January 10, 2001

Mr. Ray Tsukimura, President
Aerotest Operations, Inc.
3455 Fostoria Way
San Ramon, CA 94583

SUBJECT: INITIAL EXAMINATION REPORT NO. 50-228/OL-10-02

Dear Mr. Tsukimura:

During the week of December 18, 2000, the NRC administered a retake examination to an employee of your facility who had applied for a license to operate your Aerotest Operations reactor. The examination was conducted in accordance with NUREG-1478, "Non-Power Reactor Operator Licensing Examiner Standards," Revision 1.

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/index.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 Mr. Warren Eresian at 301-415-1833 or internet e-mail wje@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. 50-228

Enclosures: 1. Initial Examination Report No. 50-228/OL-10-02
2. Examination and answer key

cc w/encls:
Please see next page

cc:

Director
Energy Facilities Siting Division
Energy Resources Conservation
and Development Commission
1516 9th Street
Sacramento, CA 95814

Mr. Steve Hsu
Radiological Health Branch
State Department of Health Services
P.O. Box 942732
Sacramento, CA 94234-7320

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DATE	01/ 08 /2001		01/ 08 /2001		01/ 08 /2001	

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

REPORT NO.:	50-228/OL-01-02
FACILITY DOCKET NO.:	50-228
FACILITY LICENSE NO.:	R-98
FACILITY:	Aerotest Operations, Inc.
EXAMINATION DATES:	December 19, 2000
EXAMINER:	Warren Eresian, Chief Examiner

SUBMITTED BY: ***/RA/*** 01/ 08 /2001

Warren Eresian, Chief Examiner Date

SUMMARY:

During the week of December 18, 2000, the NRC administered an operator licensing retake written examination (Category B) to one Senior Reactor Operator (Instant) candidate. The candidate passed the examination.

REPORT DETAILS

1. Examiner: Warren Eresian, Chief Examiner

2. Results:

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

3. Exit Meeting: None

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

FACILITY: Aerotest

REACTOR TYPE: TRIGA

DATE ADMINISTERED: 12/19/00

REGION: 4

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% is required to pass the examination.

Examinations will be picked up one (1) hour after the examination starts.

CATEGORY VALUE	% OF TOTAL	CANDIDATE'S SCORE	% OF CATEGORY VALUE	CATEGORY
20	100	_____	____	B. NORMAL AND EMERGENCY OPERATING PROCEDURES AND RADIOLOGICAL CONTROLS

FINAL GRADE = _____%

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

_____
Candidate's Signature

ENCLOSURE 2

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

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

8. 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.

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

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

11. 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)

In accordance with the Technical Specifications, which ONE condition below is NOT permissible when the reactor is operating?

a. Maximum excess reactivity above cold, clean critical = $3.00.

b. Total time for insertion of control rods following receipt of scram signal = 600 milliseconds.

c. Reactor subcritical by at least $0.50 when maximum worth rod is fully withdrawn from core.

d. Minimum bulk water temperature = 55^{o} F.

QUESTION: 002 (1.00)

A Special Work Permit is required when:

a. work is to be performed in a high radiation area.

b. personnel will be performing work in radiation areas where they are not regularly assigned.

c. a person working in a radiation area has exceeded his/her quarterly limit.

d. performing any activity in an area where radiation monitoring is required.

QUESTION: 003 (1.00)

A radiation survey of an area reveals a general radiation reading of 1 mrem/hr. There is, however, a small pipe which reads 10 mrem/hr at one (1) meter. Assuming that the pipe can be considered a point source, which ONE of the following defines the posting requirements for the area in accordance with 10CFR Part 20?

a. Restricted Area.

b. Radiation Area.

c. High Radiation Area.

d. Grave Danger, Very High Radiation Area.

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

QUESTION: 004 (2.00)

Match the 10CFR Part 55 requirements listed in Column A for an actively licensed operator with the correct time period from Column B. Column B answers may be used once, more than once, or not at all.

	Column A		Column B
a.	License Expiration	1.	1 year
b.	Medical Examination	2.	2 years
c.	Requalification Written Examination	3.	3 years
d.	Requalification Operating Test	4.	6 years

QUESTION: 005 (1.00)

The Operation Area is defined as:

a. the area inside the concrete shield.

b. the area within the site boundary.

c. the high bay area.

d. the area within the perimeter fence.

