ENCLOSURE 1

U. S. NUCLEAR REGULATORY COMMISSION
OPERATOR LICENSING REQUALIFICATION EXAMINATION REPORT

REPORT NO.: 50-326/OL-92-01

FACILITY DOCKET NO.: 50-326

FACILITY LICENSE NO.: R-116

FACILITY: University of California-Irvine

EXAMINATION DATES: July 6-7, 1992

EXAMINER: Warren Eresian, Chief Examiner

SUBMITTED BY: for James L. Caldwell — 7/16/92
Warren Eresian, Chief Examiner — Date

APPROVED BY: James L. Caldwell — 7/16/92
James L. Caldwell, Chief — Date
Non-Power Reactor Section
Operator Licensing Branch
Division of Licensee Performance
and Quality Evaluation, NRR

SUMMARY:

Requalification examinations were administered to two SROs. Both candidates passed the written and operating sections.

REPORT DETAILS

1. Examiner:

   Warren Eresian, Chief Examiner

2. Results:

| | RO (Pass/Fail) | SRO (Pass/Fail | Total (Pass/Fail) |
|---|---|---|---|
| NRC Grading: | 0/0 | 2/0 | 2/0 |

3. Written Examinations:

   No generic deficiencies were noted from the examination. Both candidates passed the written examination.

4. Operating Examinations.

   No generic deficiencies were noted from the examination. Both candidates passed the operating examination.

5. Exit Meeting:

   The following personnel attended an exit meeting on July 9, 1992 to discuss the examination:

   Warren J. Eresian, OLB, Chief Examiner, NRC
   George E. Miller, Reactor Supervisor, University of California, Irvine

   Dr. Miller questioned four answers on the answer key, which were found to be typo-graphical errors. The answer key was corrected.

ENCLOSURE 2

U. S. NUCLEAR REGULATORY COMMISSION
NON-POWER REACTOR REQUALIFICATION EXAMINATION

FACILITY: U. of California - Irvine

REACTOR TYPE: TRIGA

DATE ADMINISTERED: 07/06/92

REGION: 5

CANDIDATE: _____

INSTRUCTIONS TO CANDIDATE:

Answers are to be written on the exam page itself, or the answer sheet provided. Write answers one side ONLY. Attach any answer sheets to the examination. Points for each question are indicated in parentheses for each question. A 70% overall is required to pass the examination.

Examinations will be picked up three (3) hours after the examination starts.

| CATEGORY VALUE | % OF TOTAL | CANDIDATE'S SCORE | % OF CATEGORY VALUE | CATEGORY |
|---|---|---|---|---|
| 20.00 | 33.33 | | | A. REACTOR THEORY, THERMODYNAMICS, AND FACILITY OPERATING CHARACTERISTICS |
| 20.00 | 33.33 | | | B. NORMAL AND EMERGENCY PROCEDURES AND RADIOLOGICAL CONTROLS |
| 20.00 | 33.33 | | | C. PLANT AND RADIATION MONITORING SYSTEMS |
| 60.00 | 100.00 | | | TOTALS |
| | | FINAL GRADE | % | |

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. 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.

7. Print your name in the upper right-hand corner of the answer sheets.

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

9. 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.

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

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

12. 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)

Which ONE of the following describes the response of the subcritical reactor to equal insertions of positive reactivity as the reactor approaches criticality at low power?

a. Each reactivity insertion causes a SMALLER increase in the neutron flux, resulting in a LONGER time to stabilize

b. Each reactivity insertion causes a LARGER increase in the neutron flux, resulting in a LONGER time to stabilize

c. Each reactivity insertion causes a SMALLER increase in the neutron flux, resulting in a SHORTER time to stabilize

d. Each reactivity insertion causes a LARGER increase in the neutron flux, resulting in a SHORTER time to stabilize

QUESTION: 002 (1.00)

The term "Shutdown Margin" describes:

a. the time required for the rods to fully insert

b. the departure from K-effective = 1.00

c. the amount of subcriticality, considering the worth of all rods

d. the amount of subcriticality with the most reactive rod fully withdrawn

QUESTION: 003 (1.00)

A factor in the six-factor formula which is most affected by control rod position is:

a. Resonance escape probability

b. Fast fission factor

c. Neutron reproduction factor

d. Thermal utilization factor

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

QUESTION: 004 (1.00)

Which ONE of the following is the reason for the -80 second period following a reactor scram?

a. the ability of U-235 to fission with source neutrons, which have an 80 second half-life.

b. The half-life of the longest-lived group of delayed neutron precursors is approximately 55 seconds.

c. The amount of negative reactivity added on a scram is greater than the Shutdown Margin.

d. The fuel temperature effect, which adds negative reactivity due to the temperature decrease following a scram.

