March 20, 2001

Dr. Gerald E. Tripard, Director
Nuclear Radiation Center
Washington State University
Pullman, WA 99164

SUBJECT: INITIAL EXAMINATION REPORT NO. 50-027/OL-01-01

Dear Dr. Tripard:

During the week of February 26, 2001, the NRC administered initial examinations to employees of your facility who had applied for a license to operate your Washington State University Reactor. The examination was conducted in accordance with NUREG-1478, "Non-Power Reactor Operator Licensing Examiner Standards," Revision 1. At the conclusion of the examination, the examination questions and preliminary findings were discussed with those members of your staff identified in the enclosed report.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosures will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/NRC/ADAMS/indesx.html. The NRC is forwarding the individual grades to you in a separate letter which will not be released publicly. Should you have any questions concerning this examination, please contact Paul Doyle at (301) 415-1058 or by Internet E-mail at pvd@nrc.gov.

Sincerely,

/RA/

Ledyard B. Marsh, Chief
Events Assessment, Generic Communications
and Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-27

Enclosures:
1. Initial Examination Report No. 50-027/OL-01-01
2. Facility comments with NRC resolution
3. Examination and answer key (RO/SRO)

cc w/encls:

Please see next page

cc:

State Planning Division
Office of Financial Management
Room 105, House Office Building
Olympia, WA 98504

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Nuclear Radiation Center
Washington State University
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ACCESSION NO.: ML010740149 **NRR-079**

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NAME	PDoyle:rdr		EBarnhill		LMarsh	
DATE	03/ 07 /2001		03/ 16 /2001		03/ 19 /2001	

C = COVER **E = COVER & ENCLOSURE** **N = NO COPY**

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

REPORT NO.: 50-027/OL-01-01

FACILITY DOCKET NO.: 50-027

FACILITY LICENSE NO.: R-76

FACILITY: Washington State University

EXAMINATION DATES: February 27, 2001

EXAMINER: Paul Doyle, Chief Examiner

SUBMITTED BY: ***/RA/*** 03/07/2001
Paul V. Doyle Jr., Chief Examiner Date

SUMMARY:

The NRC administered operator licensing examinations to one Senior Reactor Operator (Instant) candidate and one Senior Reactor Operator (Upgrade) candidate. Both candidates passed all portions of their respective examinations.

REPORT DETAILS

1. Examiners:
   Paul V. Doyle Jr., Chief Examiner

2. Results:

	RO PASS/FAIL	SRO PASS/FAIL	TOTAL PASS/FAIL
Written	0/0	1/0	1/0
Operating Tests	0/0	2/0	2/0
Overall	0/0	2/0	2/0

3. Exit Meeting:
   Paul Doyle, NRC, Examiner
   Stephanie Sharp, Washington State University, Acting Reactor Supervisor
   Dr. Gerald Tripard, Washington State University, Nuclear Radiation Center Director
   Brian Bunce, Washington State University, Reactor Technician II

   The examiner reported that he did not note any generic weaknesses in the candidates tested, and reminded the facility staff of the importance to get any written examination comments to the examiner as soon as possible. The examiner thanked the facility staff for their support in the administration of the examinations.

ENCLOSURE 1

Facility Comments and NRC Resolution

Facility Comments

In a review of the Senior Reactor Operator's written exam given at Washington State University on 2/27/01, we have the following comments.

Question C.3 has the wrong answers to parts c and e. Both answers should be alarm and are listed in the answer key as being scrams.

Question C.4 part c is confusing and poorly written and we request that part c be stricken from the exam.

Question C.7 has the wrong answer on the key (d) and should be (c) reflect neutrons, thereby reducing neutron leakage from the core.

These are our final comments. Thank you for your time and the long hours of work given in creating this exam. We await your decision. Please e-mail to confirm receipt of this message.

