

U. S. NUCLEAR REGULATORY COMMISSION  
MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 31, 32, 33, 34, 35, 36, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purposes and at the places designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s); and to import such byproduct and source material. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954 as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee 1. Department of the Army US Army Engineer District, Baltimore 2. P. O. Box 1715 Baltimore, Maryland 21203		3. License number 19-16386-02 4. Expiration date February 28, 1986 5. Docket or Reference No. 19-16386-01
6. Byproduct, source, and/or special nuclear material A. Americium 241 Cesium 137	7. Chemical and/or physical form A. Combined sealed source (Troxler Dwg. No. A-100201, Rev.B.)	8. Maximum amount that licensee may possess at any one time under this license A. Not to exceed 50 millicuries of americium and 10 millicuries of cesium 137 per source
9. Authorized use A. For use in Troxler Model 2401 density-moisture gauges for measurements of materials.		

## CONDITIONS

10. Licensed material may be used at Port Belvoir, Virginia and at temporary job sites of the licensee anywhere in the United States.
11. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 19, "Notices, Instructions and Reports to Workers; Inspections" and Part 20, "Standards for Protection Against Radiation."
12. Licensed material shall be used by, or under the supervision and in the physical presence of, Michael F. Armstrong, John B. Tustin or any individual who has completed the Troxler Training Course in the use of Troxler density-moisture gauges.

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Supplementary Sheet

License Number 19-16386-02

CONDITIONS

Docket or  
Reference No. 19-16386-01

(continued)

13. A. (1) Each sealed source containing licensed material, other than Hydrogen 3 with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source received from another person shall not be put into use until tested.
  - (2) The periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage prior to any use or transfer to another person unless they have been leak tested within six months prior to the date of use or transfer.
  - B. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.
  - C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the test with the U. S. Nuclear Regulatory Commission, Region I, Office of Inspection and Enforcement, 631 Park Avenue, King of Prussia, Pennsylvania 19406, describing the equipment involved, the test results, and the corrective action taken.
  - D. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically authorized by the Commission or an Agreement State to perform such services.
14. Sealed sources containing licensed material shall not be opened or removed from the Troxler devices by the licensee.
  15. The licensee shall conduct a physical inventory every six (6) months to account for all sealed sources received and possessed under the license. The records of the inventories shall be maintained for two (2) years from the date of the inventory for inspection by the Commission, and shall include the quantities and kinds of byproduct material, location of sealed sources, and the date of the inventory.

MATERIALS LICENSE

Supplementary Sheet

License Number 19-16386-01

Docket or  
Reference No. 19-16386-01

(continued)

16. The licensee may transport licensed material or deliver licensed material to a carrier for transport in accordance with the provisions of Title 10, Code of Federal Regulations, Part 71, "Packaging of Radioactive Material for Transport and Transportation of Radioactive Material Under Certain Conditions."
17. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated May 20, 1980 and letter dated November 19, 1980. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

FEB 06 1981

Date \_\_\_\_\_

For the U. S. Nuclear Regulatory Commission  
*Paul R. Quinn*  
Material Licensing Branch

# STANDARD OPERATING PROCEDURE FOR NUCLEAR DENSOMETER

## CAPITAL AREA OFFICE, TROXLER MODEL 2401

1. Duties and Responsibilities of the Radiation Protection Officer (RPO). The Radiation Protection Officer will:

a. Assure that the byproduct materials possessed under the license conform to the materials listed on the license.

b. Assure that the device is used only by individuals authorized by the license (particularly in the field) or who have completed acceptable training.

c. Assure that the terms and conditions of the license are met such as:

(1) Periodic leak tests (every 6 months).

(2) All required records are kept and reviewed periodically for compliance with Nuclear Regulatory Commission regulations - to include personnel exposure records, leak test reports, source certificates and records of transfer of radioactive materials.

d. Assure that the gauge is secure against unauthorized removal at all times.

e. Serve as point of contact in the event of an emergency to notify the NRC, District Safety Office, instrument manufacturer. Local authorities such as police and fire departments will be notified by the individual operators.

f. Assure that all users wear personnel monitoring devices.

g. Assure safe use of the gauge by periodically checking handling and security procedures in the field.

