VOID SHEET

TO: License Fee Management Branch

FROM: RIII - CHARLES F. GILL

SUBJECT: VOIDED APPLICATION

Control Number: 102449

Applicant: Fogg Technical Group, Inc

License Number: 34-26794-01

Docket Number: 030-34425

Date Voided: April 2, 1997

Reason for Void: Applicant agreed to have new license application (dtd 3/21/97) voided because it was not prepared per regulatory guidance. A new application is to be submitted within 20 days. Therefore, fee should not be returned.

Charles F. Gill 4/2/97
Signature Date

Attachment:
Official Record Copy of
Voided Action

FOR LFMB USE ONLY

___ Refund Authorized and processed

___ ✓ No Refund Due

___ Fee Exempt or Fee Not Required

Comments: 110112

Log completed ✓

Processed by: SAC 4/9/97

ML 30 SP

BETWEEN:

License Fee Management Branch, ARM
and
Regional Licensing Sections

(FOR LFMS USE)
INFORMATION FROM LTS

Program Code:
Status Code: 3
Fee Category:
Exp. Date: 0
Fee Comments:
Decon Fin Assur Reqd:

LICENSE FEE TRANSMITTAL

A. REGION

1. APPLICATION ATTACHED
   Applicant/Licensee: FOPPE TECHNICAL GROUP, INC.
   Received Date: 970324
   Docket No: 3034425
   Control No.: 302449
   License No.:
   Action Type: New Licensee

2. FEE ATTACHED
   Amount: 550
   Check No.: 008190

3. COMMENTS

Signed D. Hersey
Date 3-25-97

97 MAR 26 AM 11:28

B. LICENSE FEE MANAGEMENT BRANCH (Check when milestone 03 is entered /__/)

1. Fee Category and Amount: 3P $550

2. Correct Fee Paid. Application may be processed for:
   Amendment
   Renewal
   License ✓

3. OTHER

Signed SC
Date 3/26/97

Log Mar 11 III
Remitter
Check No. 8190
Amount $550
Fee Category 3P
Type of Fee APP
Date Check Rec'd 3/26/97
Date Completed 3/26/97
By: SC

MAR 31 1997

NRC FORM 313 (7-96) 10 CFR 30, 32, 33 34, 35, 36, 39 and 40

U. S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0120 EXPIRES: 7/31/99

Estimated burden per response to comply with this information collection request: 7 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Forward comments regarding burden estimate to the information and Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0120), Office of Management and Budget, Washington, DC 20503. NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

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.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

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

LICENSING ASSISTANT SECTION
NUCLEAR MATERIALS SAFETY BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

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

NUCLEAR MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION II
101 MARIETTA STREET, NW, SUITE 2900
ATLANTA, GA 30323-0199

IF YOU ARE LOCATED IN:

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

MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
801 WARRENVILLE RD.
LISLE, IL 60532-4351

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING, SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TX 76011-8064

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 JURISDICTIONS.

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

- [*] A. NEW LICENSE
- [ ] B. AMENDMENT TO LICENSE NUMBER _____
- [ ] C. RENEWAL OF LICENSE NUMBER _____

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

Foppe Technical Group,Inc.
11415 Century Blvd.
Cincinnati, Ohio 45246

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

Foppe Technical Group, Inc.
11415 Century Blvd.
Cincinnati, Ohio 45246

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Daniel R. Kennedy

TELEPHONE NUMBER

(513)671-8144

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 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 3p

AMOUNT ENCLOSED $ 550

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, 36, 39 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.

CERTIFYING OFFICER – TYPED/PRINTED NAME AND TITLE	SIGNATURE	DATE
LAWRENCE E. FOPPE PRESIDENT	Lawrence E. Foppe	3/21/97

FOR NRC USE ONLY RECEIVED

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS
			$		MAR 24 1997 REGION III MAR 24 1997
APPROVED BY				DATE	30249

Fm. 3-21-97

NRC FORM 313 (7-96) PRINTED ON RECYCLED PAPER

Attachments To The Application For
NRC Radioactive Material License

ITEM 5:

Item Possession	Radionuclide	Chemical and/or Physical Form	Maximum Activity	Limit
A.	Cs-137	Sealed Source - Troxler Drawing Number A-102112	9mCi	Any
B.	Am-241(AmBe)	Sealed Source - Troxler Drawing Number A-102451	44 mCi	Any
C.	Am-241(AmBe)	Sealed Source - Troxler Drawing Number A-102700	11 mCi	Any
D.	Cs-137	Sealed Source - Campbell Pacific Nuclear Model CPN-131	10 mCi	Any
E.	Am-241(AmBe)	Sealed Source - Campbell Pacific Nuclear Model CPN-131	50 mCi	Any
F.	Cs-137	Sealed Source - Humboldt Scientific, Inc. Drawing Number 2200064	11 mCi	Any
G.	Am-241(AmBe)	Sealed Source - Humboldt Scientific, Inc. Drawing Number 2200067	44 mCi	Any

ITEM 6:

A., B., C. For use in Troxler Electronics Models 3216, 3217, 3218, 3400 Series, 4300 Series and 4640 Series gauges for measuring the moisture/density of various materials.

D. and E. For use in Campbell Pacific Nuclear MC Series gauges for measuring the moisture/density of various materials.

F. and G. For use in Humboldt Scientific Inc. Model 5001 gauges for measuring the moisture/density of various materials.

ITEM 7:

The RSO for this license will be Daniel Kennedy (experience attached).

ITEM 8:

All authorized users for this license shall complete a manufacturers training course or the licensee's in-house training program (outline attached) or an equivalent course which is licensed by the NRC or an agreement state and have been designated by the licensee's RSO, prior to unsupervised use of radioactive material. Training records for all authorized users shall be maintained by the RSO.

ITEM 9:

The facility at the Cincinnati, Ohio office (see attached diagram) will be used as a gauge storage and work area to be occupied by Daniel Kennedy (training and experience attached) who will also be the certified technician. The front and back doors of the facility are locked entries and the storage room will be kept locked to prevent unauthorized entry.

There will be times when, due to work schedule or project location, it will not be practical to return the gauge to the permanent storage facility. In these situations the source rod will be locked in the gauge, the gauge will be locked in a Type"A" carrying case, and the case will be locked in the transport vehicle or in a secured building to prevent unauthorized use, loss, or theft.

ITEM 10:

1. The personnel monitoring requirement is not required by the licensee due to the fact that the gauge operators receive significantly less than 10% of the NRC's radiation exposure limit (summary of 1994 and 1995 results attached).

2. Rust Environment & Infrastructure Inc. will be contracted to provide radiation detection devices in case of incident. The following radiation detection devices will be kept on hand at their Sheboygan, Wisconsin office:

Rust Environment & Infrastructure Inc.
4738 North 40th Street
Sheboygan, WI 53083
(414) 458-8711

Device Range	Manufacturer	Model	No. Available	Detection
Radiation Survey Meter	S.E. International	Monitor 4	2	0-50 milliroentgens/hour
Radiation Survey Meter	Troxler	Troxalert	1	0-50 milliroentgens/hour

Each of the survey meters is calibrated annually by the following:

Troxler Electronics, Inc.
3008 Cornwallis Road
Research Triangle Park, NC 27709

3. A leak test shall be performed on the nuclear gauges utilizing a Troxler 3880 leak test kit. The sources to be tested are Cs-137 and Am-241:Be (both sealed sources). The analysis will be performed by the following:

Troxler Electronics, Inc.
3008 Cornwallis Road
Research Triangle Park, NC 27709

4. Transport of licensed material will be carried out in accordance with applicable U.S. DOT regulations.

5. Operating Procedures (copy attached) will be provided for all personnel utilizing the devices.

ITEM : 7

DANIEL R. KENNEDY
RADIATION SAFETY OFFICER
FOPPE TECHNICAL GROUP
11415 CENTURY BLVD.