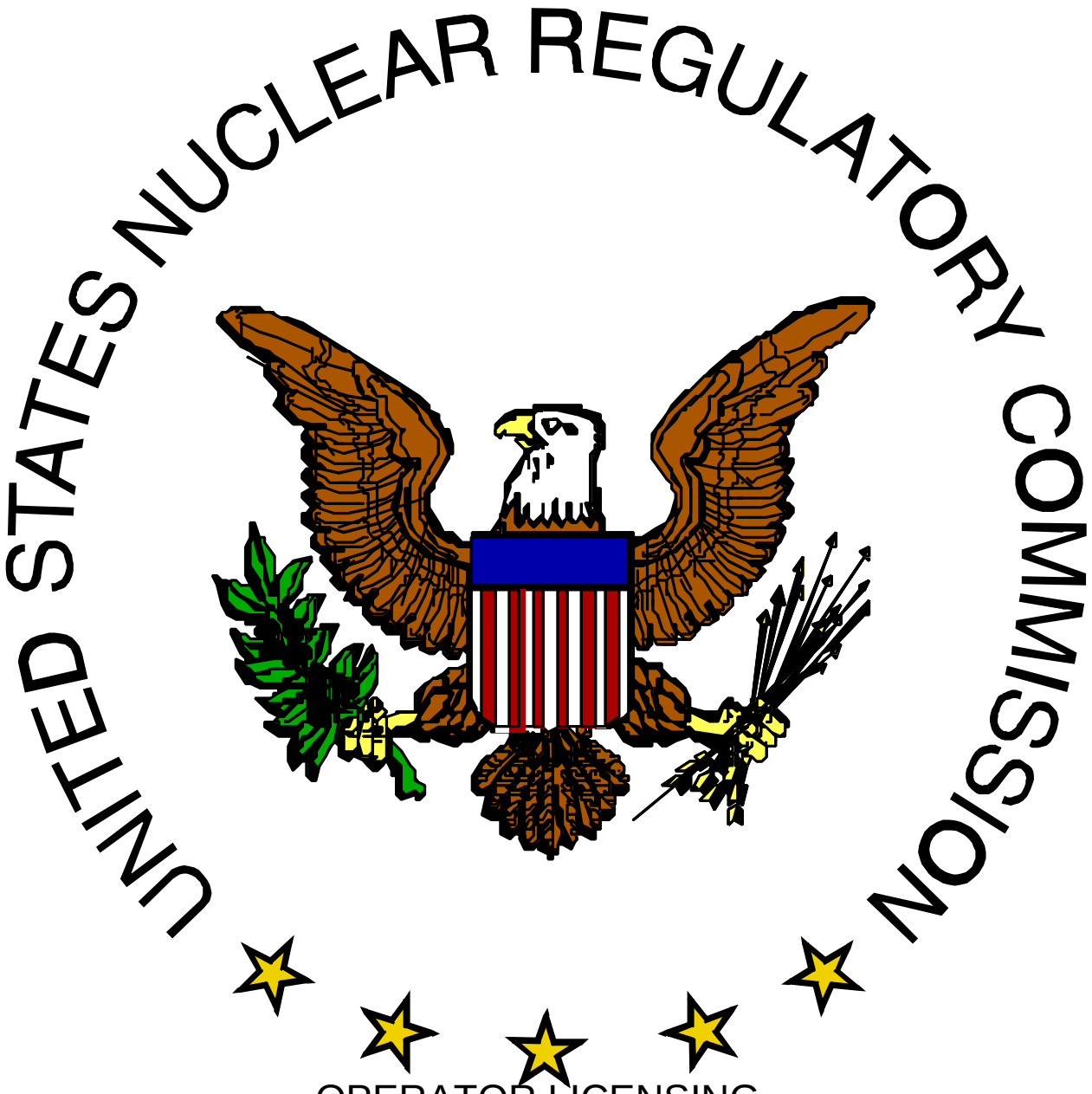
NRC Resolution

All comments accepted as written.

ENCLOSURE 2

WASHINGTON STATE UNIVERSITY

With Answer Key



OPERATOR LICENSING
EXAMINATION
February 27, 2001

ENCLOSURE 3

QUESTION (B.1) [2.0 points, ½ point each]
Match each of the Technical Specification Limits in column A with its corresponding value in column B. (Each limit has only one answer, values in Column B may be used more once, more than once or not at all.)

	Column A		Column B
a.	Minimum Shutdown Margin	1	$8.00
b.	Each secured Experiment	2	$5.00
c.	Maximum Excess Reactivity	3	$2.00
d.	Total worth of all experiments	4	$1.00
e.	Each Unsecured Experiment	5	$0.25

QUESTION (B.2) [1.0 point]
A Channel calibration of the power level monitoring channels by the calorimetric method was last performed on July 31, 2000. Which one of the following dates is the latest the maintenance may be performed again without exceeding a Technical Specifications requirement?

a. Feb. 28, 2001

b. Mar. 15, 2001

c. July 31, 2001

d. Oct. 31, 2001

QUESTION (B.3) [1.0 point]
The reactor scrams due to loss of power (electrical storms). Prior to restarting the reactor you must get permission from (as a minimum)

a. An NRC licensed Reactor Operator

b. An NRC licensed Senior Operator

c. The Reactor Supervisor

d. The Reactor Manager

QUESTION (B.4) [2.0 points, ½ point each]
Identify each of the following as either a Safety Limit (SL), Limiting Safety System Setting (LSSS).

a. The reactor power shall not exceed 1.3 MW under any condition of operation.

b. 500°C as measured in in an instrumented fuel rod located in the central region of the core.

c. The maximum temperature in a FLIP-type TRIGA fuel rod shall not exceed 1150°C under any conditions of operation.

d. All fuel elements shall be stored in a geometrical array where the K_{eff} is less than 0.8 for all conditions of moderation.