2. Transportation Procedures.

a. Transportation of the device will be by authorized personnel only.

b. The densometer will be transported to construction sites in a suitable vehicle such as a pickup or van.

c. The source-lock will be in place, and the instrument will be locked inside the transporting vehicle when the instrument is not in use.

d. Neutron and gamma radiation has been measured with the instrument both in and out of its storage case, but is barely detectable at a distance of 3 feet (1 m) from the case (see figure 1 attached). Gamma radiation was detected highest at the bottom of the case (see figure 2 attached). Therefore, when the instrument is transported, it will be a minimum of 4 feet from passengers, and the bottom of the case will face the floor or rear of the vehicle. No passenger will be allowed in the portion of the vehicle containing the material.

### 3. Storage

a. The nuclear gauge will be returned at the end of each work day to a locked room in the NW corner of Bldg. T1080. Bldg. T1080 is a single story WW II temporary wood frame structure, approximately 3,000 SF in area. The building is connected by a corridor to the Area Engineer's Office (Bldg. T1080A). Bldg. 1080 is utilized by the American Federation of Government Employees (AFGE) as office facilities on a partime basis (3-4 hours per day). AFGE employees may work as close as 16 feet from the instrument in an adjacent room. Other buildings in the area are approximately 50 yards away.

b. Standard radiation warning signs will be posted on the storage room door and windows, and building will be locked when unoccupied. Only the Area Engineer, Assistant Area Engineer, and key personnel will have keys to the storage room. The Fort Belvoir Fire Department will be notified of the storage area location.

### 4. Handling and Security - Instructions to Operators

a. Do not operate, attempt to operate, or transport the instrument unless you have been authorized to do so.

b. Keep the instrument locked in the transporting vehicle when in the field and the gauge is not in use. Never leave it unattended.

c. Wear a film badge at all times when entering the instrument storage area, transporting the instrument, or making tests in the field.

d. All tests will be performed in accordance with the Troxler 2400R Series Field Operating Instructions.

e. Keep the source in the "safe" position when not in use.

f. Never expose yourself to the unshielded source without good reason for the additional dose.

g. Limit your time working within 3 feet of the instrument to an absolute minimum.

h. Keep all unauthorized persons at least 15 feet from the instrument during operation. Others must not be unnecessarily exposed to radiation.

i. Insure that the instrument has had leak tests performed at 6 month intervals.

j. Insure that the instrument is locked in the storage room in Bldg. T1080 at the end of each work day.

5. Maintenance. The only maintenance performed by Users of the Troxler Model 2401 Moisture-Density Gauge will be external cleaning, fuse changing, and battery charging as set forth in the operator's manual. Maintenance involving dismantling or removal of the source holder is prohibited. The instrument will be returned to the manufacturer for recalibration, repair or disposal.

#### 6. Exposure Records

a. The Fort Belvoir Radiological Protection Officer (RPO) will provide regular film badge service and exposure reports.

b. Exposed film badges for all operators of the instrument will be exchanged monthly with the Fort Belvoir RPO.

(1) DA Form 3484 will be submitted in triplicate with the badges.

(2) If a badge has been lost a DF is needed stating individual's name, rank, and SSN to insure that an administrative dose is/is not appropriate as determined by the RPO.

(3) A list of individuals who used a film badge during the past period will be furnished at time of exchange.

(4) The list will include the name, grade, SSN, badge number, date of departure, and forwarding address of any individuals who will be leaving the organization during the new film badge period.

(5) If no individuals are leaving during the upcoming period, this fact will be stated on the roster.

c. At the time of the monthly film badge exchange the Fort Belvoir RPO's exposure report will be checked for possible exposure. Should the report's indicate any excess dosage of radiation, the Fort Belvoir RPO will advise the instrument operators at that time.

d. Annually, a copy of DD Form 1141 (Record of Occupational Exposure to Ionizing Radiation) will be obtained by the Area Engineer from the Fort Belvoir RPO and forwarded to the Baltimore District RPO for review and enclosure in the instrument operators' personnel records.