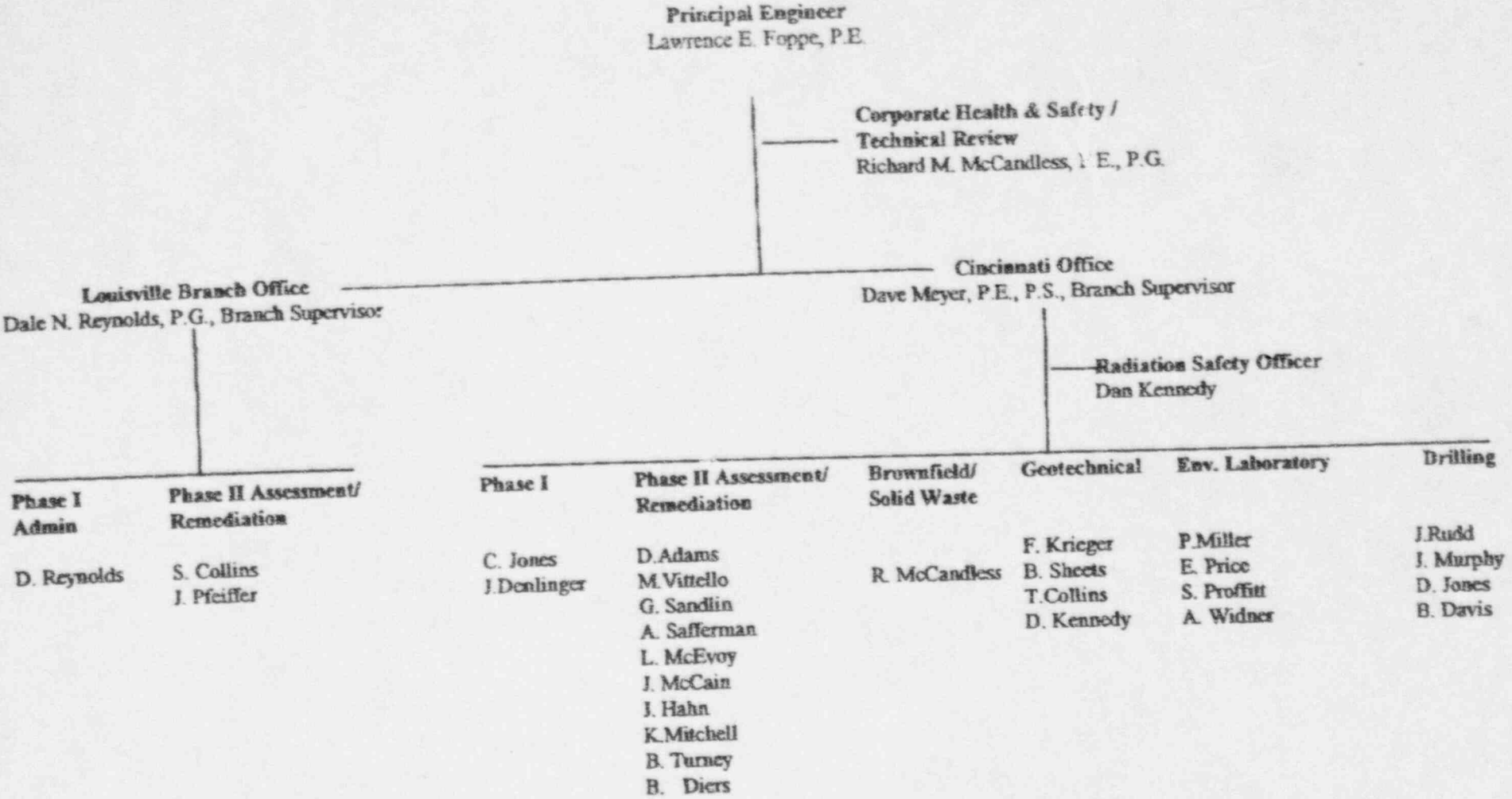
EDUCATION: BS GEOLOGY 1978

EXPERIENCE:

1997 to the present: FOPPE TECHNICAL GROUP Construction Services Manager: responsible for the training of field engineering technicians in the safe operation , transportation , and storage of nuclear density/moisture gauges.

1981 to 1997: RUST ENVIRONMENT & INFRASTRUCTURE Construction Services Manager: Responsible for the testing of construction materials using a nuclear density/moisture gauge. Trained and supervised over 100 field engineering technicians in the safe operation , transportation , and storage of nuclear density/moisture gauges.

1978 to 1981: H. C. NUTTING: Construction Services Field Technician: Responsible for the testing of construction materials for density and moisture.



Foppe Technical Group, Inc. Technical Organizational Chart

ITEM : 7

ITEM: 8.2

OUTLINE FOR THE TRAINING COURSE FOR THE SAFE OPERATION, TRANSPORTATION AND STORAGE OF NUCLEAR DENSITY/MOISTURE GAUGES

- Course duration - 8 hours

- Course provides instruction in the following topics:

1. Radiation Physics (0.5 hour)
   - Atomic and Subatomic Structure
   - Radioactivity and Types of Radiation
   - Sources of Radioactivity
   - Isotopes and Periodic Table
   - Units of Radiation Measurement and Half-Life

2. Radiation Safety (1.0 hour)
   - Biological Effects of Radiation
   - Occupational Dose Limits
   - ALARA
   - Methods to Reduce Dose
   - Personnel Monitoring

3. Regulatory Requirements (1.5 hours)
   - Licensing
   - Storage of Licensed Material
   - Constant Control and Surveillance of Radioactive Material Not in Storage
   - Personnel Monitoring
   - Leak Testing
   - Inventory
   - Maintenance
   - Operating and Emergency Procedures
   - Audits
   - Recordkeeping
   - Reciprocity
   - Disposal
   - Incidents

4. Transportation (0.5 hour)
   - Requirements in 10 CFR 71.5 and 49 CFR
   - Transportation of Licensed Material in Vehicles
   - Shipping by Common Carrier

5. Gauge Theory, Operation, and Field Training (3.5 hours)

6. Written Test and Test Review (0.5 hour)

- Successful completion of the course requires obtaining a score of at least 80 percent on a closed-book test consisting of 46 questions that have not been provided to the students before the test. (Copies attached)

ITEM: 8.3

NUCLEAR DENSITY/MOISTURE
GAUGE RADIATION SAFETY EXAMINATION
ANSWER SHEET

1. C
2. C
3. B
4. D
5. B
6. A
7. A
8. C
9. C
10. A
11. D
12. D
13. B
14. A
15. A
16. D
17. B
18. A
19. A
20. A
21. B
22. A
23. A
24. D
25. C
26. B
27. A
28. B
29. B
30. A

NUCLEAR DENSITY/MOISTURE GAUGE RADIATION SAFETY EXAMINATION

1. The types of radiation which concern the nuclear density/moisture gauge operator are:

   a. Alpha and Beta particles
   b. Alpha particle and Gamma-ray
   c. Gamma-ray and Neutron
   d. High frequency radiation

2. The maximum accumulation of occupational whole body exposure for a nuclear density/moisture gauge operator is:

   a. 5 mRem per week
   b. 5 Rem per quarter
   c. 5,000 mRem per year
   d. None of the above

3. According to the Nuclear Regulatory Commission Regulations, anyone may possess a nuclear gauge if they are in construction-related services.

   a. True
   b. False

4. The basic methods(s) of protection against radiation exposure are:

   a. Shielding
   b. Distance
   c. Reducing Exposure Time
   d. All of the above

5. Which of the following makes a good shield for Gamma-rays:

   a. Light materials, such as water
   b. Dense materials, such as lead
   c. None of the above

6. Which of the following makes a good shield for Neutrons:

   a. Materials similar in composition, such as polyethylene
   b. Dense materials, such as lead
   c. None of the above

7. The nuclear density/moisture gauge operator needs to wear a personal dosimetry badge while transporting and operating the nuclear gauge.

   a. True
   b. False

8. An exposure of 40 mRem per hour at 1-foot is reduced to _____ mRem per hour at 2 feet:

   a. 1
   b. 5
   c. 10
   d. 2.5

9. The leak test interval for a nuclear density/moisture gauge is:

   a. One month
   b. Three months
   c. Six months
   d. One year

10. 50 mRems is equal to:

    a. .05 Rems
    b. 500 Rems
    c. 5 Rems

11. In general, a nuclear density/moisture gauge is to be stored no closer than ___ feet from the nearest full-time work station:

    a. 10
    b. 25
    c. 5
    d. 15

12. The first action to be taken in the event of an accident with a nuclear gauge is:

    a. Call the RSO
    b. Call the Highway Patrol
    c. Cordon off an area around the gauge (100-foot radius)
    d. Cordon off an area around the gauge (15-foot radius)

13. The Curie is defined as the quantity of radioactive material which decays at the rate of _____ disintegrations per second:

a. 2.2×10^{12}
b. 3.7×10^{10}
c. 3.7×10^{12}
d. None of the above

14. The "Rem" is a measure of the dose of any radiation to body tissue in terms of its estimated biological effect relative to a dose of one roentgen of X-rays.

a. True
b. False

15. Half-Life is the time required for the activity of a source to decrease by 50 percent.

a. True
b. False

16. Gamma-rays are:

a. Similar to X-rays
b. A form of electromagnetic radiation
c. Extremely penetrating
d. All of the above

17. The lower the energy of a Gamma-ray, the more penetrating it is.

a. True
b. False

18. ALARA stands for As Low As Reasonably Achievable and is in reference to radiation exposure.

a. True
b. False

19. Neutrons are:

a. Small and very dense particles
b. A form of electromagnetic radiation
c. Best shielded by lead
d. None of the above