QUESTION B.5 [2.0 points, ½ point each]
Identify each of the following actions as either a channel **CHECK**, a channel **TEST**, or a channel **CAL**ibration.

a. Prior to startup you place a known radioactive source near a radiation detector, noting meter movement and alarm function operation.

b. During startup you compare all of your nuclear instrumentation channels ensuring they track together.

c. At power, you perform a heat balance (calorimetric) and determine you must adjust Nuclear Instrumentation readings.

d. During a reactor shutdown you note a -80 second period on Nuclear Instrumentation.

QUESTION (B.6) [1.0 points]
Which ONE of the following is the 10 CFR 20 definition of **TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE)**?

a. The sum of the deep does equivalent and the committed effective dose equivalent.

b. The dose that your whole body receives from sources outside the body.

c. The sum of the external deep dose and the organ dose.

d. The dose to a specific organ or tissue resulting from an intake of radioactive material.

QUESTION (B.7) [2.0 points, ½ point each]
Match the radiation reading from column A with its corresponding radiation area classification (per 10 CFR 20) listed in column B.

COLUMN A	COLUMN B
a. 10 mRem/hr	1. Unrestricted Area
b. 150 mRem/hr	2. Radiation Area
c. 10 Rem/hr	3. High Radiation Area
d. 550 Rem/hr	4. Very High Radiation Area

QUESTION (B.8) [1.0.]
You must have the presence of Health Physics personnel present to handle a radioactive sample with an expected radiation field in excess of …

a. 1000 mrem/hr

b. 500 mrem/hr

c. 100 mrem/hr

d. 50 mrem/hr

QUESTION (B.9) [1.0 point]
How many hours per calendar quarter must you perform the functions of an RO or SRO to maintain an active RO or SRO license?

a. 2

b. 4

c. 8

d. 12

QUESTION (B.10) [1.0 point]
Which ONE of the following locations is the normal (no evacuation required) Emergency Support Center per the Emergency Plan?

a. Reactor Control Room

b. Reactor Shop

c. Sidewalk in front of the Nuclear Radiation Center Main Office.

d. Nuclear Radiation Center Main Office.

QUESTION (B.11) [1.0 point]
Technical Specification 5.5 requires "All fuel shall be stored in a geometrical array where the K_{eff} is less than ____ for all conditions of moderation."

a. 0.95

b. 0.90

c. 0.85

d. 0.80

QUESTION (B.12) [1.0 point]
10CFR50.54(x) states: *"A licensee may take reasonable action that departs from a license condition or a technical specification (contained in a license issued under this part) in an emergency when this action is immediately needed to protect the public health and safety and no action consistent with license conditions and technical specifications that can provide adequate or equivalent protection is immediately apparent.* 10CFR50.54(y) states that the minimum level of management which may authorize this action is …

a. any Reactor Operator licensed at facility

b. any Senior Reactor Operator licensed at facility

c. Reactor Supervisor (or equivalent name at facility).

d. U.S. NRC Project Manager

QUESTION (B.13) [1.0 point]
The ***Quality Factor*** is used to convert …

a. dose in rads to dose equivalent in rems.

b. dose in rems to dose equivalent in rads.

c. contamination in rads to contamination equivalent in rems

d. contamination in rems to contamination equivalent in rads.

QUESTION (B.14) [1.0 point]
Two inches of shielding reduce the gamma exposure in a beam of radiation from 400 mR/hr to 200 mR/hr. If you add an additional four inches of shielding what will be the new radiation level? (Assume all reading are the same distance from the source.)

a. 25 mR/hr

b. 50 mR/hr

c. 75 mr/hr

d. 100 mr/hr

QUESTION (B.15) [1.0 point]
Which ONE of the listed emergency classifications is NOT applicable at Washington State University?

a. Notification of Unusual Event

b. General Emergency

c. Safety Event – (Non-Reactor Related)

d. Alert

QUESTION B.16[1.0 point, ¼ each]
Match the Federal Regulation chapter in column A with the requirements covered in column B.

