

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-186/OL-86-02

Docket No. 50-186

License No R-103

Licensee: University of Missouri - Columbia

Facility Name: MURR

Examination Administered At: Region III Office, Glen Ellyn

Examination Conducted: Senior Reactor Operator Written (Section J only)

Examiner(s): *TMBurdick*
T. M. Burdick, Region

2-14-86
Date

Approved By: *TMBurdick for*
J. I. McMillan, Chief
Operator Licensing Section

2-14-86
Date

Examination Summary

Examination administered on (Report 50-186/OL-86-020n)

One senior reactor operator candidate was administered Section J of the written examination.

Results: The candidate was issued a senior operator license based upon successful completion of the examination.

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PDR ADOCK 05000186
V PDR

REPORT DETAILS

1. Examiners

T. M. Burdick, Region III

2. Examination Review Meeting

No review meeting was held. The licensee has five working days following the examination date to submit written/comments for consideration.

3. Exit Meeting

No exit meeting was held.

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U. S. NUCLEAR REGULATORY COMMISSION SENIOR REACTOR OPERATOR LICENSE EXAMINATION

FACILITY: UNIVERSITY OF MISSOURI
REACTOR TYPE: TEST
DATE ADMINISTERED: 86/02/12
EXAMINER: BURDICK, I.
APPLICANT: _____

INSTRUCTIONS TO APPLICANT:

Use separate paper for the answers. Write answers on one side only. Staple question sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires at least 70% in each category and a final grade of at least 80%. Examination papers will be picked up six (6) hours after the examination starts.

CATEGORY	% OF	APPLICANT'S	% OF	
<u>VALUE</u>	<u>TOTAL</u>	<u>SCORE</u>	<u>VALUE</u>	<u>CATEGORY</u>
<u>17.00</u>	<u>100.00</u>	_____	_____	J. SPECIFIC OPERATING CHARACTERISTICS
<u>17.00</u>	<u>100.00</u>	_____	_____	TOTALS

FINAL GRADE _____%

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

APPLICANT'S SIGNATURE

QUESTION J.01 (1.00)

When the MURR reactor is changed from the 5 MW configuration to the 10 MW configuration what is the QUANTITATIVE effect on the MAGNITUDE of the core differential pressure?

QUESTION J.02 (2.00)

State the normal operating range for the following parameters:

- a. Thermal power
- b. Reactor outlet temperature
- c. Pool level
- d. pressurizer pressure

QUESTION J.03 (3.00)

State the POOL makeup water flow rating and the basis for it.

QUESTION J.04 (3.00)

HOW and WHY does the temperature coefficient for pool water differ from that of the core cooling water?

QUESTION J.05 (2.00)

At power levels above 100 KW the control blades must be positioned such that no two blades are greater than one inch apart.

- a. What does this accomplish?
- b. What adverse consequences could occur if this were not done?
(3 required)

QUESTION J.06 (2.00)

It was reported by letter to the NRC that an emergency generator problem occurred during a routine load test surveillance (CP-17). Apparently the engine stalled shortly after loading. Subsequent study revealed a large difference in initial electrical load depending upon which ventilation exhaust fan was loaded on the generator (ie. running or standby). What reason is attributed to this?

QUESTION J.07 (2.00)

The emergency generator was discovered to have shutdown 5 minutes after starting in response to the 7 day automatic exercise. Investigation showed that the electrical fuel pump was not operating due to open contacts in the control switch. If the fuel pump was not operating how could the engine run for 5 minutes before stopping?

QUESTION J.08 (2.00)

In February 1985 the reactor scrammed on a signal from the reactor outlet pressure transmitter. This was attributed to abnormal high core flow. Justify this reasoning.

ANSWERS -- UNIVERSITY OF MISSOURI -B6/02/28-BURDICK, T.

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ANSWER J.01 (1.00)

The core differential pressure INCREASES [.5] by a factor of FOUR [.5].

REFERENCE
MURR TRAINING MANUAL, PAGE I-33

ANSWER J.02 (2.00)

- a. 10 +0-5% MW
- b. 136 degrees F
- c. 29 feet-7 inches +/- 3 inches
- d. 47 +/- 3 psig [.5 each]

REFERENCE
SDP/I-14

ANSWER J.03 (3.00)

1000 GPM [.0] Sufficient enough flow to maintain the pool water level 3 feet [.0] above a severed 6 inch beam port [.0]

REFERENCE
MURR TRAINING MANUAL, PAGE I-11

ANSWER J.04 (3.00)

The core cooling water temperature coefficient is NEGATIVE [.5] whereas the pool cooling water temperature coefficient is POSITIVE [.5].

Water has neutron absorption potential as well as moderating properties [.5]. Which one of the two properties prevails is dependent upon the water to fuel ratio in that particular region in question [.5] With a low H/U ratio in the core the moderating property prevails and a temperature rise causes a reduction of the moderator thus having a negative affect [.5]. Whereas in the pool with a high H/U ratio the absorption prevails so an increase in temperature has a positive affect[.5]

ANSWERS -- UNIVERSITY OF MISSOURI -B6/02/28-BURDICK, T.

REFERENCE

MUUR HAZARD SUMMARY REPORT, PAGE 4-14

ANSWER J.05 (2.00)

a. ensure validity of peaking factors [1.5]

b. clad failure [1.5], high coolant activity [1.5], high radiation [1.5]

flux tilt OK also

REFERENCE

SOP/II-2; TS 3.2.b; REP 20

ANSWER J.06 (2.00)

The running fan presents a smaller load since it is in motion when the emergency generator picks up the load [1.0]. The idle fan takes more power to initially start and therefore is a larger load to carry initially [1.0].

REFERENCE

LETTER TO THE NRC DATED JANUARY 11, 1985

ANSWER J.07 (2.00)

There is a small reservoir of fuel that provides for starting the engine that allowed operation until it ran dry.

REFERENCE

LETTER TO THE NRC

ANSWER J.08 (2.00)

High core flow resulted in a greater core pressure drop causing core outlet pressure to decrease.

REFERENCE

84-85 ANNUAL REPORT PAGE I-7