

U. S. NUCLEAR REGULATORY COMMISSION

OPERATOR LICENSING INITIAL EXAMINATION REPORT

REPORT NO.: 50-128/OL-98-02
FACILITY DOCKET NO.: 50-128
FACILITY LICENSE NO.: R-83
FACILITY: Texas A&M University
EXAMINATION DATES: September 14, 1998
EXAMINER: Paul Doyle, Chief Examiner
SUBMITTED BY: Paul Doyle 9-18-98 Date
Paul Doyle, Chief Examiner

SUMMARY:

On September 14, 1998, one reactor operator candidate completed an NRC prepared retake examination. The candidate passed the examination. In a phone conversation Alfred Sanchez (Texas A&M) told Paul Doyle (NRC) that the facility had no comments on the NRC prepared examination.

REPORT DETAILS

1. Examiner: Paul Doyle, Chief Examiner

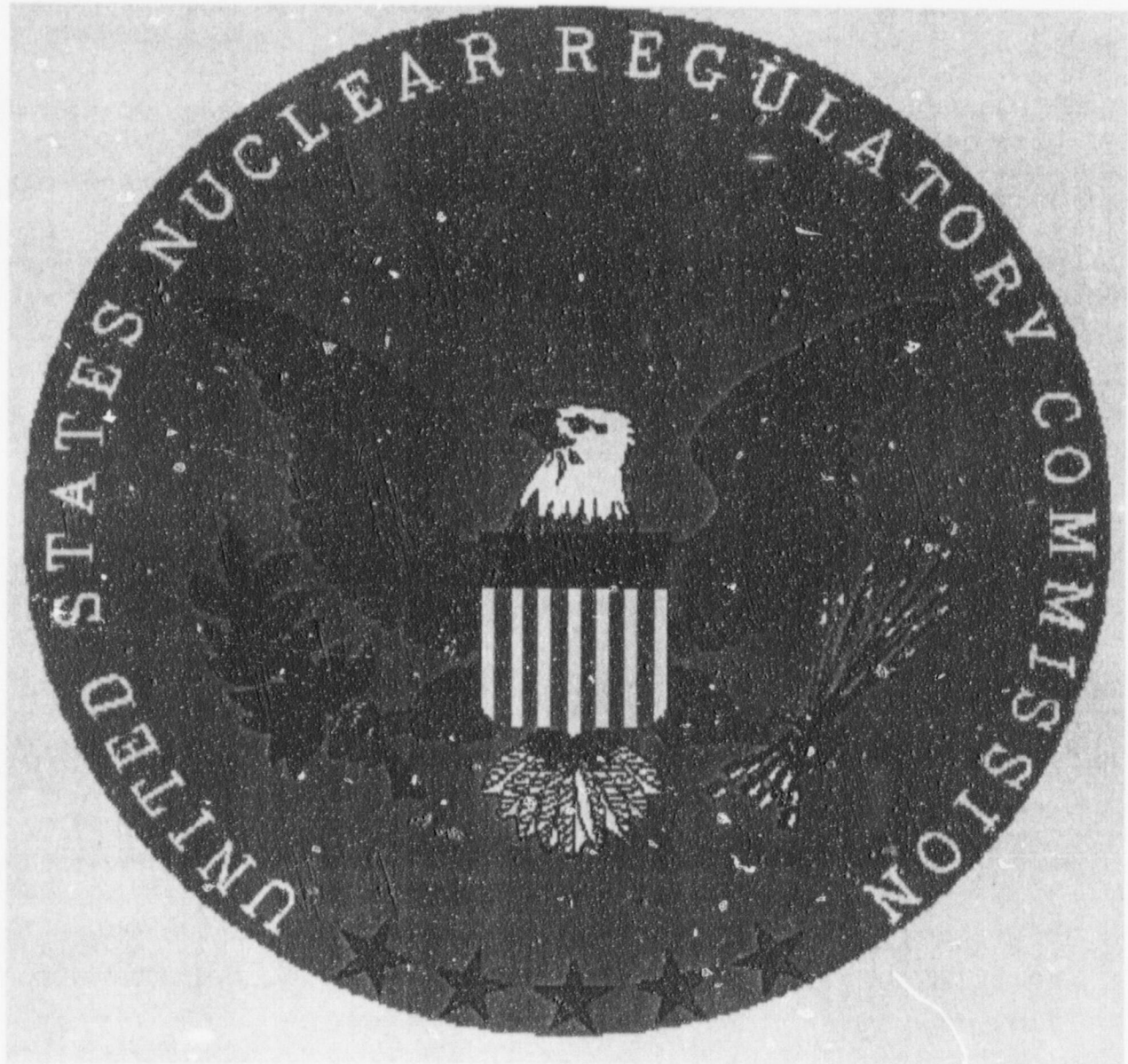
2. Results:

