

APPENDIX A  
APPLICATION FOR MATERIAL LICENSE

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

FEDERAL AGENCIES FILE APPLICATIONS WITH:

U.S. NUCLEAR REGULATORY COMMISSION  
DIVISION OF FUEL CYCLE AND MATERIAL SAFETY, NMSS  
WASHINGTON, DC 20555

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS, IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I  
NUCLEAR MATERIAL SECTION B  
631 PARK AVENUE  
KING OF PRUSSIA, PA 19406

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION II  
MATERIAL RADIATION PROTECTION SECTION  
101 MARIETTA STREET, SUITE 2900  
ATLANTA, GA 30323

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION III  
MATERIALS LICENSING SECTION  
799 ROOSEVELT ROAD  
GLEN ELLYN, IL 60137

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV  
MATERIAL RADIATION PROTECTION SECTION  
611 RYAN PLAZA DRIVE, SUITE 1000  
ARLINGTON, TX 76011

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION V  
MATERIAL RADIATION PROTECTION SECTION  
1450 MARIA LANE, SUITE 210  
WALNUT CREEK, CA 94596

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTION.

1. THIS IS AN APPLICATION FOR (Check appropriate item)

- ☐ A. NEW LICENSE  
☐ B. AMENDMENT TO LICENSE NUMBER \_\_\_\_\_  
☒ C. RENEWAL OF LICENSE NUMBER 22-14897-02

2. NAME AND MAILING ADDRESS OF APPLICANT (Include Zip Code)

Lakehead Testing Laboratory, Incorporated  
226 North Central Avenue  
P O Box 7168  
Duluth, Minnesota 55807

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED.

Licensed material will be used and/or stored at 226 North Central Avenue, Duluth, Minnesota and at temporary job sites anywhere in the United States where the Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material.

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Gary L. Wirtz, R.S.O.

TELEPHONE NUMBER

218-628-2295

SUBMIT ITEMS 5 THROUGH 11 ON 8 1/2 x 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL

a. Element and mass number, b. chemical and/or physical form, and c. maximum amount which will be possessed at any one time.

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE.

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSEE FEES (See 10 CFR 170 and Section 170.31)

FEE CATEGORY AMOUNT ENCLOSED \$

13. CERTIFICATION. (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, AND 40 AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948, 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

SIGNATURE—CERTIFYING OFFICER

TYPED/PRINTED NAME

TITLE

DATE

*[Signature]*

Leo H. Ebert

President

3/28/85

14. VOLUNTARY ECONOMIC DATA

a. ANNUAL RECEIPTS	
<\$250K	\$1M-3.5M
\$250K-500K	\$3.5M-7M
\$500K-750K	\$7M-10M
\$750K-1M	>\$10M

b. NUMBER OF EMPLOYEES (Total for entire facility excluding outside contractors)

c. NUMBER OF BEDS

d. WOULD YOU BE WILLING TO FURNISH COST INFORMATION (Dollar and/or staff hours) ON THE ECONOMIC IMPACT OF CURRENT NRC REGULATIONS OR ANY FUTURE PROPOSED NRC REGULATIONS THAT MAY AFFECT YOU? (NRC regulations permit it to protect confidential commercial or financial—proprietary—information furnished to the agency in confidence)

☐ YES

☐ NO

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS
Ren	AW15	3P	
AMOUNT RECEIVED	CHECK NUMBER	CONTROL NO.	
\$120	6643	78627	