	Column A		Column B
a.	10 CFR 20	1.	Operator Licenses
b.	10 CFR 50	2.	Facility Licenses
c.	10 CFR 55	3.	Radiation Protection
d.	10 CFR 73	4.	Special Nuclear Material

QUESTION C.1[2.0 points, ½ each]
Match the purification system functions in column A with the purification component listed in column B

Column A	Column B
a. remove floating dust, bug larvae, etc.	1. Demineralizer (Ion Exchanger)
b. remove dissolved impurities	2. Skimmer
c. remove suspended solids	3. Filter (strainer)
d. maintain pH	

QUESTION C.2[1.0 point]
Which ONE of the choices correctly identifies the radiation detector signal which if it trips will realign the ventilation system to dilute mode?

a. Continuous Air Monitor WARN alarm

b. Continuous Air Monitor HIGH alarm

c. Exhaust Gas Monitor WARN alarm

d. Exhaust Gas Monitor HIGH alarm.

QUESTION C.3[2.0 points, ¼ each]
For the eight console alarms listed below indicate whether they will cause an alarm only or a scram.

a. Continuous Air Monitor

b. Low Pulse Air

c. High Conductivity

d. Beam Port Plugs

e. Low Pool Water Level

f. Loss of High Voltage to Power Channels

g. Conductivity

h. High Fuel Temperature

QUESTION C.4 [2.0 points, ~~½ point each~~ ⅔ point each]
For the components listed in a through d below, identify the correct label(s) from the figure (1 through 6) provided. (Note: Items in column B may be used more than once, or not at all. Only one answer per letter in column A)

a. Fan(s) which run(s) in Normal mode

b. Fan(s) which run(s) in Dilute mode

~~c. Dampers which maintain static pressure (any mode)~~ This part deleted per facility comment.

d. Absolute Filter

QUESTION C.5 [1.0 point]
Following a reactor power calibration if necessary power reading on the Nuclear Instruments is adjusted by

a. adjusting the physical position (up or down) of the detector.

b. adjusting the high voltage signal to the detector.

c. adjusting the gain of the preamplifier circuit.

d. adjusting the meter face.

QUESTION C.6 [1.0 point]
During a reactor scram, damage to electrically operated control rods is prevented by …

a. A small spring located at the bottom of the rod.

b. A piston attached to the upper end of the safety rod enters a special damping cylinder as the rod approaches the full insert position.

c. An electrical-mechanical brake energizes when the rod down limit switch is energized.

d. A dashpot which is positioned at the end of the shaft travel which decelerates the rod for the last five inches of fall.

QUESTION C.7 [1.0 point]
The purpose of the graphite slugs located at the top and bottom of each fuel rod is …

a. absorb neutrons, thereby reducing neutron embrittlement of the upper and lower guide plates.

b. absorb neutrons, thereby reducing neutron leakage from the core.

c. reflect neutrons, thereby reducing neutron leakage from the core.

d. couple neutrons from the core to the nuclear instrumentation, decreasing shadowing effects.

QUESTION C.8 [1.0 point]
Which ONE of the following is the main function performed by the DISCRIMINATOR circuit in the startup channel?

a. To generate a current signal equal and of opposite polarity as the signal due to gammas generated within the Log-N Channel Detector.

b. To filter out small pulses due to gamma interactions, passing only pulses due to neutron events within the Log-N Channel Detector.

c. To convert the linear output of the Log-N Channel Detector to a logarithmic signal for metering purposes.

d. To convert the logarithmic output of the metering circuit to a δt (differential time) output for period metering purposes.

QUESTION C.9 [1.0 point]
Which ONE of the following parameters is NOT measured in the Primary Cooling Loop?

a. Temperature

b. Pressure

c. Conductivity

d. pH

QUESTION C.10 [1.0 point]
You've been asked to retrieve a rabbit sample. There is some concern that the experimenter made a math error and the sample may have a stronger radiation field than anticipated. Which ONE of the following detectors would you use as you approach the sample?

a. Geiger-Müller

b. GeLi

c. Scintillation

d. Ion Chamber

QUESTION C.11 [1.0 point]
Which ONE of the following is the actual method used to determine standard control rod position from fully inserted to fully withdrawn?

a. A logic circuit receives input from two sensors which count 100 pulses per revolution along with detecting direction, converting these signals to rod position.

b. A potentiometer, driven by the rod drive motor, generates a signal proportional to rod position.

c. As the rod moves up and down, the magnet opens and closes a series of 100s of limits switches which generate a signal which is converted to rod position.

d. As the rod moves, it move into or out of a coil, generating a signal proportional to rod position.

QUESTION C.12 [1.0 point]
Which ONE of the following describes the response of the five control blades (rods) to a reactor scram signal during NORMAL operation.

a. All five control blades (rods) will scram.

b. Shim blades #1, #2 and #4 will scram. Transient rod #3 and regulating blade #5 will remain as is.

c. Shim blades #1, #2 and #4, and Transient rod #3 will scram. Regulating blade #5 will remain as is.

d. Shim blades #1, #2 and #4 and Regulating blade #5 will scram. Transient Rod #3 will remain as is.