20. A sealed source is radioactive material that is permanently bonded or fixed in a capsule or matrix designed to prevent release and dispersal.

a. True
b. False

21. A Dosimetry Badge may be shared by individuals as long as they are from the same office.

a. True
b. False

22. When a gauge is lost, stolen, or physically damaged to the extent that the source shielding is or could be compromised, it is considered an incident, and the appropriate authorities should be notified.

a. True
b. False

23. All company gauges are to be leak tested on May 2 and November 2 of each year. If these dates are non-work days, then the leak test should be performed on the following work day.

a. True
b. False

24. When transporting a nuclear density/moisture gauge:

a. A properly completed Bill of Lading must be within arms reach of the driver
b. The gauge must be in its approved carrying case
c. The gauge trigger must be locked
d. All of the above

25. A declared pregnant woman may receive only ____ of exposure for the entire term of pregnancy.

a. 5 Rems
b. 500 Rems
c. 500 mRems

26. If an individual remains in a 2 mRem/hour area for 30 minutes, his exposure is:

a. 2 mRem
b. 1 mRem
c. 1/2 mRem
d. 1/4 mRem

27. The primary method of monitoring exposure is:

a. Personnel Dosimetry (Film or TLD Badge)
b. Measuring blood cell change
c. Observing for nausea
d. Survey meter

28. With increased exposure, a Film Badge:

a. Lightens
b. Darkens

29. Water is a better shield than lead for:

a. Gamma-rays
b. Neutrons

30. Occupational exposure is defined as the exposure received from working around radioactive sources:

a. True
b. False

ITEM: 8.3

NUCLEAR DENSITY/MOISTURE GAUGE
DOT HAZMAT EXAM
ANSWER SHEET

1. 2
2. B
3. C
4. D
5. A
6. C
7. A
8. D
9. D
10. A
11. A
12. D
13. A
14. B
15. D
16. A

C:\wordproc\manuals\dot.ans

NUCLEAR DENSITY/MOISTURE GAUGE
HAZMAT TRAINING EXAM

1. The NDMG HAZMAT training required by 49 CFR Subpart H, Sections 172.700 - 172.704 must be renewed at least once every ____ years. (Fill in the blank)

2. The primary goal of the US. DOT is to assure hazardous materials are transported:

   a. At a minimum cost
   b. Safely
   c. Quickly
   d. None of the above

3. The proper shipping name for all company-owned NDMGs (except the 4640-B) is:

   a. R.D., Radioactive Material, Special Form N.O.S.
   b. R.Q., Radioactive Material
   c. R.Q., Radioactive Material, Special Form, N.O.S.
   d. None of the above

4. There are nine basic DOT hazard classes. The class that covers radioactive material is:

   a. Class 3
   b. Class 6
   c. Class 7
   d. Class 9

5. The identification number for radioactive materials in special form (ALL NDMGs) is:

   a. UN2974
   b. UN2878
   c. UN2900
   d. None of the above

6. Company-owned NDMGs use the following radioactive sources:

   a. Cesium-137 (Cs-137)
   b. Americium-241:Beryllium (Am241:Be)
   c. All of the above

7. All NDMGs must be shipped and transported in the appropriate "Type A" carrying case.

   a. True
   b. False

8. If incorrect information is entered on the shipping document, it can affect the safety of:

   a. Emergency personnel who need product and emergency response information.
   b. Carrier personnel
   c. The shipper who may be fined
   d. All of the above

9. The only method of shipping a company-owned NDMG is:

   a. Airborne Express
   b. UPS
   c. Yellow Freight
   d. Federal Express

10. When transporting a company-owned NDMG in a private or company vehicle, the cover of its corresponding Gauge Booklet serves as the Bill of Lading and must be within immediate reach of the driver while the driver is restrained by the lap belt, while the NDMG is fully secured in the cargo compartment of the vehicle in it's appropriate carrying case.

    a. True
    b. False

11. When shipping a company-owned NDMG, it must be shipped via Federal Express and the **PROPERLY** completed SHIPPERS CERTIFICATION FOR DANGEROUS GOODS FORM serves as the Federal Express driver's shipping document.

    a. True
    b. False

12. Prior to transporting or shipping an NDMG, the following must be completed:

    a. The NDMGs source rod **MUST** be locked in its "Safe Position" and the base of the NDMG **MUST** be visually inspected to insure that the sliding tungsten shield is completely closed.
    b. A visual inspection of the carrying case MUST be performed to ensure that it is physically sound and free of defects.
    c. The carrying case MUST be inspected to insure that it has two category labels, one Type "A" label, and two Cargo Aircraft Only labels which are legible and unobstructed.
    d. All of the above

13. When **SHIPPING** an NDMG the trigger mechanism must be locked and the carrying case must be secured with:

    a. A heavy duty tie-strap
    b. A case padlock
    c. None of the above

14. When **TRANSPORTING** an NDMG in a private or company vehicle, the trigger mechanism must be locked and the carrying case must be secured with:

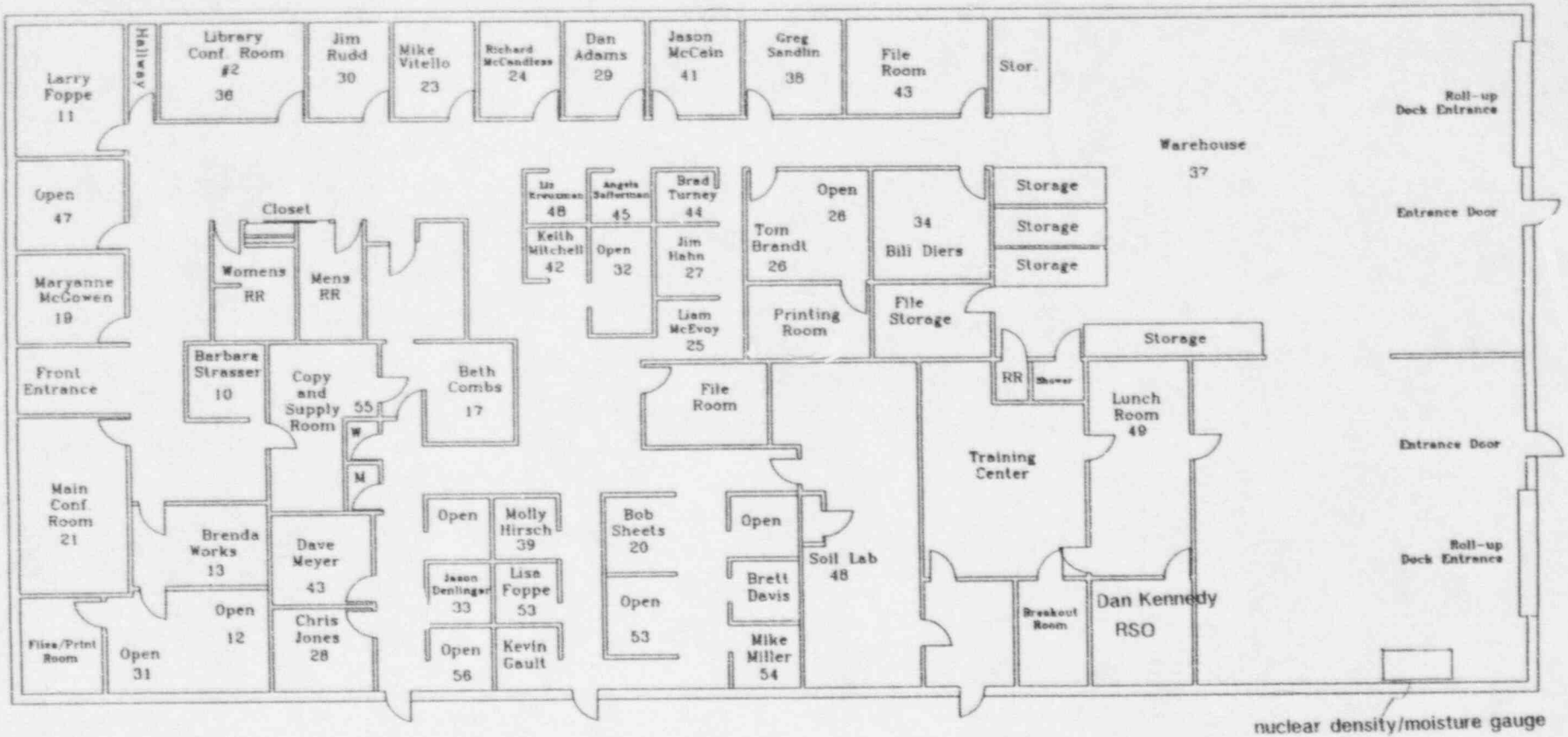
    a. A heavy duty tie-strap
    b. A case padlock
    c. None of the above

