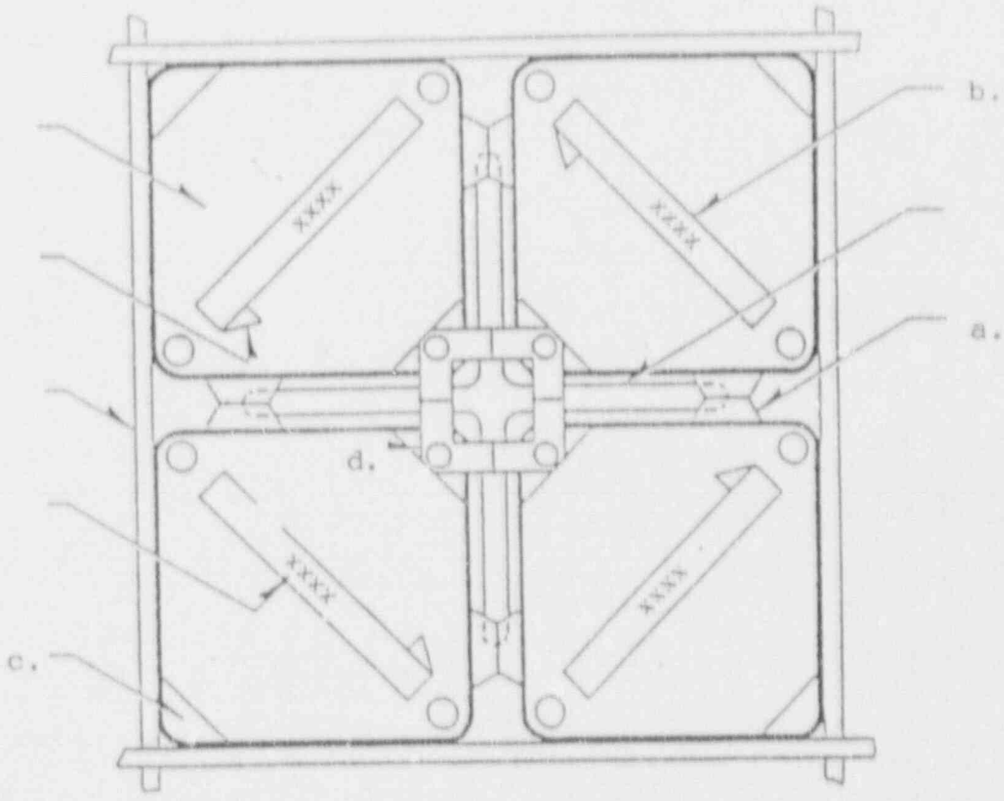

FIGURE 3.

TABLE 1

REFUELING PLATFORM TESTING SIGNOFFS

NOTE: This table ensures operability, per Tech. Spec. 3.9.1, 3.9.6 of the refuel platform/service platform interlocks per the time frame specified below.

a. Within 24 hours prior to core alterations.

b. At least once per seven days during core alterations.

c. Within 24 hours prior to resuming core alterations, following repair, maintenance OR replacement of any component that could affect the refuel position interlocks.

ACTION REQUIRED

STEPS	Prior to Core Alts Within 24 Hours Date/Time/NA	At Least Once per Seven Days During Core Alterations Date/Time/NA	Most Limiting Core Alts Start Time	Step Performed By: Initials/NA
Main Hoist Interlocks Section 6.3.46	1/13/92 0830	NA		(*)
Main Hoist Load Cells Section 6.4.24	1/13/92 0915	NA		(*)
Frame Aux Hoist Load Cells Section 6.5.15	1/13/92 1045	NA	Date/Time	(*)
Monorail Hoist Load Cells Section 6.6.15	1/13/92 1115	NA		(*)
Service Platform Load Cells ST-6-107-634-1 6.7.2	NA	NA		(*)

FIGURE 4

TABLE 2

SRM TESTING SIGNOFFS

NOTE: The following Table, in conjunction with the Daily Log, ensures SRM operability per Tech. Spec 3.9.2 prior to
AND during core alterations.