QUESTION C.13 [1.0 point]
Which one of the following describes the operation of the containment building ventilation automatic dampers on a signal which causes the system to go from normal to dilute mode?

a. Dampers 1 and 4 close. Dampers 2 and 3 open. Damper 6 maintains static pressure.

b. Dampers 2, 3 and 6 close. Dampers 1 opens. Damper 4 maintains static pressure.

c. Dampers 2 and 3 close. Dampers 1 and 4 open. Damper 6 maintains static pressure.

d. All Dampers close.

QUESTION C.14 [1.0 point]
Which ONE of the following materials is **NOT** used for neutron absorption in the control blades (1 through 5).

a. hafnium

b. boron-carbide

c. boral (boron and aluminum alloy)

d. stainless-steel

QUESTION C.15 [1.0 point]
WHICH ONE of the following detectors is used primarily to measure N^{16} release to the environment?

a. NONE, N^{16} has too short a half-life to require environmental monitoring.

b. Continuous Air Monitor

c. Exhaust Gas Monitor

d. Bridge Area Monitor

QUESTION C.16 [2.0 points, ½ each]
For each of the gasses listed in column A identify its primary source (i.e. neutron irradiation of air, neutron irradiation of water or fission product).

a. H^3

b. N^{16}

c. Ar^{41}

d. Xe^{138}

B.1 a, 5; b, 3; c, 1; d, 2; e, 4
REF: Technical Specifications §§ 3.2, 3.4, 3.10 (1)(2) &(3)

B.2 d
REFERENCE T.S. § 4.3(3)

B.3 b
REF: SOP 4 § A.3.c.

B.4 a, LCO; b, LSSS; c, SL; d, LCO
REF: T.S. a: § 3.1.a; b: § 2.2.a; c: § 2.1.b; d § 3.8.d

B.5 a, Test; b, Check; c, Cal; d, Check
REF: Technical Specification 1.3 Definitions, p. 2.

B.6 a
*REF: 10 CFR 20.1003 *Definititions*

B.7 a, 2; b, 3; c, 3; d, 4
*REF: 10 CFR 20.1003, Definitions

B.8 c
REFERENCE SOP 1 § L, 2nd ¶.

B.9 b
REF: 10CFR55.53(e).

B.10 d
REF: Emergency Plan, § 8.1.

B.11 d
REF: Technical Specification 5.5(1)

B.12 b
REF: 10CFR50.54(y)

B.13 a
REF: 10CFR20.1004.

B.14 b
REF: Nuclear Power Plant Health Physics and Radiation Protection, Research Reactor Version©1988, § 9.2.3 "Half-Thickness and Tenth-Thickness"

B.15 b
REF: Emergency Plan, § 4.0 Emergency Classification System

B.16 a, 3; b, 2; c, 1; d, 4
REFERENCE Facility License and 10 CFR Parts 20, 50, 55 and 73

C.1a, 2; b, 1; c, 3; d, 1
REF: SAR § 4.10, figure 4.10-1.

C.2b
REF: SOP 19 § C.2.d.2.a.2. p. 5

C.3a, Alarm; b, Alarm; c, ~~Scram~~ Alarm; d, Alarm; e, ~~Scram~~ Alarm; f, Scram; g, Alarm; h, Scram Answers changed per facility comment.
REF: Old NRC exam questions combined and rewritten.

C.4a, 9 & 10; b, 5; ~~c, 3 & 6~~ deleted per facility comment; d, 4
REF: SAR, Pool Room Ventilation System Figure (08/03/87)

C.5a
REF: Old NRC question from Examination Question bank, also SOP 13, p. 5

C.6d
REF: SAR § 4.7, p. 4-19, 1st ¶.

C.7~~d~~ c Answer changed per facility comment (typographical error).
REF: SAR § Figure on page 4-10.

C.8b
REF: Standard NRC question

C.9d
REF: SAR § 4,9.

C.10 d
REF: Standard NRC question, also NRC Examination Question Bank

C.11 b (CAF)
REF: Standard NRC question.

C.12 c
REF: SOP 5 § D, pp. 2 – 4.

C.13 a
REF: SOP 5, p. 13.

C.14 a
REF: SAR §§ 4.5, 4.6 and 4.7.

C.15 a
REF: Chart of the Nuclides

C.16 a, Water; b, Water; c, Air; d, Fission Product
REF: Standard NRC question

U. S. NUCLEAR REGULATORY COMMISSION
NON-POWER INITIAL REACTOR LICENSE EXAMINATION

FACILITY: Washington State University

REACTOR TYPE: Converted TRIGA (Pulsing)

DATE ADMINISTERED: 2001/02/27

REGION: IV

CANDIDATE: _____

INSTRUCTIONS TO CANDIDATE:
Answers are to be written on the answer sheet provided. Attach the answer sheets to the examination. Points for each question are indicated in brackets for each question. A 70% in each section is required to pass the examination. Examinations will be picked up two (2) hours after the examination starts.