15. ALARA stands for **A**s **L**ow **A**s **R**easonably **A**chievable and is in reference to radiation exposure. The three primary methods of maintaining your radiation exposure ALARA are:

    a. Minimize the **TIME** spent around a source
    b. Maintain an adequate **DISTANCE** between yourself and the radioactive source
    c. Do not tamper with or remove the **SHIELDING** built into the device
    d. All of the above

16. NDMG operators are required to _____ and are assigned a _____ in order to assure that they are not being overexposed to radiation.

    a. maintain complete control of the NDMG at all times when it is in their possession, TLD Badge
    b. do ten situps prior to operating a NDMG, Film Badge
    c. be in shape, American Express credit card
    d. None of the above



LEGEND

ITEM 9

OFFICE LAYOUT

FOPPE TECHNICAL GROUP, INC.
11415 CENTURY BOULEVARD
CINCINNATI, OHIO

Project #:	
Ref. #: OFFICES	
Drawn By: TJB	
Date: 3/17/97	
Project Mgr.: LEF	
Scale: 1"=~20'	

Revisions

HAZARDOUS MATERIAL TRAINING FOR TRANSPORTATION AND SHIPPING OF NUCLEAR DENSITY/MOISTURE GAUGES (NDMG) (U.S. DOT Hazmat Training Required by 49 CFR Part 172, Subpart H)

TABLE OF CONTENTS

LIST OF ATTACHMENTS

LIST OF ATTACHMENTS - CONT

INTRODUCTION

This training is designed to assure that all company Nuclear Density/Moisture Gauge (NDMG) operators are trained to transport and ship nuclear density/moisture gauges as required by 49 CFR Part 172, Subpart H, Sections 172.700-172.704. This training requirement is in addition to an NRC certified NDMG Radiation Safety Training Course and must be renewed at least once every 2 years.

The U.S. Department of Transportation (DOT) has added this requirement to assist in achieving its primary goal which is to assure hazardous materials are transported safely.

Please understand this course is intended to meet the training requirements for transportation of radioactive material contained in NDMGs. If you are shipping or transporting any other type of hazardous materials, you need to contact your Health and Safety Manager for a schedule of other classes that are available to you.

TRANSPORTATION AND SHIPPING DOCUMENTS

Anytime a NDMG is shipped or transported from the confines of the licensee's facility, a Shipping Form, or Bill of Lading must accompany the device. These documents indicate compliance with U.S. DOT regulations and contain vital information in case an NDMG is involved in an accident, lost, or stolen. In addition, the Shipping Form or Bill of Lading **must be carried within immediate reach of the driver.**

TRANSPORTING IN A PRIVATE OR COMPANY VEHICLE

When transporting an NDMG in a private or company vehicle, a Bill of Lading must accompany the NDMG and must include the following information:

1. Proper Shipping Name - This can be found by referring to the 49 CFR 172.101 Hazardous Materials Table. For all of the nuclear density/moisture gauges presently owned by the company (except for the Troxler 4640-B, R.Q. is omitted) it is as follows: **R.Q., Radioactive Material, Special Form, N.O.S.**

   Definitions:

   R.Q. - This stands for Reportable Quantity and was added as part of the proper shipping name when the EPA added a rule that requires that R.Q. be added to the proper shipping name on the shipping documents and on the shipping package for the materials listed in Table 2 of 49 CFR 172.101, if their value is greater than or equal to the value listed in Column 3. Any release of hazardous materials labeled R.Q. must be reported or substantial fines and/or criminal charges may be levied against you.

Radioactive Material - For our purposes, we will define it as a hazardous material which emits any or all of the following: alpha particles, beta particles, gamma rays, or neutrons.

Special Form - Special form is defined as material in a solid form having no dimensions less than 0.5 millimeter or at least one dimension greater than 5 millimeters; does not melt sublime, or ignite in air at a temperature of 1,475 degrees Fahrenheit; will not shatter or crumble if subjected to the percussion test described in 10 CFR 71.77, and is not dissolved or converted into dispersible form to the extent of more than 0.005 percent by weight by immersion for one week in water at 68 degrees Fahrenheit or in air at 86 degrees Fahrenheit.

N.O.S. - This stands for Not Otherwise Specified and means that this material is not otherwise specified in the 49 CFR 172.101 Hazardous Materials Table.

2. Classification - There are nine different classifications for hazardous materials:

Class 1 (Explosives)
Class 2 (Compressed Gases)
Class 3 (Flammable Liquids)
Class 4 (Flammable Solids)
Class 5 (Oxygen Producers)
Class 6 (Poisonous)
Class 7 (Radioactive)
Class 8 (Corrosives)
Class 9 (Miscellaneous)

3. Identification Number - The identification number for radioactive materials in special form (all nuclear density/moisture gauges) is always **UN2974**.

4. The name of each radionuclide - In the company-owned nuclear density/moisture gauges, the radionuclides used are **Cesium-137 (Cs-137)** and/or **Americium-241:Beryllium (Am241:Be).**

5. The activity of each radionuclide - Since some carriers require the metric system of measurement, we will use both Becquerel (Bq) and Curie (Ci) units. These quantities can be found on the Gauge Certificate for each gauge.

6. The type of carrying container - All company-owned NDMGs use a "Type A" container. "Type A" indicates that the container has met specific testing requirements and is labeled as such. All gauges must be shipped and transported in the appropriate "Type A" container.

7. The category label which applies to each package - "RADIOACTIVE WHITE-I", "RADIOACTIVE YELLOW-II", OR "RADIOACTIVE YELLOW-III". All of the present company-owned gauges are in the **"RADIOACTIVE YELLOW-II"** category except for the Troxler 4300 gauge (Unit #33) which is in the **"RADIOACTIVE WHITE-1"** category.

8. The Transport Index (TI) - defined as the maximum radiation level in millirem per hour at one meter from the external surface of the gauge carrying case.

9. An emergency number which is monitored 24 hours a day - The purpose of this number is to provide a contact in case of an accident during transport. An example is the Troxler 24-hour number (919) 839-2676.

10. Emergency Response Document - This must accompany the shipping document to provide instructions to personnel responding to a transportation accident. Incorrect information on either the shipping document or the Emergency Response Document can effect the safety of emergency personnel, safety of carrier personnel, and the shipper who may be fined.

11. Shippers declaration stating: "This is to certify that the above named materials are properly classified, described, packaged, marked, and are in proper condition for transportation according to the applicable regulations."

SHIPPING VIA FEDERAL EXPRESS

When shipping an NDMG via Federal Express **(The only method of shipping company-owned NDMGs)**, a "SHIPPERS CERTIFICATION FOR DANGEROUS GOODS" Shipping Form must accompany the package. This Shipping Form requires the following information in addition to the previously mentioned information required on the Bill of Lading:

a. Statement as to the acceptability for either passenger - carrying or cargo - only aircraft. For the nuclear density/moisture gauges, it will always be "Cargo Aircraft Only!"

b. Dimensions of the carrying case.

c. Quantity or number of packages.

d. The authorization or the number of the Certificate of Approval of Design for Special Form Radioactive Material.

e. Emergency Response Guide (ERG) page attached - This informs personnel responding to an emergency that an ERG is attached to this form. Copies of ERG page are included in each Transportation Booklet and in each shipping package.

f. Metal Solid - This lets personnel know that the radioactive source is in metal solid form.

SUMMARY

- Each NDMG is assigned a **Unit Number**.

- Each Unit contains a **"Gauge Booklet"** (Black Binder) and a **"Shipping Package"** (Inter-Office Envelope).

- Each **"Gauge Booklet"** has all the necessary transportation information on its cover and contains other pertinent licensing information for the corresponding NDMG.

- Each **"Shipping Package"** has complete step-by-step instructions on how to complete a Federal Express Shipping Form taped to its front side and contains blank Federal Express Shipping Forms, Tie-Straps, and labels for the corresponding NDMG.