PRIVACY ACT STATEMENT ON THE REVERSE

8506100159 850531  
REQ3 LIC30  
22-14897-02 PDR

RECEIVED  
APR 01 1985  
REGION III

APPROVED BY

DATE

*[Signature]*

4/9/85

# SUPPLEMENTAL INFORMATION

## Item 5 - Material To Be Possessed

<u>Element &amp; Mass Number</u>	<u>Chemical and/or Physical Form</u>	<u>Maximum Amount Which Will Be Possessed At Any One Time</u>	<u>Manufacturer &amp; Model Number of Gauging Device In Which The Sealed Source(s) Will Be Used</u>
A. Cesium 137	Sealed Sources (Troxler DWG No. A-102112)	No single source to exceed 9 mil- licuries	Troxler Electronic Laboratories, Inc. 3400 Series portable gauges
B. Americium -241	Sealed Sources (Troxler DWG. No. A-102451)	No single source to exceed 50 millicuries	Troxler Electronic Laboratories, Inc. Models 3216 Roof/ Reader II, 3401 Compac or 3411 portable gauges
C. Cesium-137/ Americium-	Sealed Sources (Troxler DWG No. A-100281)	No single source to exceed 10 mil- millicuries of Cesium-137 and 50 millicuries of Americium-241	Troxler Electronic Laboratories, Inc. Model 2401 portable gauges

## Item 6 - Purpose(s) For Which Licensed Material Will Be Used

Gauging devices will be used for measuring moisture and/or density of construction materials.

Item 7 - Individuals Responsible for Radiation Safety Program - Their Training and Experience

Gary L. Wirtz will be responsible for the Radiation Safety Program and related records. He has been responsible for the Radiation Safety Program at this company for the past 11 years. He has 16 years hands-on experience with sources used in industrial radiography and 7 years with Moisture/Density Gauges.

Item 8 - Training Provided to Other Users

Only authorized personnel who have completed either the Troxler Electronics Laboratories, Inc. training course, or a similar manufacturer's training course, or our company training course will be permitted to use these Surface Moisture/Density Gauges. An outline of our company training course and a sample quiz with acceptable answers is attached. A score of 70% will be required to pass.

The radiation safety training will be the responsibility of the Radiation Safety Officer listed in Item 7.

The training in the operation of the gauges will be the responsibility of Robert Christen, Assistant Laboratory Manager. He attended the Troxler Electronic Laboratories, Inc. course in radiation safety and use of nuclear gauges. He has had 9 years experience at this company using and supervising the use of Surface Moisture/Density Gauges. He has 14 years experience with sources used in industrial radiography.

Records documenting the training of each employee will be maintained for a minimum of 2 years from the date training is completed.

Item 9 - Facilities and Equipment

A description of the Surface Moisture/Density Gauges used by this company are listed in our Gauge Operation Manual, attached.

The Surface Moisture/Density Gauges will be stored in a locked and posted enclosure such as a storeroom or vehicle to prevent access by unauthorized persons. When not in storage the gauges will be under constant surveillance and immediate control of an authorized user at all times.

## Item 10 - Radiation Safety Program

### 10.1 Personnel Monitoring Equipment

All surface Moisture/Density Gauge operators will wear Type P film badges supplied by R. S. Landauer, Jr & Co. These film badges detect gamma and neutron radiation and are changed on a bi-weekly schedule.

### 10.2 Radiation Detection Instruments

We will use survey meters used in our radiography program when necessary for leak tests, emergencies, etc.

### 10.3 Leak Testing

We will perform Leak Tests at 6-month intervals using a LT-1 Leak Test Kit supplied by ICN Health Physics Services, 2727 Campus Drive, Irvine, California 92715. The leak tests are sent to the supplier for evaluation.

Only qualified individuals who are knowledgeable in Leak Testing Sources will perform this test following the procedure in our Gauge Operation Manual (attached).

### 10.4 Maintenance

All maintenance will be performed by qualified individuals following the procedures in our Gauge Operation Manual (attached).

### 10.5 Transportation of Devices to Field Locations

Packaging and transport of Surface Moisture/Density Gauges will be done in accordance with the procedure in our Gauge Operation Manual (attached) and DOT regulations.

### 10.6 Operating and Emergency Procedures

Our Gauge Operation Manual (attached) contains detailed operating and emergency procedures and includes the following topics.

1. Use of personnel monitoring. A film badge supplied by R. S. Landauer, Jr. & Co., will be worn at all times whenever operating or transporting these gauges.
2. Use of Gauges. Step-by-step procedures for the use of each gauge.
3. Storage of Gauges. Procedure for storage of gauges when not in use or under the physical surveillance of qualified individual.
4. Transportation. Procedures for transporting devices to and from work sites.



5. Leak-Testing. Procedures for performing leak tests by qualified individuals.
6. Source Rod Removal. Procedures for removal and shielded storage of source rod assembly.
7. Emergency Procedures. Procedures to follow if a Surface Moisture/Density Gauge is involved in an accident, lost, or stolen, including individuals to be notified.

Item 11 - Waste Management

Sources will be returned to the supplier for disposal.

## TRAINING COURSE OUTLINE - SURFACE MOISTURE/DENSITY GAUGES

<u>Subject</u>	<u>Hours</u>
1. Radiation Principles . . . . .	2.0
A. Radiation Characteristics	
1. Types of radiation	
2. Types of sources	
3. Radiation units	
4. Biological effects of radiation	
5. Exposure limitations	
6. Shields	
7. Operator exposure	
B. Radiation Statistics	
2. Instrument Theory . . . . .	1.0
A. Gamma radiation and matter	
B. Direct transmission geometry	
C. Backscatter geometry	
D. Neutron radiation and matter	
E. Moisture geometry	
3. Control Functions . . . . .	1.0
A. Power switch	
B. Time switch	
C. Data accumulation control	
D. Accumulated data display	
E. Data processor	
F. Calibration constants mode	

TRAINING COURSE OUTLINE - SURFACE MOISTURE/DENSITY GAUGES

<u>Subject</u>	<u>Hours</u>
G. Moisture correction switch	
H. Charger connector	
I. Display heater	
4. Measurements . . . . .	1.0
A. Source position handle	
B. Backscatter density	
C. Direct transmission density	
D. Moisture	
5. Field Application . . . . .	1.0
A. Standard counts	
B. Site preparation	
C. Density measurements and dry density determinations	
D. Moisture measurement and percent moisture determination	
E. Corrections	
6. Maintenance . . . . .	1.0
A. Periodic maintenance	
B. Service	
7. Radiological Safety Procedures . . . . .	1.0
A. Handling procedures	
B. Accident and incident procedures	
C. Gauge storage and transportation procedures	

TRAINING CCOURSE OUTLINE - SURFACE MOISTURE/DENSITY GAUGES

<u>Subject</u>	<u>Hours</u>
D. Leak testing procedures	
E. General safety precautions	
3. On-the-job Training. . . . .	1 week
Using Surface Moisture/Density Gauge at project sites under supervision	



RADIATION SAFETY TEST FOR  
NUCLEAR DENSITY GAUGE OPERATORS

NAME \_\_\_\_\_ DATE \_\_\_\_\_

Please answer the following questions. Be specific and give as much detail as possible.  
Please show all calculations for problems which require such.

1. What types of radiation are emitted from Moisture/Density Gauges?

Alpha and beta particles, gamma rays, and neutrons

2. The two units of radiation measurement that operators of density gauges should be familiar with are the Curie and the REM. Define these two terms.

a. Curie: A unit that indicates the quantity of a radioactive material and is the  
quantity of a radioactive material that has the same number of disinte-  
grations per second as a gram of radium ( $3.7 \times 10^{10}$  dps).

b. REM: A unit used to calculate the amount or dose of radiation accumulation  
in a person. Its effect on man is approximately equal to one Roentgen.

3. What are the most common soil gauge sources?

Radium<sup>226</sup> / Beryllium

Cesium<sup>137</sup> Americium<sup>241</sup> / Beryllium

RADIATION SAFETY TEST FOR  
NUCLEAR DENSITY GAUGE OPERATORS  
Page 2

4. List three ways to limit exposure to radiation.

a. by shielding

b. by distance

c. by limiting exposure time

5. What radiation monitoring equipment is required to be worn by all personnel working with nuclear density gauges?

film badge

6. List at least five general precautions you should observe to insure the safety of yourself and others when using a nuclear density gauge.

a. Do not use a gauge unless authorized to do so.

b. Wear a film badge at all times while operating, transporting, or servicing a gauge.

c. Keep the gauge in the "safe" or shielded position when not in use.

d. Keep the gauge in a locked or otherwise secured and marked area when not in use.

e. Follow established operating procedures.

f. Keep unauthorized persons away from the gauge.

g. Leak test the gauge at proper intervals.

h. If there is any doubt about operating or safety procedures - ask for help.

RADIATION SAFETY TEST FOR  
NUCLEAR DENSITY GAUGE OPERATIONS  
Page 3

7. If the source rod must be removed from the gauge for any reason, how should it be handled?

It should quickly be placed in or behind some dense shielding material such as source rod pig, in soil (ground) prepared with the nuclear gauge Drill Rod and Steel Template, lead, concrete or steel. Keep at least 5' from the source with the shielding between the source and yourself.

8. At what distance from the gauge should all unauthorized persons be kept?

5 meters or 15 feet

9. How often are the gauges leak tested?

Every 6 months

10. Who is the Company Radiation Safety Officer?

Gary Wirtz

11. In what position should the gauge be placed when cleaning the sliding shield pocket or leak testing?

Place the gauge on its side so that the bottom is facing away from the operator. Use a mirror if it is necessary to view the work being performed.

12. List the two modes of operation that may be used to obtain density measurements.

a. Backscatter density

b. Direct transmission density

13. Why should a log be kept of the daily standard counts for moisture and density?

To establish a norm for the rate of change in the standard counts per unit of time and to allow the user to determine when a defect may be occurring either in procedure or the instrument.

RADIATION SAFETY TEST FOR  
NUCLEAR DENSITY GAUGE OPERATIONS  
Page 4

Circle the correct answer(s) to the following.

14. Your film badge measures \_\_\_\_\_

- ☒ a. Accumulated dose \_\_\_\_\_
- b. Dosage rate \_\_\_\_\_
- c. Both of the above \_\_\_\_\_

15. The allowed occupational dose of radiation is \_\_\_\_\_

- a. 50 millicuries \_\_\_\_\_
- ☒ b. 1.25 REM per calendar quarter \_\_\_\_\_
- c. 500 Roentgens \_\_\_\_\_

16. Which of the following are required records for nuclear density gauges?

- a. Film badge reports \_\_\_\_\_
- b. Quarterly inventory of gauges and sources \_\_\_\_\_
- c. Leak test reports \_\_\_\_\_
- d. Maintenance service and calibration log \_\_\_\_\_
- e. Shipping log \_\_\_\_\_
- ☒ f. All of the above \_\_\_\_\_

17. Circle the correct statements from the following:

- a. The source emits radiation only when the gauge is "on". \_\_\_\_\_
- ☒ b. Doubling the distance from a source reduces the exposure by four times. \_\_\_\_\_
- ☒ c. Standard counts are taken with the source rod in the "safe" position. \_\_\_\_\_
- ☒ d. Film badges should be worn when leak testing the gauge. \_\_\_\_\_
- e. Man can detect radiation with his senses. \_\_\_\_\_

18. When transporting a gauge to a jobsite, which of the following are required?

- a. The gauge should be carried only in a vehicle that is placarded with radioactive materials signs.
- b. The gauge should be transported in its shipping case.
- c. The shipping case should be placed on the vehicle seat to prevent shock and vibration damage to the gauge.
- d. The vehicle should be locked whenever there is a gauge in it.
- e. The vehicle must be locked and posted with "caution-radioactive materials" signs if the gauge is stored in it.

19. If the nuclear density gauge you are using is involved in an accident, explain in detail what you would do.

Immediately restrict access to the area of the gauge for at least 15'. Stop  
the vehicle(s) which may have collided with the gauge and which could possibly  
have radiation contamination on it. Do not walk through the area and do not  
move the gauge or any gauge parts until the damage has been assessed. Call the  
company Radiation Safety Officer or other authorized personnel for instructions and  
or assistance.



RADIATION SAFETY TEST FOR  
NUCLEAR DENSITY GAUGE OPERATORS  
Page 6

20. If there has been an accident or theft, or loss of a gauge and no one from the company can be reached for help, who do you contact?

The Minnesota State Department of Health and the Region III U.S. Nuclear Regulatory Commission.