## 7. Emergency Procedures

a. In the event of loss of the Troxler 2401 Moisture-Density Gauge, whether accidental or due to theft, contact:

- (1) Area Engineer or Assistant Area Engineer (703) 664-6061.
- (2) Baltimore District Radiological Protection Officer and Safety Officer (301) 962-4100.
- (3) Military Police, if on Fort Belvoir 664-1251.
- (4) Fairfax County Police, if applicable 691-2233.
- (5) Fire Department, Fort Belvoir 664-1485.
- (6) Baltimore District RPO will notify NRC and Troxler Laboratories, if necessary.
- (7) Within 3 days of loss, a written report must be forwarded to the Baltimore District RPO giving a description of the source, circumstances of the loss, possible radiation exposures or hazard, procedures implemented to prevent a recurrence of loss or theft.

b. In the event of physical damage to the gauge:

- (1) Keep all personnel involved from becoming panicked.
- (2) Maintain at least a 50 foot radius exclusion area around the tester until the extent of damage can be determined.
- (3) Notify the Fort Belvoir Radiological Protection Officer, if on Fort Belvoir 664-1984.
- (4) Notify Baltimore District RPO (301) 962-4100.
- (5) Notify the Area Engineer or Assistant Area Engineer (703) 664-6061.
- (6) Notify Military Police, if on Fort Belvoir, 664-1251, or County/State police.
- (7) Notify the appropriate fire department. If on Fort Belvoir, dial 77.
- (8) Attempt to extinguish fires using available first-aid type extinguisher if a radiological hazard is not immediately present. If possible, prevent water or fire fighting chemicals from coming in contact with the radioactive source.
- (9) Following an emergency, the RPO will monitor the area and determine the protective measures necessary for the removal of radiation hazards. The RPO will determine if the instrument must be returned to the manufacturer for repair or whether it must be disposed of.
- (10) All persons who were in the emergency area or involved in combating the emergency will be monitored for exposure.

c. Individual Procedures

(1) Cuts/abrasions will be thoroughly flushed with water if radiation contamination exists.

(2) Ingestion: Do not smoke or eat when handling a radioactive device. If ingestion is suspected, notify a doctor immediately and identify the isotope.

(3) Inhalation: Same as 3b. above. If radioactive dust is believed present, wear a respirator. Caution: The filter can become highly contaminated.

(4) Clothing: If clothing has been monitored and found to read 0.2 m Rads/hr at 2.5cm or more, the clothing will immediately be removed and handled as stated in the following paragraph. Particular attention should be paid to shoes.

(5) Rags and contaminated clothing will be placed in a sealed container, such as a garbage can with a lid.

(6) Skin: When a person is monitored and the reading is greater than 0.06m/Rads/hr at 2.5cm, the person should wash immediately. Particular attention should be given to cleaning fingernails, hair and creases in skin.

d. Decontamination (Equipment & Area)

(1) Care must be taken during this process to prevent further spread of contaminant as follows:

(a) Always take precautions to contain the contamination by use of monitoring, protective clothing, and shoe covers.

(b) Always work from areas of least contamination to area(s) of heaviest contamination.

(c) Use a minimum amount of decontamination liquids and be aware that runoff solutions, mops, rags, and brushes will all be contaminated.

(2) The following decontamination methods should be attempted in the sequence listed:

(a) Damp mopping. The area is wiped with a damp rag. The wiping surface of the rag is changed repeatedly to minimize the spreading of the contaminant.