QUESTION: 005 (1.00)

Which ONE of the following is true concerning the differences between prompt and delayed neutrons?

a. Prompt neutrons account for less than one percent of the neutron population while delayed neutrons account for approximately ninety-nine percent of the neutron population

b. Prompt neutrons are released during fast fissions while delayed neutrons are released during thermal fissions

c. Prompt neutrons are released during the fission process while delayed neutrons are released during the decay of fission products

d. Prompt neutrons are the dominating factor in determining the reactor period while delayed neutrons have little effect on the reactor period

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

QUESTION: 006 (1.00)

In a subcritical reactor, K eff is increased from 0.861 to 0.946. Which ONE of the following is the amount of reactivity that was added to the reactor core?

a. 0.085 delta k/k

b. 0.104 delta k/k

c. 0.161 delta k/k

d. 0.218 delta k/k

QUESTION: 007 (1.00)

With the reactor on a constant period, which transient requires the LONGEST time to occur?

A reactor power change of:

a. 5% power -- going from 1% to 6% power

b. 10% power -- going from 10% to 20% power

c. 15% power -- going from 20% to 35% power

d. 20% power -- going from 40% to 60% power

QUESTION: 008 (1.00)

The fuel temperature coefficient of reactivity is -1.25E-4 delta K/K/deg.C. When a control rod with an average rod worth of 0.1 % delta K/K/inch is withdrawn 10 inches, reactor power increases and becomes stable at a higher level. At this point, the fuel temperature has:

a. increased by 80 deg C

b. decreased by 80 deg C

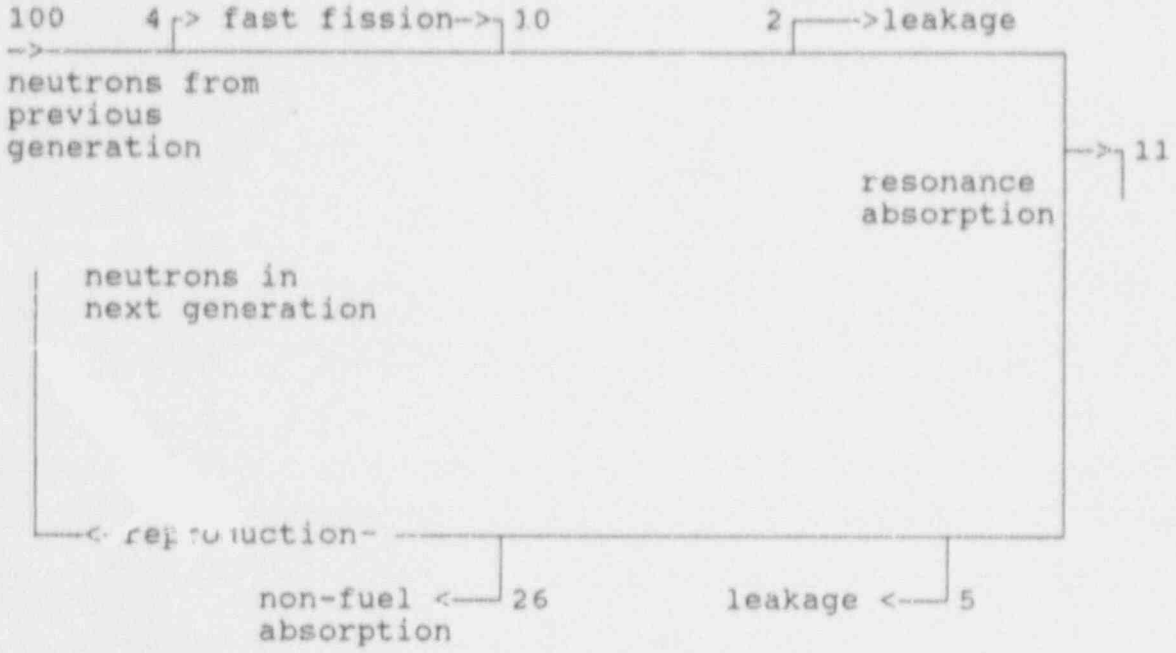
c. increased by 8 deg C

d. decreased by 8 deg C

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

QUESTION: 009 (2.00)