When transporting an NDMG by private or company vehicle, the Gauge Booklet that has been assembled for each NDMG contains the above mentioned information and must be within immediate reach of the driver while the driver is restrained by the lap belt. In addition, the NDMG must be fully secured and braced to prevent shifting in the cargo compartment of the vehicle, while in its locked transportation case, and with the NDMGs trigger mechanism locked in the "Safe Position". When shipping an NDMG via Federal Express **(the only method of shipping company owned NDMGs)** the completed Federal Express "SHIPPERS CERTIFICATION FOR DANGEROUS GOODS" contains the above mentioned information and serves as the Federal Express driver's Shipping Form; therefore, it is imperative that you follow the instructions on the Shipping Package for the NDMG that you are shipping exactly as shown. **Failure to have the "Gauge Booklet" within immediate reach of the driver while the driver is restrained by the lap belt when transporting an NDMG in a private or company vehicle or failure to properly complete the Federal Express "SHIPPERS CERTIFICATION FOR DANGEROUS GOODS" Shipping Form when shipping an NDMG, may result in substantial fines and or imprisonment.**

For your information and use, attached are examples of the Shipping Instructions and Bill of Lading that accompany each NDMG. The examples are for NDMG Unit 1, but each NDMG's paperwork will vary, therefore, when shipping a NDMG you should follow the instructions included for the unit you are shipping, exactly as shown. **If you are ever unsure of these procedures, contact the Radiation Safety Officer (RSO) at (513) 671-8144.**

VISUAL INSPECTION OF PACKAGES

IMPORTANT: Prior to placing an NDMG into its carrying case, the source rod must be locked into its "Safe Position"and the base of the gauge must visually be inspected to **insure that the sliding tungsten shield is completely closed!!! If the tungsten shield is not completely closed, then notify the RSO before proceeding!!!** For your information and use, attached are illustrations of both the tungsten shield correctly positioned and incorrectly positioned.

Prior to transporting or shipping an NDMG, its carrying case must be visually inspected to ensure that it is physically sound and that each closure device (hinges, hasps, latches, etc.) is properly installed, secured, and free of defects. It is also important to ensure that all of the required labels are not obstructed and are legible. Each carrying case **must** have the following labels:

Two Category Labels - All company-owned NDMG carrying cases are in the YELLOW-II category, except for the Troxler 4300 gauge case which falls under the WHITE-I category.

In either case, the two labels must be on opposite sides of the package and must include spaces for marking the contents and the activity of the package.

One "TYPE A" Label - This label identifies the package as conforming to U.S. DOT Specification 7A testing procedures. It also indicates the type of package (Type A) in which the radioactive material is being transported, and that the radioactive material is in special form.

Two "CARGO AIRCRAFT ONLY" Labels - These are required for shipments by air and the two labels must be affixed on opposite sides of the package adjacent to the category labels.

For your information and use, attached are illustrations of each of the above mentioned labels and an NDMG carrying case with each of the labels properly positioned on it.

LOCKING THE CARRYING CASE DURING TRANSPORT

Licensees who transport NDMGs in their own vehicles must provide adequate blocking, bracing, or tie-down of the package **to prevent shifting or movement during normal transport.** The licensee is also responsible for providing adequate security measures to prevent unauthorized entry. **Make sure you always lock the NDMG trigger mechanism in order to keep the source rod locked in its "Safe Position" and lock the carrying case prior to transport in a private or company vehicle.** If you are transporting and NDMG in an open bed vehicle, make sure you secure it by locking it to the vehicle bed. **In addition, always lock the vehicle doors if you must leave the vehicle unattended for ANY PERIOD OF TIME!!!**

SEALING OF PACKAGES WHEN SHIPPING

When shipping the package, 49 CFR 173.412 requirements for Type A packages demand that "the outside of the package incorporate a feature, such as a seal, that is not readily breakable, and that, while intact, provides evidence that the package has not been opened." We use a heavy-duty plastic tie-strap to meet this requirement. If you should ever receive a package that is not sealed, contact the RSO immediately so that the matter can be investigated. **In addition, prior to shipping an NDMG the trigger mechanism must be locked in order to keep the source rod locked in its "Safe Position".**

SUMMARY

When transporting an NDMG in a private or company vehicle, the carrying case **must be locked.** When shipping an NDMG via Federal Express, the carrying case **must be sealed. In either case, the source rod must always be locked in the "Safe Position" and the tungsten shield must be completely closed.**

ALARA

ALARA stands for **A**S **L**OW **A**S **R**EASONABLY **A**CHIEVABLE. The three ways to accomplish this are time, distance, and shielding.

Time - The easiest way to reduce exposure is to minimize the time spent around a source. If you reduce your time spent around a source by 50 percent you also reduce the exposure by 50 percent.

Distance - Another way to reduce occupational exposure is to increase the distance between yourself and the source. If you double the distance between yourself and the source, you are able to reduce your exposure to one-fourth the dosage at the closer point.

Shielding - Shielding is defined as any material used to reduce your exposure to radiation from a radioactive source. Adequate shielding is designed into the gauge and is very effective as long as it is not tampered with or removed.

PROPER HANDLING AND PROTECTION

In addition to utilizing the ALARA concept, it is important to always maintain complete control of any package you handle. Complete control requires that the package not be dropped, kicked, jarred, or **left unattended**. The sealed sources and shielding in these gauges are very reliable and by minimizing the risk of accidents (by maintaining complete control) you greatly reduce the chances of being exposed to radiation from these devices.

Although it is not required by our NRC license, NDMG operators are assigned a personnel monitoring device (TLD Badge) to assure that they are not being overexposed to radiation. The exposure results for these badges are routinely submitted to each operator on a yearly basis. If for any reason you require immediate results, they can be obtained by contacting the RSO.

EMERGENCY RESPONSE PROCEDURES

If a NDMG is damaged at a job site · involved in an accident during transport, you must treat this as an emergency and follow these procedures:

1. Immediately cordon off an area around the NDMG. An area radius of 15 ft will be sufficient.

2. Detain all personnel and vehicles involved until the extent of the contamination can be established.

3. A visual inspection of the NDMG must be conducted to determine if the source housing and/or shielding has been damaged.

4. At the earliest possible time, when the situation is under control, contact your local RSO at the number listed below. This individual should be the contact with the regulatory agency in all matters, if at all possible.

5. If this individual is not available, contact the gauge manufacturer at the corresponding emergency number listed below.

IMPORTANT PHONE NUMBERS

1. **Radiation Safety Officer (RSO) - Dan Kennedy**
   Work (800) 486-8144
   Home (513) 598-1869

2. Corporate Health and Safety Manager - Richard McCandless

3. 24-hour Troxler Emergency Number - (919) 839-2676.

4. 24-hour Humboldt Emergency Number - (800) 992-4589.

Attached is a copy of the Emergency Response Document that will accompany all company-owned gauges. Remember, any driver transporting a gauge is required to have a copy of this document at all times during transport. Make sure you are familiar with the information listed on this sheet.

SHIPPING PACKAGE AND INSTRUCTIONS: Unit: 01 Model: 3411-B Serial No: 12763
PRIOR TO ANY SHIPMENT, NOTIFY THE RSO AT THE NUMBER LISTED BELOW!!!

REQUIRED CASE LABELS: (2) YELLOW II, (1) TYPE "A", (2) CARGO AIRCRAFT ONLY! (EXTRA LABELS INSIDE)

1. Verify that the gauge you are shipping matches the Unit, Model, and Serial No. listed at the top of this page.
2. **FILL IN ALL OF THE YELLOW HIGHLIGHTED AREAS!!!**
3. Fill in Boxes 1 & 2 which are self-explanatory. SENDERS FEDERAL EXPRESS NUMBER is not required.
4. In the bottom right-hand corner, fill in your NAME AND TITLE, PLACE (city and state) and DATE, and your SIGNATURE.
5. All of the other Boxes should be filled in for you and are highlighted in Pink; however, it is your responsibility to verify that the information on the form you are using is legible and matches the information highlighted in Pink.
   If you do not have a preprinted form, then you must fill in all of the information highlighted in Pink and Yellow.
6. Remove a blank shipping label from this package and fill in a **FROM:** NAME, ADDRESS, PHONE NUMBER and a **TO:** NAME, ADDRESS, PHONE NUMBER.
7. Assure that there is an Emergency Letter attached to your form. If not, attach one.
8. Visually inspect the **CASE** to ensure that it is physically sound and all closure devises are properly installed, **CASE** labels are legible (if not replace them), check your UNIT INVENTORY LIST and verify that all accessories are accounted for, remove a tie-strap from this package, and **PUT THIS PACKAGE BACK IN THE CASE!!!** Then close the case and seal it with the tie-strap and affix the completed shipping label and Federal Express Form (with attached Emergency Letter) to the case.

If you have any questions, contact the RSO: Dan Kennedy, Foppe Technical Group, 11415 Century Boulevard, Cincinnati, Ohio 45246, (513) 671-8144.