QUESTION: 006 (1.00)

Which ONE of the following provides the minimum personnel requirements for movement of fuel or graphite elements within the reactor pool?

a. One Senior Reactor Operator and two other licensed Operators.

b. Three licensed Operators.

c. One Senior Reactor Operator, another licensed Operator, and one other individual.

d. Same requirement as for reactor operation.

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

QUESTION: 007 (1.00)

At 8:00 am, prior to the start of reactor operation, the ARRR Startup Sheet is completed in accordance with the Operating Procedures. The reactor is started up, operated, and then shutdown at 1:00 pm, with no further operations planned for that day. However, at 4:00 pm, the reactor is started up again for another unplanned run. As a result:

a. a new Startup Sheet must be completed.

b. a new Startup Sheet does not need to be completed, since the new startup occurs on the same day.

c. only the scram checks need to be performed before the reactor can be restarted.

d. only the instrument calibrations need to be rechecked.

QUESTION: 008 (1.00)

The licensed maximum power level for the ARRR is 250 kilowatts thermal. This means that:

a. at no time may reactor power exceed 250 kilowatts.

b. the steady state power level should not exceed 250 kilowatts, but may be exceeded temporarily for a special experiment with permission from the Reactor Safeguards Committee.

c. the reactor must automatically scram when power exceeds 250 kilowatts.

d. the steady state power level may not exceed 250 kilowatts.

QUESTION: 009 (1.00)

The dose rate at one foot from a point source is 450 mrem/hr. The dose rate at three feet from the source will be:

a. 5 mrem/hr.

b. 15 mrem/hr.

c. 50 mrem/hr.

d. 150 mrem/hr.

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

QUESTION: 010 (1.00)

While the reactor is operating, the control room radiation monitor alarms at a level > 100 mR/hr. As a result, the reactor operator should_____ and _____.

a. scram the reactor; activate the evacuation alarm.

b. notify the Senior Reactor Operator; notify Radiological Safety Officer.

c. evacuate the affected area; notify both Senior Reactor Operator and Radiological Safety Officer.

d. scram the reactor, notify Radiological Safety Officer.

QUESTION: 011 (1.00)

Which ONE of the following statements concerning instrumentation requirements for refueling operations is correct?

a. The daily reactor checks are not required to be completed.

b. Either the air OR water radiation monitors and the associated chart recorder must be operable.

c. All instrumentation required for reactor operation must be operating.

d. Only Channel 4 must be operating since it is the channel that is normally used.

QUESTION: 012 (1.00)

The safety rod is withdrawn to its full out position during a startup, but there is NOT a significant increase in count rate. As a result, the operator should:

a. insert the safety rod and initiate corrective action.

b. adjust the shim and reg rods to obtain the desired power level.

c. adjust the output of the Log Count Rate Meter and continue the startup.

d. obtain permission from the Reactor Supervisor to continue the startup.

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

QUESTION: 013 (1.00)

Two point sources have the same curie strength. Source A's gammas have an energy of 1 Mev, whereas Source B's gammas have an energy of 2 Mev. You obtain a reading from the same GM tube 10 feet from each source. Concerning the two readings, which ONE of the following statements is correct?

a. The reading from Source B is four times that of Source A.

b. The reading from Source B is twice that of Source A.

c. Both readings are the same.

d. The reading from Source B is half that of Source A.

QUESTION: 014 (2.00)

Match the area of fire in Column I with the associated precautions or limitations in Column II. Answers in Column II may be used once, more than once, or not at all.

Column I		Column II	
a.	Area containing radioactive material.	1.	Even if it is safe to move explosives to a safer location, do NOT move them.
b.	Area containing nuclear fuel.	2.	Water may be used to fight the fire.
c.	Area containing explosives.	3.	Aerotest personnel will evacuate the area and fire fighting personnel entering such areas will use self-contained breathing apparatus.
d.	Area containing electrical equipment.	4.	Carbon dioxide and halon are the ONLY extinguishers to be used.

QUESTION: 015 (1.00)

Radiation surveys, calibration of radiation survey instruments, and swipe samples in areas where radioactive samples are routinely handled are required to be performed:

a. monthly.

b. quarterly.

c. every six months.

d. annually.