Given the following neutron life cycle for the fission of U-235:




The thermal utilization factor is:

a. 0.419

b. 0.620

c. 0.704

d. 1.613

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

QUESTION: 010 (1.00)

Starting with a critical reactor at low power, a control rod is withdrawn from position X and reactor power starts to increase. Neglecting any temperature effects, in order to terminate the increase with the reactor again critical but at a higher power, the control rod must be:

a. inserted deeper than position X

b. inserted, but not as far as position X

c. inserted back to position X

d. inserted, but exact position depends on power level

QUESTION: 011 (1.00)

The equations which describe the installed neutron source are:

a. Am-241 -> alpha + Np-237
Be-9 + alpha -> C-12 + neutron

b. Am-241 -> alpha + Np-237
B-10 + alpha -> N-13 + neutron

c. Am-241 -> beta + Cm-241
Be-9 + beta -> Li-8 + neutron

d. Am-241 -> beta + Cm-241
B-10 + beta -> Be-9 + neutron

QUESTION: 012 (1.00)

During a reactor startup, it is observed that the count rate is increasing linearly with time, with no rod motion. This meann:

a. the reactor is subcritical and the count rate increase is due to the buildup of delayed neutron precursors

b. the reactor is critical and the count rate increase is due to Am-Be source neutrons

c. the reactor is subcritical and the count rate increase is due to Am-Be source neutrons

d. the reactor is critical and the count rate increase i due to the buildup of delayed neutron precursors

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

QUESTION: 013 (1.00)

Which ONE of the following describes the difference between reflectors and moderators?

a. Reflectors decrease core leakage while moderators thermalize neutrons

b. Reflectors shield against neutrons while moderators decrease core leakage

c. Reflectors decrease thermal leakage while moderators decrease fast leakage

d. Reflectors thermalize neutrons while moderators decrease core leakage

QUESTION: 014 (1.00)

Which ONE of the following statements describes the difference between Differential and Integral (IRW) rod worth curves?

a. DRW relates the worth of the rod per increment of movement to rod position. IRW relates the total reactivity added by the rod to the rod position.

b. DRW relates the time rate of reactivity change to rod position. IRW relates the total reactivity in the core to the time rate of reactivity change.

c. IRW relates the worth of the rod per increment of movement to rod position. DRW relates the total reactivity added by the rod to the rod position.

d. IRW is the slope of the DRW at a given rod position

QUESTION: 015 (1.00)

Which ONE of the following elements will slow down fast neutrons most quickly, i.e. produces the greatest energy loss per collision?

a. Oxygen-16

b. Uranium-238

c. Hydrogen-1

d. Boron-10

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

QUESTION: 016 (1.00)

The term "Prompt Critical" refers to:

a. the instantaneous jump in power due to a rod withdrawal

b. a reactor which is supercritical using only prompt neutrons

c. a reactor which is critical using both prompt and delayed neutrons

d. a reactivity insertion which is less than Beta-effective

QUESTION: 017 (1.00)

The major contributor to the production of Xenon-135 in a reactor operating at full power is:

a. direct from the fission of Uranium-235

b. from the radioactive decay of Iodine

c. from the radioactive decay of Promethium

d. direct from the fission of Uranium-238

QUESTION: 018 (1.00)

During an approach to criticality experiment, the value of 1/R:

a. decreases toward zero

b. decreases toward one

c. increases toward infinity

d. increases toward one

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

QUESTION: 019 (1.00)

A reactor has been operating at full power for one week when a scram occurs. Twelve hours later, the reactor is brought critical and quickly raised to full power. Considering xenon effects only, to maintain a constant power level for the next few hours, control rods must be:

a. inserted

b. maintained at the present position

c. withdrawn

d. withdrawn, then inserted to the original position

(***** END OF CATEGORY A *****)

QUESTION: 001 (1.00)

The Safety Limit for fuel element temperature is:

a. 1000 deg F

b. 1000 deg C

c. 800 deg F

d. 800 deg C

QUESTION: 002 (1.00)

The reactor is shutdown when it is:

a. subcritical by at least $1.00

b. subcritical by at least $1.00 with the highest worth rod withdrawn

c. subcritical by at least $0.50

d. subcritical by at least $0.50 with the highest worth rod withdrawn

QUESTION: 003 (1.00)