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

3. Exit Meeting: There was no exit meeting.

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United States Nuclear Regulatory Commission
Operator Licensing Examination



Texas A&M University
Week of 09/14/98

QUESTION (C.1) [2.0, 0.33 each]

Using the figure of an Instrumented Fuel Element provided, match the components identified by the letter on the drawing in column A with the correct names listed in column B.

	Column A	Column B
a.	A	1. Input from Cell T_c
b.	B	2. Input from Pool T_c
c.	C	3. Input from Mode Selector Switch
d.	D	4. Digital Indicator (DORIC)
e.	E	5. Fuel Temp Recorder
f.	F	6. Disconnects at the R bridge

QUESTION (C.2) [2 points, 0.33 each]

Using the figure of the Liquid Waste Disposal System provided, identify the valve positions of the listed valves when lined up to 'stir' the tank identified as B. (O = open, C = closed)

- a. CW-3
- b. CW-4
- c. WS-4
- d. WS-1
- e. LW-1
- f. LW-7

QUESTION (C.3) [1.0 point]

On a decreasing pool level, the University communications room will receive an alarm. What other automatic action will occur?

- a. Recirculation pump trip.
- b. Skimmer pump trip.
- c. Core diffuser pump trip
- d. Purification pump trip.

QUESTION (C.4) [1.0 point]

On a decreasing pool level the SRO directs you (after scrambling reactor) to line Makeup to the pool via the demineralizer system at 100 gpm. Procedure V.A *Operation of the Demineralizer System* cautions you not to exceed 70 gpm through the demineralizer. At the higher (100 gpm) rate you run the risk of ...

- a. blowing resin out of the demineralizer into the pool
- b. creating channels through the demineralizer.
- c. over pressuring the demineralizer.
- d. blowing the filter upstream of the demineralizer into the demineralizer.

QUESTION (C.5) [1.0 point]

Why is Erbium added to FLIP fuel?

- a. Erbium improves the overall heat transfer coefficient of the fuel necessary due to higher temperatures generated when pulsing FLIP fuel.
- b. Erbium both acts as a burnable poison (so that more fuel may be added), and as a resonance absorber (enhancing prompt negative temperature coefficient).
- c. Erbium acts as a burnable poison only (so that more fuel may be added).
- d. Erbium acts as a resonance absorber only (enhancing prompt negative temperature coefficient).

QUESTION (C.6) [1.0 point]

Which one of the following is the reason that the control rods have **FUELED** followers?

- a. To enhance their control characteristics.
- b. To increase the effectiveness for reactor pulsing.
- c. To provide excess reactivity and extend core life.
- d. To decrease the Core Excess.

QUESTION (C.7) [1.0 point]

How is the amount of reactivity inserted during a pulse adjusted?

- a. The transient rod is at the bottom of its travel and a stopper is adjusted to determine how far out the rod may move.
- b. The transient rod is moved to a predetermined position out of the core and the pulse worth is due to ejecting the rod the rest of the way out of the core.
- c. The pressure of the air is adjusted to counteract a spring holding the rod at the bottom of the core, a calibrated amount.
- d. A timing circuit on the air supply is adjusted to inject air, driving the rod out for an amount of time calibrated to the distance required.

QUESTION (C.8) [1.0 point]

The facility is divided into three zones of negative pressure for isolation of contaminated area. Rate each of the three areas given (beam ports (BP), control room (CR) and main research areas (MRA) from LEAST negative pressure to MOST negative pressure.

- a. BP, CR, MRA
- b. BP, MRA, CR
- c. CR, MRA, BP
- d. CR, BP, MRA

QUESTION (C.9) [1.0 point]

What gas is used in the pneumatic tube experiment system?

- a. Air
- b. Ar
- c. N₂
- d. CO₂

QUESTION (C.10) [1.0 point]

Which of the pool water systems would do the most to minimize activation of *DISSOLVED* impurities in the primary coolant?