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

QUESTION: 016 (1.00)

An Emergency Action Level is:

a. a condition which calls for immediate action, beyond the scope of normal operating procedures, to avoid an accident or to mitigate the consequences of one.

b. a class of accidents for which predetermined emergency measures should be taken or considered.

c. a procedure that details the implementation actions and methods required to achieve the objectives of the Emergency Plan.

d. a specific instrument reading or observation which may be used as a threshold for initiating appropriate emergency procedures.

QUESTION: 017 (1.00)

Which ONE of the following is required to be trended on a quarterly frequency?

a. Shutdown Margin.

b. Excess Reactivity at critical.

c. Reactor coolant radiation level.

d. Reactor pool water level.

QUESTION: 018 (1.00)

Which ONE of the following is required to call the San Ramon Fire Department in the event of a fire that cannot be controlled by portable fire fighting equipment within the facility?

a. The Senior reactor operator in charge.

b. The Reactor Supervisor.

c. The Radiological Safety Officer.

d. The person discovering the fire.

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

B. NORMAL/EMERGENCY PROCEDURES & RADIOLOGICAL CONTROLS

ANSWER: 001 (1.00)
D.
REFERENCE:
ARRR Technical Specifications, Section 4.0.

ANSWER: 002 (1.00)
B.
REFERENCE:
ARRR Radiological Safety Procedures.

ANSWER: 003 (1.00)
C.
REFERENCE:
Administrative Procedure VI, page 8.
10 mrem/hr at 1 meter (100 cm.) = 111.1 mrem/hr at 30 cm.

ANSWER: 004 (2.00)
A,4; B, 2; C, 2; D,1.
REFERENCE:
10 CFR 55

ANSWER: 005 (1.00)
C.
REFERENCE:
ARRR Emergency Plan, page 4.

ANSWER: 006 (1.00)
C.
REFERENCE:
ARRR Critical Assembly and Power Calibrations Procedures, section A.3.

ANSWER: 007 (1.00)
A.
REFERENCE:
ARRR Operating Procedures.

ANSWER: 008 (1.00)
D.
REFERENCE:
ARRR Facility License.

ANSWER: 009 (1.00)
C.
REFERENCE:
ARRR Reactor Operator Training Manual, Volume 5, page 10
$DoseRate_1 \times D_1^2 = DoseRate_2 \times D_2^2$.

ANSWER: 010 (1.00)
D.
REFERENCE:
ARRR General Emergency Procedures.

ANSWER: 011 (1.00)
C.
REFERENCE:
ARRR Critical Assembly and Power Calibration Procedures, section D.3.

ANSWER: 012 (1.00)
A.
REFERENCE:
ARRR Operating Procedures, section 3.

ANSWER: 013 (1.00)
C.
REFERENCE:
ARRR Reactor Operator Training Manual, Volume 2, page VIII-6.
GM tubes cannot distinguish between gammas of different energy.

ANSWER: 014 (2.00)
A,3; B,2; C,2; D,4.
REFERENCE:
ARRR General Emergency Procedures, section C.6.

ANSWER: 015 (1.00)
B.
REFERENCE:
ARRR Radiological Safety Procedures, sections D.2, D.5.

ANSWER: 016 (1.00)
D.
REFERENCE:
ARRR Emergency Plan, Definitions.

ANSWER: 017 (1.00)
B.
REFERENCE:
ARRR Maintenance Procedures, section A.5.

ANSWER: 018 (1.00)
A.
REFERENCE:
ARRR General Emergency Procedures, section C.6.

B. NORMAL/EMERGENCY PROCEDURES & RADIOLOGICAL CONTROLS

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 _____

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

EQUATION SHEET

$Q = m\ c_p\ \Delta T$

$CR_1\ (1\text{-}Keff)_1 = CR_2\ (1\text{-}Keff)_2$

$SUR = 26.06/\rho$

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

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

$\rho = (\ell^*/\rho) + [(\rho\text{-}\rho)/\rho_{eff}\rho]$

$\rho_{eff} = 0.1\ seconds^{-1}$

$Doserate_1\ x\ D_1^2 = Doserate_2\ x\ D_2^2$

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

$DR = 6CiE/D^2$

$\rho = (Keff\text{-}1)/Keff$

1 Curie = $3.7x10^{10}$ dps

1 gallon water = 8.34 pounds

1 Btu = 778 ft-lbf

$°F = 9/5°C + 32$

1 Mw = $3.41x10^6$ BTU/hr

$°C = 5/9\ (°F - 32)$