Following an evacuation from the facility, a radiation demarcation line is established. The radiation level used to determine this line is:

a. 100 mR/hr

b. 5 mR/hr

c. 2 mR/hr

d. 0.5 mR/hr

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

QUESTION: 004 (1.00)

In accordance with the Technical Specifications, which ONE situation below is permissible for reactor operation?

a. drop time of a standard control rod = 1 second

b. fuel rod temperature = 1100 deg F

c. shutdown margin = 0.050 % delta k/k

d. pulsing the reactor with the ventilation system inoperable

QUESTION: 005 (1.00)

How would an accessible area be posted if the radiation level in the area is 40 mR/hr?

a. CAUTION- RADIATION AREA

b. CAUTION- HIGH RADIATION AREA

c. CAUTION- AIRBORNE RADIOACTIVITY AREA

d. CAUTION- RESTRICTED AREA

QUESTION: 006 (1.00)

The three Safety System Channels required to be operable in all modes of operation are:

a. fuel element temperature scram, reactor power level scram, and manual scram

b. fuel element temperature scram, manual scram, and seismic scram

c. manual scram, reactor power level scram, and seismic scram

d. reactor power level scram, seismic scram and fuel element temperature scram

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

QUESTION: 007 (1.00)

The measuring channels required to be operable in all modes of operation are:

a. 1 fuel element temperature, 1 reactor power level, 1 area radiation monitor

b. 2 reactor power levels, 1 fuel element temperature, 1 continuous air monitor

c. 1 reactor power level, 1 continuous air monitor, 2 area radiation monitors

d. 2 area radiation monitors, 1 fuel element temperature, 1 continuous air monitor

QUESTION: 008 (1.00)

Which ONE of the following requires the direct supervision of a licensed Senior Reactor Operaor?

a. an individual operating the reactor who is licensed at another reactor facility

b. a student operating the reactor for training as part of a course

c. a reactor operator trainee during a normal startup

d. an unlicensed individual moving fuel

QUESTION: 009 (1.00)

Who has the authority to authorize resumption of operations following an unscheduled shutdown?

a. The Operator in charge

b. any Senior Reactor Operator

c. the Senior Reactor Operator on call

d. the Reactor Administrator

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

QUESTION: 010 (1.00)

In order to conduct a reactor power calibration, the two parameters required in addition to elapsed time are:

a. pool temperature and pool level

b. pool temperature and primary system flow rate

c. pool leval and secondary system flow rate

d. primary and secondary system flow rates

QUESTION: 011 (1.00)

In the reactor log book, entries which are related to fuel changes are:

a. written in red ink

b. flagged with a red sticker

c. written in green ink

d. flagged with a green sticker

QUESTION: 012 (1.00)

A radioactive sample (0.7 Mev gamma radiation) from an experiment results in a dose rate of 100 mR/hr at a distance of one foot from the sample. One-half inch thick lead sheets are available for shielding. The minimum number of sheets required to lower the dose rate to 1 mR/hr at a distance of one foot is:

a. 2

b. 3

c. 4

d. 5

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

QUESTION: 013 (1.00)

A tour group of six persons escorted by a reactor operator is about to enter the facility. What is the minimum number of self-reading dosimeters that must be issued to the tour group?

a. 0

b. 1

c. 2

d. 6

QUESTION: 014 (1.00)

The best absorber of high energy (~ 1 Mev) gamma radiation is:

a. lead

b. water

c. aluminum

d. polyethylene

QUESTION: 015 (1.00)

Following an experiment, the principal responsibility for properly disposing of radioactive waste lies with the:

a. Operator in charge

b. Reactor Administrator

c. experimenter

d. Senior Reactor Operator

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

QUESTION: 016 (1.00)

The CONTROLLED ACCESS area is defined to be:

a. the control room and the reactor room

b. the control room, the reactor room, and the laboratory room

c. the control room, the reactor room, the laboratory rooms

d. the control room, the reactor room, the laboratory rooms and the office

QUESTION: 017 (1.00)

A radioactive sample was removed from the reactor core, reading 25 Rem/hour. Four (4) hours later, the sample reads 2.5 Rem/hour. What is the approximate time required for the sample to decay to 100 mRem/hour from the 2.5 Rem/hour point?

a. 1.9 hours

b. 3.8 hours

c. 5.6 hours

d. 7.8 hours

QUESTION: 018 (1.00)