BILL OF LADING

"CAUTION, RADIOACTIVE MATERIAL MAY BE LOCATED IN THE CARGO COMPARTMENT OF THIS VEHICLE"

OWNER OF DEVICE: Foppe Technical Group
11415 Century Boulevard
Cincinnati, Ohio 45246
(513) 671-8144

DEVICE: NUCLEAR DENSITY/MOISTURE GAUGE

MODEL: **3411-B** SERIAL NO: **12763**

CONTENTS: CESIUM 137 (Cs-137) AMERICIUM-241:BERYLLIUM (Am-241:Be)

ACTIVITY: **31** GBq **.0087** Ci **1.48** GBq **.04** Ci

SHIPPING DESCRIPTION:

R.Q. RADIOACTIVE MATERIAL
SPECIAL FORM, N.O.S. UN 2974, TYPE 7A PACKAGE
RADIOACTIVE YELLOW II LABELS, METAL SOLID
TRANSPORT INDEX **0.5**

This is to certify that the above named materials are properly classified, described, packaged, marked, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Daniel Kennedy/Radiation Safety Officer

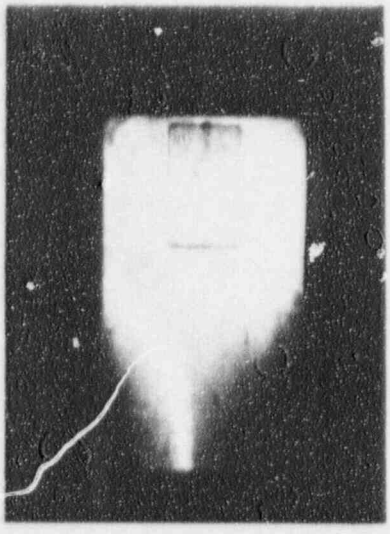
Signature: _____ Date: _____

Transport Requirements: The regulations require that a properly prepared Bill of Lading, a copy of the gauge's source certificate, Type "A" certificate, and a copy of the latest leak test; all must be carried within arms reach of the driver of the vehicle. The gauge must be transported in the carrying case, in the cargo compartment, secured from unauthorized removal, and blocked or braced from shifting.

CALL THE FOLLOWING FOR EMERGENCY ASSISTANCE:

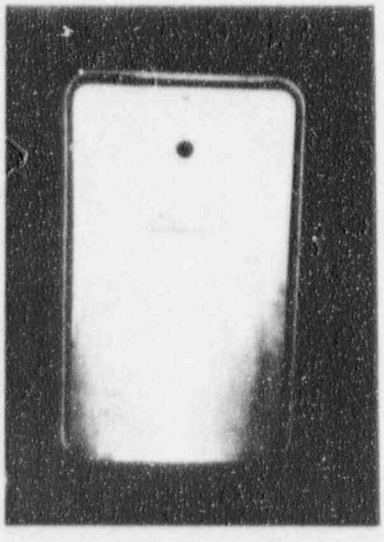
TROXLER ELECTRONIC LABORATORIES	(919) 839-2676
HUMBOLDT SCIENTIFIC	(800) 992-4589
CAMPBELL PACIFIC NUCLEAR CORP.	(800) 535-5053

COMPLETELY CLOSED TUNGSTEN SHIELD



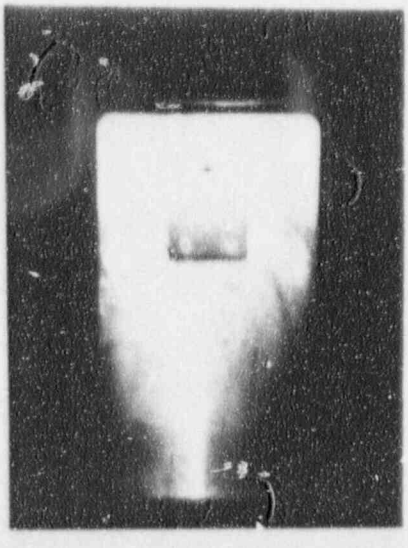
Look closely at the opening for the source rod and you will only see the tungsten shield., **INDICATING THAT IT IS COMPLETELY CLOSED**.

COMPLETELY OPENED TUNGSTEN SHIELD



Look closely at the opening for the source rod and you cannot see the tungsten shield. **INDICATING THAT IT IS COMPLETELY OPENED.**

PARTIALLY OPENED TUNGSTEN SHIELD



Look closely at the opening for the source rod you will only see part of the tungsten shield. **INDICATING THAT IT IS PARTIALLY OPENED.**

TYPE "A"

USA DOT 7A
TYPE "A"
RQ RADIOACTIVE MATERIAL
SPECIAL FORM
NOS UN 2974

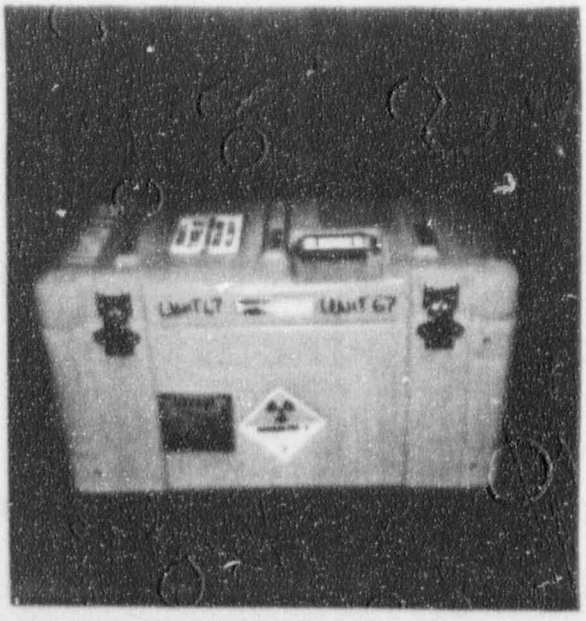
Trivalent Electronic Laboratories, Inc. Research Triangle Park, NC 27709 USA

CATEGORY

CARGO AIRCRAFT ONLY

Shown below are a front view and rear view of an NDMG carrying case with the required labels positioned correctly. Note that there are 2 **CATEGORY** labels, 2 **CARGO AIRCRAFT ONLY** labels, and 1 **TYPE "A"** label for a total of 5 labels. Prior to transporting or shipping an NDMG, insure that the required labels are legible, unobstructed, and placed on the carrying case as shown below.

FRONT VIEW



REAR VIEW

NUCLEAR DENSITY/MOISTURE GAUGE EMERGENCY RESPONSE INFORMATION

(Reference Section 10D-91.2003, F.A.C., 49 CFR Subpart G, DOT P 5800.5 ERG90 and Section USG-17 of IATA Dangerous Goods Regulations)

1. **SHIPPING NAME AND HAZARDOUS CLASS:** RQ, RADIOACTIVE MATERIAL, SPECIAL FORM, N.O.S. UN2974, CLASS 7, TYPE A PACKAGE

2. **IMMEDIATE HAZARDS TO HEALTH:**

- External radiation hazard from unshielded radioactive material.
- Low-level radioactive material; little personal radiation hazard.
- Materials in special form are not expected to cause contamination in accidents.
- Some radioactive materials cannot be detected by commonly available instruments.
- Potential internal radiation hazard from inhalation, ingestion, or breaks in skin, only if special form capsule is breached.

3. **FIRE OR EXPLOSION:**

- No risk of fire or explosion.
- Radioactivity does not change flammability or other properties of the materials.

4. **IMMEDIATE PRECAUTIONS:**

- Isolate hazard area to within a 10 to 15 foot radius of the gauge and restrict access.
- Emergency response actions may be performed prior to any measurement of radiation; limit entry to shortest time possible.
- Notify local authorities and Radiation Control Authority of accident conditions.
- Detain uninjured persons, isolate equipment with suspected contamination, and delay cleanup until instruction from Radiation Control Authority.
- Positive pressure SCBA and structural firefighters' protective clothing will provide limited protection.

5. **FIRE:**

- Do not move damaged containers; move undamaged containers out of fire zone.
- Small Fires: Dry Chemical, CO_2, water spray, or regular foam.
- Large Fires: Water spray, fog (flooding amounts).

6. **SPILL OR LEAK:**

- Do not touch damaged containers or exposed contents.
- Damage to outer container may not affect primary inner container.
- Special form capsules are not expected to leak as a result of an accident or fire.

7. **FIRST AID:**

- Use first aid treatment according to the nature of the injury.
- Advise medical personnel that victim may be contaminated with low-level radioactive material.
- Except for the injured, detain persons exposed to radioactive material until arrival or instruction of Radiation Control Authority.

CONTACT THE FOLLOWING FOR EMERGENCY ASSISTANCE:

TROXLER ELECTRONIC LABORATORIES	(919) 839-2676
HUMBOLDT SCIENTIFIC	(800) 992-4589

V. Transportation and Shipping Documents

A. **Emphasize:** All company NDMGs will be mobilized by either shipping them Federal Express or transporting them in personal or company vehicles. In order to simplify shipping and transportation procedures, no other carriers shall be used. In either case, a properly completed Shipping Form or Bill of Lading **must** be within immediate reach of the driver while the NDMG is secured in the cargo compartment of the vehicle.

IV. Transporting in a Private or Company Vehicle

A. **FYI:** R.Q. (Reportable Quantity) is not required on the 4640-B as part of the proper shipping name since it contains only the Cesium-137 source which does not meet the criteria listed in Table 2 of 49 CFR 172.101.

B. **FYI:** A copy of the Emergency Response Guide is located at the rear of the training manual

VII. Shipping Via Federal Express

A. **Emphasize:** The only method of shipping company- wned NDMGs is Federal Express.

B. **Emphasize:** The need to follow the step by step instructions on the front of the Shipping Package when shipping a gauge.

VIII. Summary

A. **FYI:** In the rear of this training manual, there are examples of a Federal Express shipping form (required when shipping a NDMG) and a Bill of Lading (required when transporting a NDMG by personal or company vehicle). A completed Bill of Lading is on the cover of each Gauge Booklet which accompanies each gauge at all times (NDMG operators should never have to complete this form, it is completed and signed by the Radiation Safety Officer). Blank Federal Express forms are located in each Shipping Package which accompanies each gauge. Step by step instructions on how to complete and ship each NDMG are taped to the front of each Shipping Package. Each NDMG has a specific Gauge Booklet and Shipping Package assigned to it.

B. **Emphasize:**The Gauge Booklet which contains all of the necessary transportation documents must be within the immediate reach of the driver while restrained by his lap belt, with the NDMG fully secured in the cargo compartment of the vehicle.

C. **Emphasize:** The Federal Express Shipping Form must be completed exactly as shown for the corresponding unit.

IX. Visual Inspection of Packages

A. **Emphasize:** It is important to perform a visual inspection of the sliding tungsten shield prior to placing an NDMG into its carrying case.

B. **Emphasize:** It is important to perform a visual inspection of the carrying case prior to shipping. Should the labels be obstructed or illegible, then replace them with the extra labels located in the Shipping Package.

X. Locking the Carrying Case During Transport

A. **Emphasize:** Both locking of the NDMG trigger mechanism and carrying case (package) are mandatory when transporting an NDMG by personal or company vehicle.

XI. Sealing of Packages When Shipping

A. **Emphasize:** Locking the NDMG trigger mechanism is mandatory, but do not lock the carrying case (package) when shipping a NDMG. Instead, use a heavy duty tie-strap (located in the Shipping Package) to seal the carrying case after assuring all items listed on the Unit Inventory List (which is located in each Gauge Booklet) are enclosed in the carrying case.

XII. Summary

A. **Emphasize:** It is important to perform a visual inspection of the sliding tungsten shield prior to placing the NDMG into its carrying case and lock the NDMG source rod in the "Safe Position".

XIII. ALARA

A. **Emphasize:** Use common sense, always try to keep your radiation exposure **A**s **L**ow **A**s **R**easonably **A**chievable.

XIV. Proper Handling and Protection

A. **Emphasize:** Do not abuse the NDMG in any manner.

B. **Emphasize:** NEVER LEAVE THE NDMG UNATTENDED, UNLESS IT IS LOCKED IN THE TEMPORARY OR PERMANENT STORAGE ROOM!!! The majority of incidents reported to the NRC are due to NDMGs left unattended and run over by vehicles.

XV. Emergency Response Procedures

A. **Emphasize:** Do not Panic if there is an accident. Stop all personnel and vehicles involved. Assess the damage and contact the emergency personnel within the company. If they are unavailable, then contact the corresponding manufacturer's 24-hour emergency number.

XVI. Important Phone Numbers

A. **FYI:** These are the numbers to call in case of an emergency.

XVII. Hand out the enclosed NDMG HAZMAT Training Exam. Each attendee must achieve a score of 75 percent (12 of 16 questions correct) or better in order to be certified.

XVIII. Upon completion of the test, forward the test along with the completed sign-in sheet to Dan Kennedy at the Cincinnati Office. **Don't forget to print your name (instructor), sign, and date the sign-in sheet! Incomplete sign-in sheets will not be accepted.**

XIX. **All first time attendees must receive a copy of the enclosed Compliance Certification Form along with the NDMG Operating Procedures, and a copy of the Occupational Exposure History Form. These forms must be completed and forwarded to the RSO along with a copy of the attendees NDMG Training Certificate prior to being authorized as an authorized Foppe NDMG operator.**

ITEM: 10.5

NUCLEAR DENSITY/MOISTURE GAUGE (NDMG) OPERATING PROCEDURES

TABLE OF CONTENTS

LIST OF FIGURES

Figure

NUCLEAR DENSITY/MOISTURE GAUGE (NDMG) OPERATING PROCEDURES

If there are any questions regarding the material covered in this document, feel free to contact the RSO at (513) 671-8144.

PROGRAM COORDINATOR

Lawrence Foppe

RADIATION SAFETY OFFICER (RSO)

Daniel Kennedy

FOPPE TECHNICAL GROUP AUTHORIZED NDMG OPERATORS

In order to be listed as an authorized Foppe NDMG operator on any Foppe Federal or State NDMG Radioactive materials license, you must provide the RSO with the following:

1. A completed Foppe NDMG Compliance Certification form.
2. A completed Foppe Occupational Exposure History form.
3. Proof of attendance at a licensed NDMG training course.
4. Proof of attendance at an in-house Foppe NDMG DOT training course within 90 days of the employee's hire date or change in job functions.

OPERATING AN NDMG WITHOUT FULL COMPLIANCE OF ALL THE ABOVE MENTIONED REQUIREMENTS, WILL RESULT IN TERMINATION OF EMPLOYMENT AND MAY RESULT IN PUNITIVE ACTIONS BY FEDERAL AND STATE REGULATORY AGENCIES WHICH COULD INCLUDE SUBSTANTIAL FINES AND/OR IMPRISONMENT.

EMERGENCY PROCEDURES

♦ In the event of damage to a NDMG, the following must be performed:

1. Immediately cordon off an area around the NDMG. An area radius of 15 ft will be sufficient.

2. Detain all personnel and vehicles involved until the extent of contamination can be established.

3. A visual inspection of the NDMG is to be made to determine if the source housing and/or shielding has been damaged.

4. At the earliest possible opportunity, when the situation is under control, contact Dan Kennedy at the number listed below. This individual will then be the contact with the regulatory agency in all matters.

5. If this individual is not available, contact the NDMG manufacturer at the corresponding emergency number listed below.

- Important Phone Numbers:

1. **Radiation Safety Officer (RSO) - Dan Kennedy**
   Work (800) 486-8144
   Home (513) 598-1869

2. Corporate Health and Safety Manager - Richard McCandless

3. 24-hour Troxler Emergency Number - (919) 839-2676.

4. 24-hour Humboldt Emergency Number - (800) 992-4589.

5. NRC Emergency Number - (301) 816-5100.

6. New York Emergency Number - during normal work hours - (718) 797-7641, after hours (518) 457-2200.

7. Alabama 24-hour Emergency Number - (205) 242-4378 ask for Operator 971.

- If a NDMG is lost or stolen, **immediately contact the RSO** who will then notify the proper authorities.

FIELD RADIATION SAFETY

NDMGs contain radioactive material which is regulated by Federal and State agencies. As a authorized NDMG operator, you are responsible for understanding and adhering to the regulations set forth by those agencies and the company's NDMG operating procedures. Failure to do so, could result in substantial penalties. With recent changes in Federal and State regulations, these penalties may include imprisonment and/or fines for the NDMG operator.

- Per company policy, only company-owned NDMGs shall be used by its employees, conversely, only company employees shall use its NDMGs, unless otherwise approved by the RSO.

- In order to obtain an NDMG, contact the RSO at (513) 671-8144.

- Prior to requesting an NDMG, the authorized NDMG operator must confirm that a storage area has been provided by the job site. The storage area must be capable of preventing unauthorized access to the NDMG and it must be at least 15 ft from any permanent work station.

- When an NDMG arrives at a temporary job site, the NDMG must be secured in the designated storage area and the storage area door must be immediately posted with a "NOTICE TO EMPLOYEE" sign and a "NOTICE TO FIREMAN, CAUTION RADIOACTIVE MATERIAL" sign (**POST THE FULL 11 x 17 SIGNS, DO NOT FOLD THEM IN HALF!!!)** These postings are always located at the front of each NDMG BOOKLET, along with any additional postings that may be required for your job site. If the postings are missing, then contact the RSO immediately. IT IS IMPERATIVE THAT ALL NDMG STORAGE AREAS BE PROPERLY POSTED!!!

- When removing the NDMG from a permanent storage location, it must be recorded in the UTILIZATION LOG located at the permanent storage location. If the NDMG is being stored at a temporary storage location, it's removal must be recorded in the DAILY UTILIZATION/STANDARD COUNT LOG located in the rear of each NDMG BOOKLET.