ACTION REQUIRED

STEPS	Prior to Core Alts Within... Date/Time/NA	At Least Once per Seven Days During Core Alterations Date/Time/NA	Most Limiting Core Alts Start Time	Step Performed By: Initials/NA
SRM A Functional 6.9.1.a (ST-2-074-600-1)	24 hours 1/13/92 0800	NA		(*)
SRM B Functional 6.9.1.b (ST-2-074-601-1)	24 hours 1/13/92 0830	NA		(*)
SRM C Functional 6.9.1.c (ST-2-074-602-1)	24 hours 1/13/92 0900	NA	Date/Time	(*)
SRM D Functional 6.9.1.d (ST-2-074-603-1)	24 hours 1/13/92 0930	NA	Initials	(*)
SRM Inserted 6.9.2	12 hours 1/13/92 1845	NA		(*)
SRM Recorders 6.9.3	12 hours 1/13/92 1900	NA		(*)

FIGURE 5

TABLE 3

MISCELLANEOUS TESTING SIGNOFFS

NOTE: The following table ensures operability requirements stated in Tech. Spec. 3.9.1, 3.9.3, 3.9.4, 3.9.5, 3.9.8, 3.9.9.

ACTION REQUIRED

STEPS	Prior to Core Alts... Date/Time/Int/NA	Most Limiting Core Alts Start Time	Step Performed By: Initials/NA
Reactor Subcritical 6.10.1	for at least 24 hrs 1/11/92 2330		(*)
Notify HP 6.10.2	within 2 hours 1/14/92 0500	Date/Time	
Rx Water Level 6.10.3	within 2 hours 1/14/92 0515	Initials	(*)
Rods Inserted 6.10.4	within 2 hours 1/14/92 0515		(*)
Mode Sw. position 6.10.5	within 2 hours 1/14/92 0530		(*)
Communications 6.10.6	within 1 hour 1/14/92 0600		(*)

FIGURE 6

EQUATIONS AND CONVERSIONS HANDOUT SHEET

EQUATIONS

$\dot{Q} = \dot{m} c_p \Delta T$

$\dot{Q} = \dot{m} \Delta h$

$\dot{Q} = UA\Delta T$

$SUR = 26.06/\tau$

$SUR = \dfrac{26.06(\lambda_{eff}\rho)}{(\bar{\beta} - \rho)}$

$P = P_0 10^{SUR(t)}$

$P = P_0 e^{(t/\tau)}$

$\tau = (l^*/\rho) + [(\bar{\beta} - \rho)/\lambda_{eff}\rho]$

$\rho = (K_{eff} - 1)/K_{eff}$

$\rho = \Delta K_{eff}/K_{eff}$

$$\upsilon(P_e - P_i) + \frac{(\vec{v}_e^{\,2} - \vec{v}_i^{\,2})}{2} + g(z_e - z_i) = 0$$

$A = A_0 e^{-\lambda t}$

$$\text{Cycle Efficiency} = \frac{\text{Net Work (out)}}{\text{Energy (in)}}$$

$SCR = S/(1 - K_{eff})$

$CR_1(1 - K_{eff})_1 = CR_2(1 - K_{eff})_2$

$M = 1/(1 - K_{eff}) = CR_1/CR_0$

$M = \dfrac{(1 - K_{eff})_0}{(1 - K_{eff})_1}$

$SDM = (1 - K_{eff})/K_{eff}$

$Pwr = W_f \dot{m}$

$\tau = l^*/(\rho - \bar{\beta})$

$l^* = 1 \times 10^{-5}$ seconds

$\lambda_{eff} = 0.1$ seconds^{-1}

CONVERSIONS

1 Curie	=	3.7×10^{10} dps	1 kg	=	2.21 lbm
1 hp	=	2.54×10^{3} BTU/hr	1 Mw	=	3.41×10^{6} BTU/hr
1 BTU	=	778 ft-lbf	°F	=	9/5 °C + 32
°C	=	5/9(°F - 32)			