In the reactor log book, resolution of an unusual event is indicated by:

a. red underlining

b. green underlining

c. a red sticker

d. a green sticker

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

QUESTION: 019 (1.00)

Which two individuals must review a proposed experiment to determine whether it is a "tried" or "untried" experiment?:

a. a member of the Radiological Safety Staff and the Reactor Supervisor

b. a member of the Radiological Safety Staff and a member of the Reactor Operations Committee

c. the experimenter and a member of the Reactor Operations Committee

d. the experimenter and the reactor supervisor

QUESTION: 020 (1.00)

A temporary change to a SOP which does not alter its original intent may be made by the:

a. Operator in charge

b. Senior Reactor Operator

c. Reactor Administrator

d. Reactor Supervisor

(***** END OF CATEGORY B *****)

QUESTION: 001 (1.00)

The TRIGA fuel elements consist of a mixture of zirconium hydride and:

a. 70% enriched uranium with stainless steel clad

b. 20% enriched uranium with stainless steel clad

c. 70% enriched uranium with aluminum clad

d. 20% enriched uranium with aluminum clad

QUESTION: 002 (1.00)

The Emergency Purge System is activated by:

a. high fuel temperature scram

b. low reactor pool level

c. area radiation monitor high alarm

d. continuous air monitor high alarm

QUESTION: 003 (1.00)

When a main power failure has occurred, the power to operate the area radiation and continuous air monitors comes from:

a. building emergency batteries and inverter

b. building emergency diesel generator

c. Southern California Edison emergency line

d. batteries and inverter in the control cabinet

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

QUESTION: 004 (1.00)

During steady-state power operations, the two indications that are displayed on the dual pen strip chart recorder are:

a. percent power channel and count rate channel

b. percent power channel and log power channel

c. linear power channel and count rate channel

d. linear power channel and log power channel

QUESTION: 005 (1.00)

When the reactor is on automatic control:

a. both the shim rod and the regulating rod move together to stay banked

b. either the shim rod or the regulating rod moves one at a time

c. only the shim rod moves

d. only the regulating rod moves

QUESTION: 006 (1.00)

For a standard control rod, the UP light is ON, the DOWN light is OFF, and the CONT/ON light is OFF. This indicates that:

a. the rod and drive are not in contact, the rod is full up and the drive is full down

b. the rod and drive are both full up

c. the rod and drive are both full down

d. the rod and drive are not in contact, the drive is full up and the rod is full down

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

QUESTION: 007 (1.00)

Following the release of fission products from a damaged fuel element into the reactor room, the ventilation system emergency purge fan:

a. starts at 4325 CFM and the exhaust dampers shut

b. starts at 4325 CFM and the supply dampers shut

c. starts at 250 CFM and the exhaust dampers shut

d. starts at 250 CFM and the supply dampers shut

QUESTION: 008 (1.00)

Which ONE of the following is a control rod drive interlock?

a. above reactor power of 1 kW, transient rods cannot be operated in the pulse mode

b. only one standard rod at a time can be moved in the pulse mode

c. control rods cannot be withdrawn unless the count rate is greater than 1 CPS in the steady state mode

d. two control rods cannot be moved at the same time above 1 kW in the steady state mode

QUESTION: 009 (1.00)

The percent power channel uses a (an):

a. uncompensated ion chamber

b. compensated ion chamber

c. fission chamber

d. boron-trifluoride detector

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

QUESTION: 010 (1.00)

The Water Cooling System water returns to the pool above the core in order to:

a. aid in the mixing of the water, which results in the pool attaining a uniform temperature

b. interrupt the vertical convective currents and therefore reduce the pool surface dose rate

c. reduce pool surface temperature, since the return water is cooler

d. not interfere with the pool skimmer, which takes its suction at the pool surface

QUESTION: 011 (1.00)

The fast transient rod has a double-length poison section in order to:

a. provide more negative reactivity to allow larger pulses

b. provide a faster reactivity change during pulses

c. provide more negative reactivity during a scram

d. provide a more constant change of reactivity as the rod is inserted or withdrawn

QUESTION: 012 (1.00)

When the fast transient rod is fully withdrawn and used as a safety rod, it can be reinserted without affecting the position of the other rods by:

a. depressing the DOWN pushbutton

b. depressing the FIRE pushbutton a second time

c. depressing the ARM pushbutton a second time

d. depressing the CONT/ON pushbutton

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

QUESTION: 013 (1.00)