Category Value	% of Total	% of Candidates Score	Category Value	Category
				A. WAIVED
20.00	33.3	_____	____	B. Normal and Emergency Operating Procedures and Radiological Controls
20.00	33.3	_____	____	C. Facility and Radiation Monitoring Systems
40.00		_____	____% FINAL GRADE	TOTALS

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

_____
Candidate's Signature

NRC RULES AND GUIDELINES FOR LICENSE EXAMINATIONS

During the administration of this examination the following rules apply:

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 neither received nor 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 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. The point value for each question is indicated in [brackets] after the question.

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

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

10. 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.

11. To pass the examination you must achieve a grade of 70 percent or greater in each category.

12. There is a time limit of two (2) hours for completion of the examination.

13. When you have completed and turned in you examination, leave the examination area. If you are observed in this area while the examination is still in progress, your license may be denied or revoked.

EQUATION SHEET

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

$$P_{max} = \frac{(\beta - \beta)^2}{2\beta(k)\ell}$$

$$\ell^* = 1 \times 10^{-4} \text{ seconds}$$

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

$$SCR = \frac{S}{-\rho} \approx \frac{S}{1 - K_{eff}}$$

$$CR_1(1 - K_{eff_1}) = CR_2(1 - K_{eff_2})$$

$$CR_1(-\rho_1) = CR_2(-\rho_2)$$

$$SUR = 26.06\left[\frac{\beta_{eff} - \beta}{\beta}\right]$$

$$M = \frac{1 - K_{eff_0}}{1 - K_{eff_1}}$$

$$M = \frac{1}{1 - K_{eff}} = \frac{CR_1}{CR_2}$$

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

$$P = P_0 \, e^{\frac{t}{\tau}}$$

$$P = \frac{\beta(1 - \beta)}{\beta - \beta} P_0$$

$$SDM = \frac{(1 - K_{eff})}{K_{eff}}$$

$$\tau = \frac{\ell^*}{\beta - \bar{\beta}}$$

$$\beta = \frac{\ell^*}{\beta} + \left[\frac{\bar{\beta} - \beta}{\beta_{eff}\beta}\right]$$

$$\beta\beta = \frac{K_{eff_2} - K_{eff_1}}{k_{eff_1} \times K_{eff_2}}$$

$$T_{1/2} = \frac{0.693}{\beta}$$

$$\beta = \frac{(K_{eff} - 1)}{K_{eff}}$$

$$DR = DR_0 \, e^{-\beta t}$$

$$DR = \frac{6CiE(n)}{R^2}$$

$$DR_1 d_1^2 = DR_2 d_2^2$$

DR – Rem, Ci – curies, E – Mev, R – feet

$$\frac{(\beta_2 - \beta)^2}{Peak_2} = \frac{(\beta_1 - \beta)^2}{Peak_1}$$

---

1 Curie = 3.7 x 10^{10} dis/sec

1 kg = 2.21 lbm

1 Horsepower = 2.54 x 10^3 BTU/hr

1 Mw = 3.41 x 10^6 BTU/hr

1 BTU = 778 ft-lbf

°F = 9/5 °C + 32

1 gal (H_2O) ≈ 8 lbm

°C = 5/9 (°F - 32)