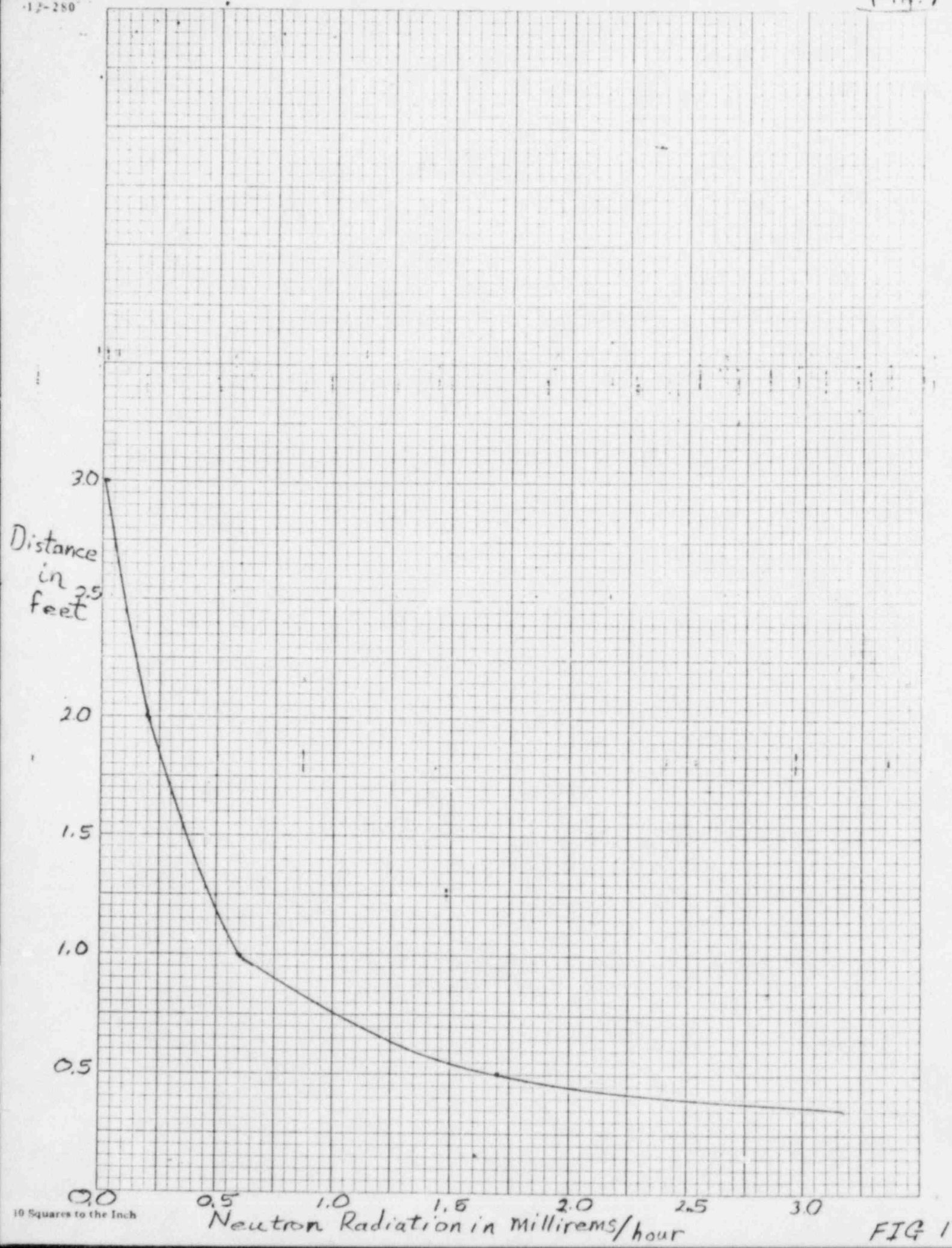
(b) Water and detergent. The area is wetted with a minimum amount of detergent solution with absorbent gauze or cloth.

(c) Steam cleaning.

(d) Cleaning with solvents other than water.

(e) Surface removal using chemicals, abrasives, sand blasting, grinding, etc.

(3) Vacuum Cleaners. Only vacuum cleaners which are equipped with absolute filters and which have been tested for filtration efficiency will be used. The filtration efficiency will be tested after each replacement of the filter and each time contents are emptied.



# Gamma Radiation Measured from Bottom of Storage Case

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