For a standard control rod, the UP light is OFF, the DOWN light is OFF, and the CONT/ON light is ON. This indicates that:

a. the rod and drive are in contact, and are both full down

b. the rod and drive are in contact, and are both full up

c. the rod and drive are not in contact, and the rod and drive are somewhere between full up and full down

d. the rod and drive are in contact, and are somewhere between full up and full down

QUESTION: 014 (1.00)

In the Water Cooling and Purification Systems, water conductivity is measured:

a. at the discharge of the 7.5 HP pump

b. at the suction of the 2 HP pump

c. between the filter and demineralizers

d. at the outlet of the heat exchanger prior to entering the pool

QUESTION: 015 (1.00)

In the Automatic Control mode, the controlling signal is:

a. reactor power as measured by the percent power channel

b. reactor power as measured by the log power channel

c. reactor power as measured by the linear power channel

d. reactor period as measured by the linear power channel

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

QUESTION: 016 (1.00)

Streaming of radiation from the loading and removal tube to the rotary rack is prevented by:

a. the tube not being in line with the core

b. the tube being lined with cadmium to absorb leaking neutrons

c. a plastic rod inserted into the top of the tube

d. large radius bends in the tube

QUESTION: 017 (1.00)

A facility evacuation is initiated by:

a. an alarm from the CAM system

b. an alarm from the Area Radiation Monitoring system

c. actuation of the fire alarm system

d. an alarm from the Gamma Area Monitor system

QUESTION: 018 (1.00)

The reactor tank water level alarm will trip at:

a. three feet below normal level

b. five feet below normal level

c. ten feet above the bottom of the reactor tank

d. five feet above the reactor top grid plate

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

QUESTION: 019 (1.00)

Which ONE of the following types of detector is used in the Area Radiation Monitor System?

a. Geiger-Mueller tube

b. Scintillation detector

c. Ionization chamber

d. Proportional counter

QUESTION: 020 (1.00)

The compensated ion chamber is able to discriminate between:

a. gamma and beta radiation

b. gamma and alpha radiation

c. neutrons and fission fragments

d. neutrons and gamma radiation

(***** END OF CATEGORY C *****)
(***** END OF EXAMINATION *****)

A. RX THEORY, THERMO & FAC OP CHARS

ANSWER: 001 (1.00)
B.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 3-24

ANSWER: 002 (1.00)
D.
REFERENCE:
Technical Specifications, Section 3.1.a

ANSWER: 003 (1.00)
D.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 3-15

ANSWER: 004 (1.00)
B.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 3-22

ANSWER: 005 (1.00)
C.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 3-16

ANSWER: 006 (1.00)
B.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 3-16

ANSWER: 007 (1.00)
A.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 3-19

ANSWER: 008 (1.00)
A.
REFERENCE:
SOP 4.4

ANSWER: 009 (2.00)
C.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 3-7

ANSWER: 010 (1.00)
C.
REFERENCE:
Everybody should know this

ANSWER: 011 (1.00)
A.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 5-25a

ANSWER: 012 (1.00)
B.
REFERENCE:
Requal Operator Exam Test Bank

ANSWER: 013 (1.00)
A.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 2-1

ANSWER: 014 (1.00)
A.
REFERENCE:
SOP 4.4

ANSWER: 015 (1.00)
C.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 3-9

ANSWER: 016 (1.00)
B.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 3-20

ANSWER: 017 (1.00)
B.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 3-33

ANSWER: 018 (1.00)
A.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 3-58

ANSWER: 019 (1.00)
A.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 3-38

(***** END OF CATEGORY A *****)