c_P = 1.0 BTU/hr/lbm/°F

c_p = 1 cal/sec/gm/°C

B.1a 1 2 3 4 5 ___

B.1b 1 2 3 4 5 ___

B.1c 1 2 3 4 5 ___

B.1d 1 2 3 4 5 ___

B.1e 1 2 3 4 5 ___

B.2 a b c d ___

B.3 a b c d ___

B.4a SL LSSS LCO ____

B.4a SL LSSS LCO ____

B.4a SL LSSS LCO ____

B.4a SL LSSS LCO ____

B.5a Check Test Cal ___

B.5b Check Test Cal ___

B.5c Check Test Cal ___

B.5d Check Test Cal ___

B.6 a b c d ___

B.7a 1 2 3 4 ___

B.7b 1 2 3 4 ___

B.7c 1 2 3 4 ___

B.7d 1 2 3 4 ___

B.8 a b c d ___

B.9 a b c d ___

B.10 a b c d ___

B.11 a b c d ___

B.12 a b c d ___

B.13 a b c d ___

B.14 a b c d ___

B.15 a b c d ___

B.16a 1 2 3 4 ___

B.16a 1 2 3 4 ___

B.16b 1 2 3 4 ___

B.16c 1 2 3 4 ___

C.1a 1 2 3 ___

C.1b 1 2 3 ___

C.1c 1 2 3 ___

C.1d 1 2 3 ___

C.2a b c d ___

C.3a 1 2 3 4 5 6 7 8 ___

C.3b 1 2 3 4 5 6 7 8 ___

C.3c 1 2 3 4 5 6 7 8 ___

C.3d 1 2 3 4 5 6 7 8 ___