- a. Pool Recirculation System
- b. Pool Purification System
- c. Pool Diffuser System
- d. Pool Skimmer system

QUESTION (C.11) [2.0 points, 0.5 each]

Identify each of the beam ports listed in column A with the correct type in column B. Note, items in column B may be used more than once or not at all.

	<u>Column A</u>		<u>Column B</u>
a.	1	1.	Radial
b.	3	2.	Through Tube
c.	4	3.	Weighted extensions tubes
d.	6	4.	Bismuth Trough may be suspended from tip.

QUESTION (C.12)

Which ONE of the following is the purpose of the graphite slugs located at the top and bottom of each fuel rod?

- a. To absorb neutrons, thereby reducing neutron embrittlement of the upper and lower guide plates.
- b. To absorb neutrons, thereby reducing neutron leakage from the core.
- c. To reflect neutrons, thereby reducing neutron leakage from the core.
- d. To couple neutrons from the core to the nuclear instrumentation, thereby decreasing neutron shadowing effects

QUESTION (C.13)

Which ONE of the following is the result of taking the mode selector switch to *PULSE*?

- a. Defeat the 2 counts per second control rod interlock.
- b. Defeat the 3 second period scram.
- c. Defeat the 1000 Kwatt interlock.
- d. Defeat the Fuel Temperature Scram.

QUESTION (C.14)

The fission product monitor is designed with a low sensitivity to gases to eliminate high detector backgrounds due to ...

- a. Argon⁴¹
- b. Krypton⁸⁸
- c. Xenon¹³⁸
- d. Radon²²⁸

QUESTION (C.15)

Which ONE of the following is the correct method used to determine rod position from 0 to 100%?

- a. A logic circuit receives input from the two sensors which count 100 pulses per revolution and detect direction, converting this to a rod position.
- b. A synchronous motor which is connected by a chain drive to the drive motor generates a signal, which in turn moves a servo motor, generating a signal proportional to rod position.
- c. As the magnet moves up and down, it closes a series of 10,000 limit switches which generates a signal which is converted to rod position.
- d. As the motor turns the lead screw moves up and down into a coil generating a signal proportional to rod position.

QUESTION (C.16)

Which ONE of the following is the method you should use (as the console operator) to sound the ventilation alarm if the solenoid valve was inadvertently left shut in the reception room?

- a. The normal switch on the control panel should still work.
- b. Open a "bypass" valve located in the control room.
- c. Open a "bypass" valve located just inside the door leading out of containment.
- d. Override the solenoid signal via a switch located in the back of the reactor console.

QUESTION (C.17)

The pulsing circuit utilizes a ...

- a. Fission chamber
- b. Compensated Ion Chamber
- c. Uncompensated Ion Chamber
- d. Geiger-Müller Chamber

(C.1) a, 6; b, 1 or 2; c, 1 or 2; d, 3; e, 4; f, 5
 REFERENCE SAR, Figure 7-4, p. 97.

(C.2) a, O; b, C; c, O; d, O; e, C; f, C
 REFERENCE SOP VII, C.9, *Radioactive Waste Disposal*

(C.3) a
 REFERENCE SAR, §VIII, G.1, p. 112

(C.4) b
 REFERENCE SOP V.A, § 1.g , p. 5

(C.5) b
 REFERENCE SAR p. 50.

(C.6) c
 REFERENCE SAR pp. 10, 22.

(C.7) a
 REFERENCE SAR p. 38.

(C.8) c
 REFERENCE SAR p. 79

(C.9) d
 REFERENCE SOP IV-C. p. 1.

(C.10) b
 REFERENCE TS 3.8, p. 29

(C.11) a, 4; b, 1; c, 4; d, 3;
 REFERENCE SAR § VI.A.2. p. 83.

(C.12) c
 REFERENCE SAR § III.B.4 ¶ 2, p. 14.

(C.13) b
 REFERENCE SAR §§ VII.B.(1) and (2), pp. 91 - 96.

(C.14) a
 REFERENCE SAR § IX.F, 5th ¶, p. 119.

(C.15) a
 REFERENCE Modification M-46

(C.16) b
 REFERENCE Standard Operating Procedure III-R, p. 1, step 2.

(C.17) c
 REFERENCE Standard Operating Procedure III-F, p. 1. Also, SAR § VII.B.2, p. 96.