B. NORMAL/EMERG PROCEDURES & RAD CON

ANSWER: 001 (1.00)
B.
REFERENCE:
Technical Specifications, Section 2.1

ANSWER: 002 (1.00)
A.
REFERENCE:
Technical Specifications, Section 1.1

ANSWER: 003 (1.00)
C.
REFERENCE:
SOP 6.3

ANSWER: 004 (1.00)
B.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 7-15

ANSWER: 005 (1.00)
A.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 8-11

ANSWER: 006 (1.00)
B.
REFERENCE:
Technical Specifications, Section 3.4

ANSWER: 007 1.00)
D.
REFERENCE:
Technical Specifications, Section 3.3

ANSWER: 008 (1.00)
D.
REFERENCE:
SOP 4.5

ANSWER: 009 (1.00)
B.
REFERENCE:
SOP 4.1

ANSWER: 010 (1.00)
A.
REFERENCE:
SOP 4.3

ANSWER: 011 (1.00)
A.
REFERENCE:
SOP 4.2

ANSWER: 012 (1.00)
C.
REFERENCE:
Radiation Safety Handbook, Page 9

ANSWER: 013 (1.00)
C.
REFERENCE:
SOP 4.9

ANSWER: 014 (1.00)
A.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 8-5

ANSWER: 015 (1.00)
C.
REFERENCE:
SOP 5.7

ANSWER: 016 (1.00)
C.
REFERENCE:
SOP 4.9

ANSWER: 017 (1.00)
C.
REFERENCE:
Radiation Safety Handbook, Page 19

ANSWER: 018 (1.00)
D.
REFERENCE:
SOP 4.2

ANSWER: 019 (1.00)
A.
REFERENCE:
SOP 2.2

ANSWER: 020 (1.00)
D.
REFERENCE:
SOP 1.3

(***** END OF CATEGORY B *****)

C. PLANT AND RAD MONITORING SYSTEMS

ANSWER: 001 (1.00)
B.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 5-1

ANSWER: 002 (1.00)
D.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 4-13

ANSWER: 003 (1.00)
B.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 9-2

ANSWER: 004 (1.00)
D.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 6-21

ANSWER: 005 (1.00)
D.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 6-21

ANSWER: 006 (1.00)
D.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 6-13

ANSWER: 007 (1.00)
D.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 4-13

ANSWER: 008 (1.00)
A.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 6-22

ANSWER: 009 (1.00)
A.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 6-17

ANSWER: 010 (1.00)
B.
REFERENCE:
SAR, Page 8-16

ANSWER: 011 (1.00)
B.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 5-5

ANSWER: 012 (1.00)
C.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 6-14

ANSWER: 013 (1.00)
D.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 6-13

ANSWER: 014 (1.00)
C.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 5-34

ANSWER: 015 (1.00)
C.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 6-17

ANSWER: 016 (1.00)
D.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 5-26

ANSWER: 017 (1.00)
C.
REFERENCE:
SOP 6.5

ANSWER: 018 (1.00)
B.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 6-20

ANSWER: 019 (1.00)
A.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 9-3

ANSWER: 020 (1.00)
D.
REFERENCE:
TRIGA Reactor Instruction Manual, Page 7-15

(***** END OF CATEGORY C *****)

ANSWER SHEET

MULTIPLE CHOICE (Circle or X your choice)

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

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 _____

011 a b c d _____

012 a b c d _____

013 a b c d _____

014 a b c d _____

015 a b c d _____

016 a b c d _____

017 a b c d _____

018 a b c d _____

019 a b c d _____

(***** END OF CATEGORY A *****)

ANSWER SHEET

MULTIPLE CHOICE (Circle or X your choice)

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

| | | | | | |
|---|---|---|---|---|---|
| 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 | _____ |
| 011 | a | b | c | d | _____ |
| 012 | a | b | c | d | _____ |
| 013 | a | b | c | d | _____ |
| 014 | a | b | c | d | _____ |
| 015 | a | b | c | d | _____ |
| 016 | a | b | c | d | _____ |
| 017 | a | b | c | d | _____ |
| 018 | a | b | c | d | _____ |
| 019 | a | b | c | d | _____ |
| 020 | a | b | c | d | _____ |

(***** END OF CATEGORY B *****)

ANSWER SHEET

MULTIPLE CHOICE (Circle or X your choice)

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

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 _____

011 a b c d _____

012 a b c d _____

013 a b c d _____

014 a b c d _____

015 a b c d _____

016 a b c d _____

017 a b c d _____

018 a b c d _____

019 a b c d _____

020 a b c d _____

(***** END OF CATEGORY C *****)

# EQUATION SHEET

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

$SUR = 26.06/\tau$

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

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

$DR = DR_o e^{-\lambda t}$

$\rho = (Keff-1)/Keff$

$CR_1\,(1-Keff)_1 = CR_2\,(1-Keff)_2$

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

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

$DR_1D_1^2 = DR_2D_2^2$

$DR = 6CiE/D^2$

---

1 Curie = $3.7 \times 10^{10}$ dps

1 BTU = 778 ft-lbf

1 Mw = $3.41 \times 10^6$ BTU/hr

1 hp = $2.54 \times 10^3$ BTU/hr

°F = 9/5°C + 32

°C = 5/9 (°F - 32)