C.3e 1 2 3 4 5 6 7 8 ___

C.3f 1 2 3 4 5 6 7 8 ___

C.3g 1 2 3 4 5 6 7 8 ___

C.3h 1 2 3 4 5 6 7 8 ___

C.4a 1 2 3 4 ___

C.4b 1 2 3 4 ___

C.4c 1 2 3 4 ___

C.4d 1 2 3 4 ___

C.5 a b c d ___

C.6 a b c d ___

C.7 a b c d ___

C.8 a b c d ___

C.9 a b c d ___

C.10 a b c d ___

C.11 a b c d ___

C.12 a b c d ___

C.13 a b c d ___

C.14 a b c d ___

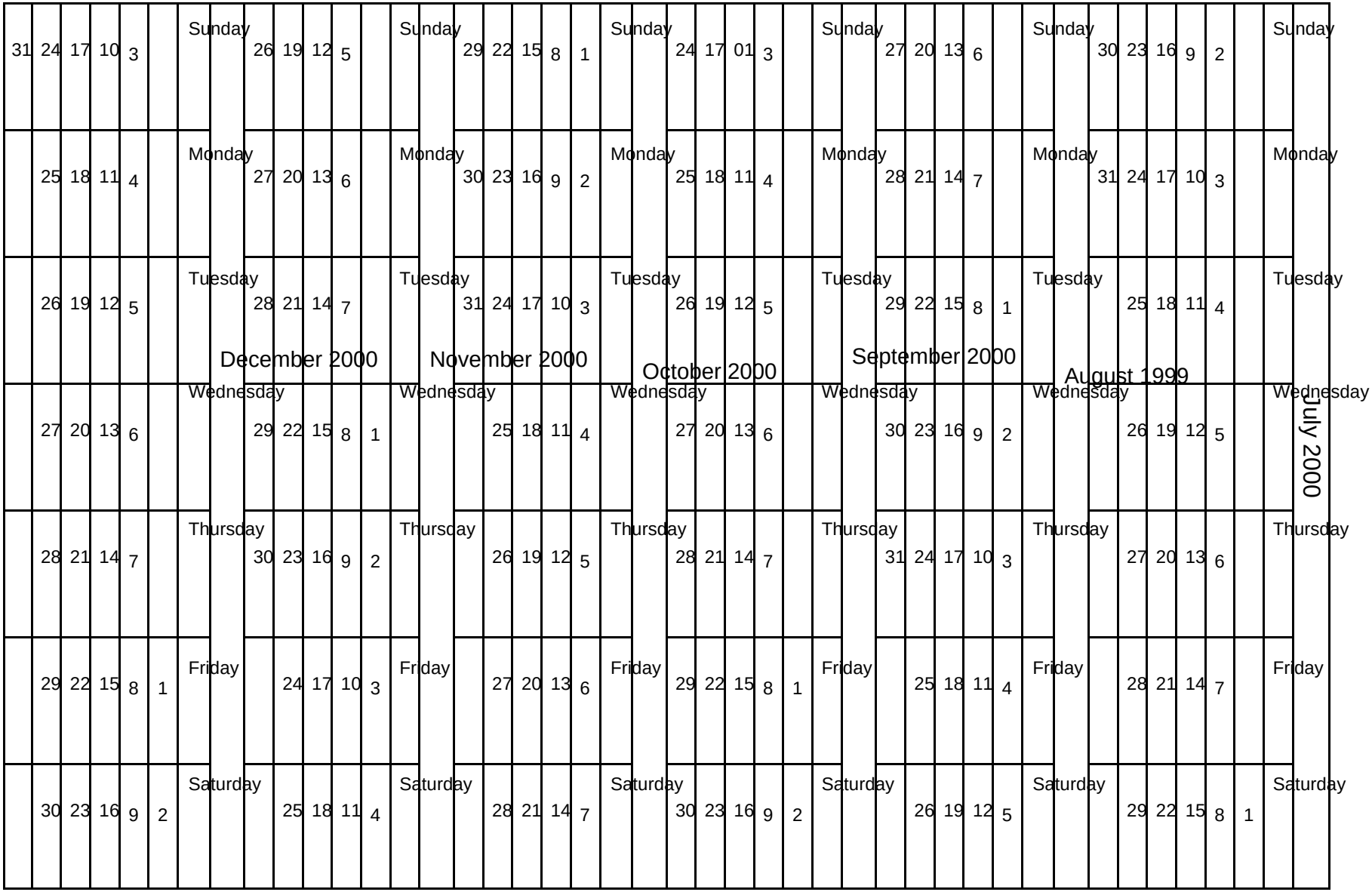
C.15 a b c d ___

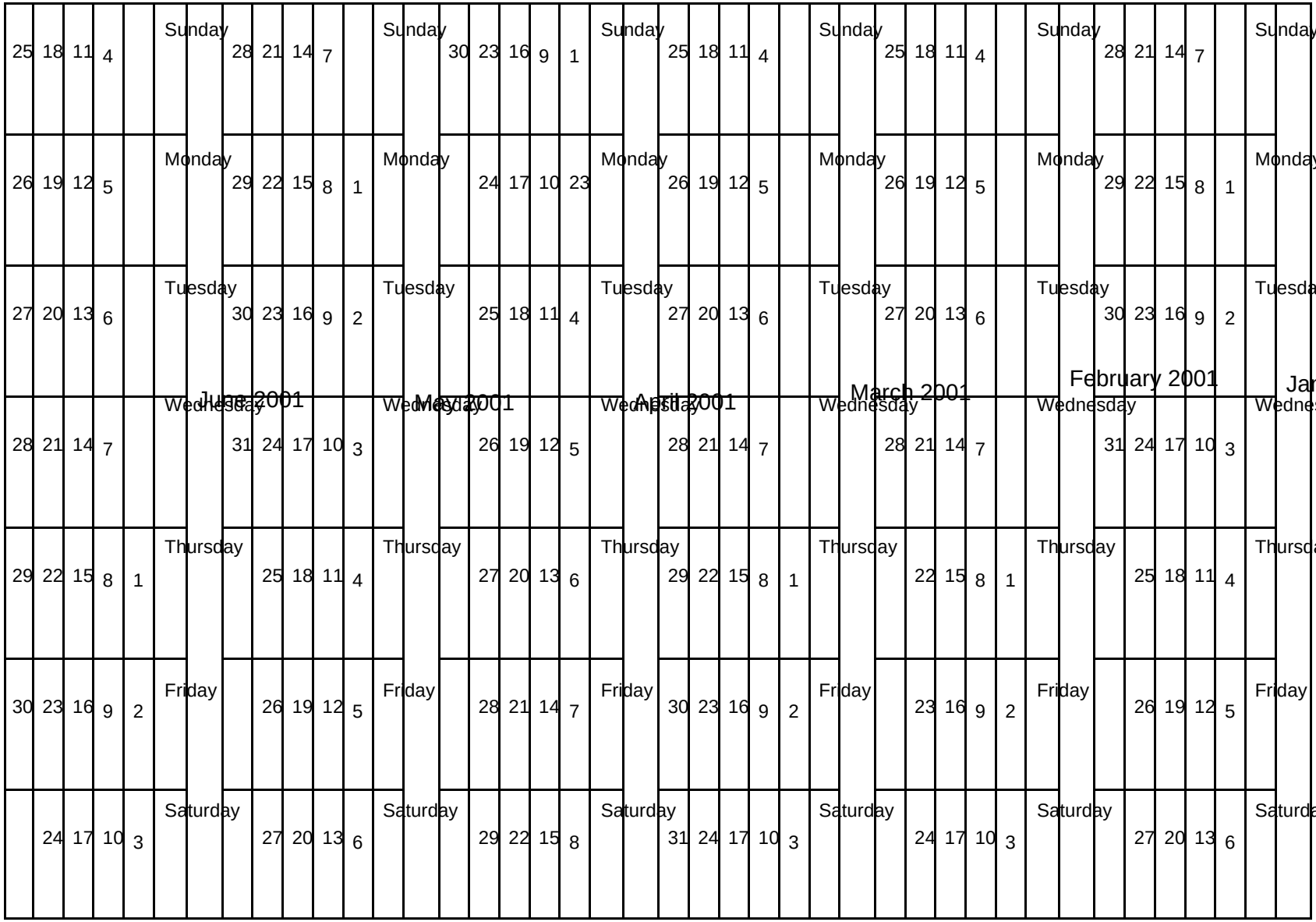
C.16a Water Air Fission Product ___

C.16b Water Air Fission Product ___

C.16c Water Air Fission Product ___

C.16d Water Air Fission Product ___


December 2000
November 2000
October 2000
September 2000
August 1999
July 2000
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday


January 2
February 2001
March 2001
April 2001
May 2001
June 2001
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday