May 30, 2001

Mr. Stephen G. Frantz, Director
Reed Reactor Facility
3203 SE Woodstock Blvd.
Portland, OR 97202

SUBJECT: INITIAL EXAMINATION REPORT NO. 50-288/OL-01-01

Dear Mr. Frantz:

During the week of April 30, 2001, the NRC administered examinations to employees of your facility who had applied for a license to operate your Reed College 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 placed in the NRC Public Document Room. 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 Patrick Isaac at 301-415-1019.

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. 50-288

Enclosures:
1. Initial Examination Report No. 50-288/OL-01-01
2. NRC Resolutions - Written Examination
3. Examination and answer key

cc w/enclosures:
Please see next page

cc:

Mayor of the City of Portland
1220 Southwest 5th Avenue
Portland, OR 97204

Reed College
ATTN: Dr. Peter Steinberger
Dean of the Faculty
3203 S.E. Woodstock Boulevard
Portland, OR 97202-8199

Reed College
ATTN: Dr. Steven S. Koblik
President
3203 S.E. Woodstock Boulevard
Portland, OR 97202-8199

Oregon Department of Energy
ATTN: David Stewart-Smith, Director
Division of Radiation Control
625 Marion Street, N.E.
Salem, OR 97310

Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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DISTRIBUTION:

PUBLIC	REXB r/f
PIsaac	LMarsh
MMendonca, PM	DMatthews
Facility File (EBarnhill)	LTremper, LFDCB (T9-E10)

ADAMS ACCESSION #: ML011340064 **TEMPLATE #: NRR-074**

OFFICE	DIPM:IOLB		REXB:CE		REXB:BC	
NAME	EBarnhill		PIsaac		LMarsh	
DATE	05/ 25 /2001		05/ 16 /2001		05/ 29 /2001	

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

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

REPORT NO.: 50-288/OL-01-01

FACILITY DOCKET NO.: 50-288

FACILITY LICENSE NO.: R-112

FACILITY: Reed College

EXAMINATION DATES: 04/30/2001 - 05/03/2001

EXAMINER: Patrick Isaac, Chief Examiner

SUBMITTED BY: ***/RA/*** 05/10/2001
Patrick Isaac, Chief Examiner Date

SUMMARY:

During the week of April 30, 2001, NRC administered Operator Licensing Examinations to 7 Reactor Operator (RO) and 8 Senior Reactor Operator Upgrade (SROU) candidates. One RO candidate failed the written portion of the examinations. The other candidates passed all portions of the examinations.

ENCLOSURE 1

REPORT DETAILS

1. Examiners:

Paul V. Doyle
Patrick Isaac, Chief Examiner

2. Results:

	RO PASS/FAIL	SRO PASS/FAIL	TOTAL PASS/FAIL
Written	**6/1**	**N/A**	**6/1**
Operating Tests	**7/0**	**8/0**	**15/0**
Overall	**6/1**	**8/0**	**14/1**

3. Exit Meeting:

Mr. Stephen Frantz, Director, REED College Reactor
Patrick Isaac, Chief Examiner

The facility examination comments were discussed as noted in Enclosure 2. Mr. Isaac also noted that some candidates were unable to list all the reactor scrams. This deficiency was brought to the attention of the facility's management following previous examinations.

Comment [illegible]

NRC Resolution [illegible]

concentration

The [illegible] rack.

Xenon [illegible] temperature.

(µCi/ml). Credit should be given for answers “a” and “b”.

NRC RESOLUTIO

ENCLOSURE 2

Comm[illegible]

Autor[illegible]

60.00	20.00	[illegible]

NON-POWER INITIAL R

U. S. NUCLEAR REG

% TOTALS _____

SYSTEMS [illegible] FACILITY [illegible]

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

Candidate's Signature

ENCLOSURE 3

019 018b 017b 016b 015b 014b 013b 012b 011b 010b 009b 008b 007b 006b 005b 004b 003b 002b 001b

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

ANSWER SHEET

018 a b c d e

017 a b c d e

016 a b c d e

015 a b c d e

014 a b c d e

013 a b c d e

012 a b c d e

011 a b c d e

010 a b c d e

009 a b c d e

008 a b c d e

007 a b c d e

006 a b c d e

005 a b c d e

004 a b c d e

003 a b c d e

002 a b c d e

001 a b c d e

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

ANSWER SHEET

020 019 018 017 016 015 014 013 012 011 010 009 008 007 006 005 004 003 002 001

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

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

ANSWER SHE

12.

11.

10.

9.

8.

7.

6.

5.

4.

3.

2.

1.

During the adminis

There

NRC RULES AND GUIDELINES FOR LICENSE EXAMINATIONS

d. c. b. a. Xe

Direct Direct Radio Radio Decay of Iodine 75% 50% 33% 10%

Delayed Neutron

[1.0 point]

[1.0 point]

[2.0 po

4. 3. 2. 1.

A neutron

Depletion

Neutron Radioactive Decay Radioactive Decay

d. c. b. a. Excess Activity is

QUESTION A.6

b. a. Which of the following does NOT

QUESTION A.5

b. a. Which

QUESTION A.4

Theo

withdraw the maximum amount of

The maximum amount of

Factor (f

[1.0 point] **[1.0 point]** **[1.0**

d. c. b. a. K_{eff} **QUESTION A.9** 0.98. If you [illegible] **QUESTION A.8** [illegible] **QUESTION A.7** [illegible]

1.018 1.013 0.987 0.982 Hydrogen Carbon Uranium 238 Reproduction [illegible] (p).

[1.0 point] **[1.0 point]** **[1.0 p**

d. c. b. a. For [illegible] **QUESTION A-13** [illegible] **QUESTION A-11** [illegible] **QUESTION A-10** [illegible]

[illegible] generally … [illegible] Theo

decrease [illegible] energy.

[1.0 point] **[1.0 point]** **[1.0 point]** **[1.0**

d. c. b. a. As [illegible] **QUESTION A.16** [illegible] **QUESTION A.15** [illegible] **MAJOR** [illegible] **QUESTION A.14** [illegible]

remains [illegible]

[1.0 point] **[1.0 point]** **[1.0 p**

d. c. b. a. reaction of the following is the

QUESTION A.19

QUESTION A.18

QUESTION A.17

Delay Delay

[1.0 point] **[1.0 point]** **[1.0**

d. c. b. a. 10 Cap Bo Ind B 3 each B. from a column A Aqu Est Type B 2 ding radiation Ind Ind

550 Rem 150 mrem 10 Column A neutron (meta alpha Column A The first Tiffe Emergency Coordinator.

[2.0 points, 0.5 each] **[2.0 points, 0.5 each]** **[1.0**

4. 3. 2. 1.

Very High Radiation Area

Column B

20 5 2 1 10

d. c. b. a. **(TEDQUESTION 8.6** Which one of the following is the source [illegible]

The [illegible]

[1.0 point] **[1.0 point]** **[1.0**

10CFR50.54(y) states that the

"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.

d. c. b. a. pow

A diffe greater

[1.0 point] **[1.0 point]** **[1.0**

d. c. b. a. As check Per, yo Chan Bl Ch Sh Q E S T O N B 1 1, the following [illegible]

the Pre Pe Ch Bl Ch Sh Q E S T O N B 1 1 [illegible]

[1.0 point] **[1.0**

Calibration 100.03%

3.5 secs 274 kW

Scr 27 kW

d. c. b. a. operation of the following is the [illegible]

2 GM [illegible]

[1.0 point] **[1.0 point]** **[1.0**

d. c. b. a. [illegible]

Perform [illegible] Operator o

and [illegible] under the Technical Specifications

[1.0 point] **[1.0 point]** **[1.0**

d. 50. C 48.9 F 148 C 120 F

QUESTION B18

[1.0

d. c. b. a. Which of the following statements [illegible]

the fuel [illegible]

Supply Unit Reactor Room

Exhaust Unit Reactor Room

Supply Unit Reactor Room

Exhaust Unit Reactor Room

QUESTION C.3 [illegible]

[1.0 point] [illegible]

[1.0 point]

[1.0 point]

Stopped Running

Stopped Running

Running Running

d. c. b. a. mi[illegible] **[illegible]** [illegible] **[illegible]** [illegible] **[illegible]** [illegible]

To de[illegible]

[1.0 point] **[1.0 point]** **[1.0 point]** **[1.0 p**

d. c. b. a. The [illegible] in Reed's [illegible]

Boron [illegible] A 2 mg [illegible]

QUESTION C.11 [illegible]

[1.0 point] **[1.0 point]** **[1.0 point]** **[1.0 p**

d. c. b. a. Which of the following generates [illegible]

The reactor [illegible]

QUESTION C.14 [illegible]

QUESTION C.13 [illegible]

[1.0 point] **[1.0 point]** **[1.0**

QUESTION C.18

c.

b.

a.

[1.0 point]

[1.0 point]

[1.0 point]

[1.0

d. c. b. a. [illegible]

[illegible]

[1.0 point] **[1.0 point]**

***** END OF EXAMINATION*****

REA.16 REA.15 REA.14 REA.13 REA.12 REA.11 REA.10 REA.9 REA.8 REA.7 REA.6 REA.5 REA.4 REA.3 REA.2 REA.1 Section A

Theo

Burn, RBurn, RBurn, RBurn, RBurn, RBurn, RP, KP1 = 1.41 ... = 10.99 x C (-18 ...)/K $2.72. Adding +$1.00 reactivity will result in a SDM of $2.72 - $1.00

Introduction to Nuclear Reactor Operations, © 1982, § 1.3.2, p. 1-8 Introduction to Nuclear Reactor Operations, © 1982, § 1.3.2, p. 1-8 Introduction to Nuclear Reactor Operations, © 1982, § 1.3.2, p. 1-8 Introduction to Nuclear Reactor Operations, © 1982, § 1.3.2, p. 1-8 Introduction to Nuclear Reactor Operations, © 1982, § 1.3.2, p. 1-8 Introduction to Nuclear Reactor Operations, © 1982, § 1.3.2, p. 1-8 Introduction to Nuclear Reactor Operations, © 1988, § 2.5.3, p. 2-45 Introduction to Nuclear Reactor Operations, © 1982, § 3.2.5, p. 3-12 Introduction to Nuclear Reactor Operations, © 1982, § 3.2.5, p. 3-12 Introduction to Nuclear Reactor Operations, © 1982, § 3.2.5, p. 3-12 Introduction to Nuclear Reactor Operations, © 1982, § 3.2.5, p. 3-12 Introduction to Nuclear Reactor Operations, © 1982, § 3.3.1, p. 3-18 Introduction to Nuclear Reactor Operations, © 1982, § 3.4.1, p. 3-21

Introduction to Nuclear Reactor Operations, © 1982, § 2.2.8, p. 6-1 — 6-4.

Burn, R., *Introduction to Nuclear Reactor Operations*, © 1982, 1988, 1988, 1988

REF:F.18 REF:F.17 REF:F.16 REF:F.15 REF:F.14 REF:F.13 REF:F.12 REF:F.11 REF:F.10 REF:F.9 REF:F.8 REF:F.7 REF:B.6 REF:F.5 REF:F.4 REF:F.3 REF:F.2 REF:F.1 Section

a

Tech. Specifications Admin. Procedures Admin. Section Definitions Appendix A: Standard Procedures Appendix B: Special Provisions 10 CFR Part 1042 Health Physics Procedures

b, 3; b, 1;

c, 3; c, 1;

d, 4 d

$$\frac{DR_1}{X_2^2} = \frac{DR_2}{X_1^2}$$

$$X_2^2 = \frac{DR_1}{DR_2} \times$$

$$X_2^2 = \frac{2000}{5} \times 1^2 = 400ft^2$$

$$X_2 = 20f$$

REF:18 REF:17 REF:16 REF:15 REF:14 REF:13 REF:12 REF:11 REF:10 REF:9 REF:8 REF:7 REF:6 REF:5 REF:4 REF:3 REF:2 REF:1 Section

REC:20 REC:19 Section

Plan, Section 13