- Once an NDMG is properly removed from storage, it is important that the NDMG operator **maintain complete control of the device at all times.** The Nuclear Regulatory Commission (NRC) along with a number of state regulatory agencies have found that failure to secure NDMGs has resulted in several incidents causing damage to NDMGs by heavy construction equipment. The NRC along with the other state agencies are taking enforcement action (i.e., substantial penalties) in such cases; therefore, it is important that all NDMG operators adhere to the following operating procedures:

  1. Whenever possible, use the site vehicle to transport the NDMG from test area to test area, keep the vehicle near the test area, and upon completion of each test, secure the NDMG in the "safe" position and return the NDMG to its carrying case in the rear of the vehicle. This means that the only time the NDMG is out of the vehicle is during the actual test.

  2. If it is not possible to use the site vehicle to transport the NDMG to the test area, then bring the vehicle as close to the test area as possible and carry the NDMG from test site to test site. Maintain visual contact with the NDMG at all times, and keep it within a 2-foot proximity, except when performing an actual test as noted below.

  3. When performing an actual test, after securing the NDMG in the proper test position and pressing the start button, you must step back approximately 4 ft from the NDMG, maintain visual contact with the NDMG at all times, complete the test, then secure the NDMG in the "safe" position and return the NDMG to its carrying case

in the rear of the vehicle or carry it to the next test area while maintaining visual contact with the NDMG at all times, and keeping it within a 2-foot proximity.

4. When you are done testing for the day, IMMEDIATELY secure the trigger mechanism, the carrying case, and return the NDMG to it's designated storage area.

- **PERIODICALLY INSPECT THE BASE OF THE GAUGE TO INSURE THAT THE SLIDING TUNGSTEN SHIELD IS COMPLETELY CLOSED WHEN THE SOURCE ROD IS IN ITS SAFE POSITION. IF THE TUNGSTEN SHIELD IS NOT COMPLETELY CLOSED, THEN NOTIFY THE RSO IMMEDIATELY.**

- When an NDMG is removed from a site, the certified NDMG operator must remove the "NOTICE TO EMPLOYEE" sign, "NOTICE TO FIREMAN, CAUTION RADIOACTIVE MATERIAL" sign along with any other NDMG related postings from the NDMG storage area door.

HEALTH AND SAFETY

NDMG operators are responsible for recognizing an unsafe working environment. If at anytime you are placed in a work environment which does not allow you to perform your work duties in a safe manner (i.e., maintain complete control of the NDMG) you must immediately notify the project manager, if the situation is not resolved to the operator's complete satisfaction, notify your Construction Quality Assurance (CQA) manager, and if the situation is still not resolved, notify the Program Coordinator.

EQUIPMENT DEFECTS AND NONCOMPLIANCE

Individuals aware of noncompliance with Nuclear Regulatory Commission (NRC) or equivalent agreement state regulations or defects in NDMG equipment must file a written report to the RSO. The RSO will investigate the report and respond to the matter within ten (10) working days and maintain a record of the report for inspection by the NRC.

STORAGE AREAS

- All storage areas must be further than 15 ft from a permanent work station and have a "Caution Radioactive Materials" sign and a "Notice to Employees" sign posted on the door of the storage area.

- All storage areas ***must be locked to prevent unauthorized entry.***

- Do not post a "Caution Radioactive Materials" sign at the entrance of a building or trailer; this will only cause unnecessary attention.

- Permanent storage locations must be approved by the Nuclear Regulatory Commission (NRC) or equivalent agreement state agency and listed on the company's NRC or equivalent agreement state Radioactive Materials License.

ALARA

ALARA stands for **A**S **L**OW **A**S **R**EASONABLY **A**CHIEVABLE. The three ways to accomplish this are time, distance, and shielding.

Time - The easiest way to reduce exposure is to minimize the time spent around a source. If you reduce your time spent around a source by 50 percent you also reduce the exposure by 50 percent.

Distance - Another way to reduce occupational exposure is to increase the distance between yourself and the source. If you double the distance between yourself and the source, you are able to reduce your exposure to one-fourth the dosage at the closer point.

Shielding - Shielding is defined as any material used to reduce your exposure to radiation from a radioactive source. Adequate shielding is designed into the gauge and is very effective as long as it is not tampered with or removed

TRANSPORTATION

PRIOR TO TRANSPORTING AN NDMG, ALWAYS LOCK THE SOURCE ROD IN ITS SAFE POSITION AND VISUALLY INSPECT THE BASE OF THE GAUGE TO INSURE THAT THE SLIDING TUNGSTEN SHIELD IS COMPLETELY CLOSED. IF THE TUNGSTEN SHIELD IS NOT COMPLETELY CLOSED, THEN NOTIFY THE RSO BEFORE PROCEEDING.

- All possible precautions shall be taken to ensure that the equipment is fully secured and braced to prevent shifting in the transporting vehicle and that the equipment is always isolated from the passenger compartment. When transporting in an enclosed vehicle (car or van), the vehicle must be locked at all times if the vehicle is left unattended. When transporting in an open bed vehicle, the NDMG must be securely fastened and locked to the vehicle bed.

- The NDMG must be transported in the proper transportation case with its trigger mechanism locked in the "Safe" Position. This procedure is dictated by the U.S. Department of Transportation which requires that the NDMG be transported in a properly labeled and approved transport case.

- At all times during transport, the driver must have the transportation booklet for each NDMG being transported within arms reach while restrained by the lap belt.

- Each transportation booklet will contain:

  1. Bill of Lading
  2. "Notice to Employee" Sign
  3. "Notice to Fireman," "Radioactive Material" Sign
  4. Unit Inventory List
  5. Nuclear Density/Moisture Gauge (NDMG) Operating Procedures
  6. Emergency Response Information
  7. Copy of the company's NRC License
  8. Copy of the company's State License or Reciprocity Certificate, if applicable
  9. NDMG Certificate
  10. Type "A" Certification
  11. Updated Calibration Sheets
  12. Current Leak Test Certification
  13. Daily Utilization/Standard Count Log

- If your NDMG does not have a booklet or is missing any of the items listed, contact the RSO.

- Any questions regarding transportation of the NDMG should be directed to the RSO and resolved before proceeding.

SHIPPING

PRIOR TO SHIPPING AN NDMG, ALWAYS LOCK THE SOURCE ROD IN ITS SAFE POSITION AND VISUALLY INSPECT THE BASE OF THE GAUGE TO INSURE THAT THE SLIDING TUNGSTEN SHIELD IS COMPLETELY CLOSED. IF THE TUNGSTEN SHIELD IS NOT COMPLETELY CLOSED, THEN NOTIFY THE RSO BEFORE PROCEEDING.

- The Nuclear Regulatory Commission requires that the RSO know the **exact location** of each NDMG at all times; therefore, prior to transporting a NDMG from a site, the RSO must be notified.

- Each NDMG will have a "Shipping Package and Instructions". This package will have everything needed to ship the NDMG; including Federal Express forms, tie straps, labels, and step by step instructions. If you are unsure of the procedure, contact the RSO before proceeding.

LEAK TEST PROCEDURES

- All **authorized** Foppe NDMG operators may perform leak tests on Foppe NDMGs.

- All company NDMGs will be leak tested twice a year on May 2 and November 2 of each year, using Troxler 3880 leak test kit. **Do not conduct the leak test prior to the above mentioned dates.**

- If these dates fall on a non-work day, then they must be performed on the next work day. The individual in control of the NDMG on these dates must make certain the leak test is performed.

- Each NDMG will have a leak test kit assigned to it and this kit will remain with the NDMG at all times.

- Each leak test kit includes complete instructions with an example of competed forms for the assigned NDMG. If you are unsure of the procedure, contact the RSO.

INVENTORY AND SECURITY

- The Unit Inventory List in each NDMG transportation booklet must be checked anytime a NDMG is transported. If there is anything missing, notify the RSO so that the missing part can be properly replaced.

- When the NDMG is in the field, the operator, as the authorized user, must maintain control over the NDMG at all times.

- When the NDMG is not being used, the NDMG trigger mechanism must be secured, locked, and placed in the transport case. The case must then be secured, locked, and returned to the storage area as soon as possible.

FIELD OPERATING PROCEDURES

- Per company policy, only company-owned NDMGs shall be used by its employees; conversely, only company employees shall use its NDMGs, unless otherwise approved by the RSO.

- When removing the NDMG from storage, it must be recorded in the daily utilization/standard count log located in each NDMG transportation booklet.

- Remove the trigger lock, turn on the NDMG and check the base to make sure it's clean.

- Take standard counts daily and record them in the daily utilization/standard count log.

- Standard counts must be taken in slow (4 minute) position, on the standard block with the NDMG in the safe position, and the block placed on a solid surface with a density of 100 pcf or greater.

- Attempt to take the standard counts on the same spot every day. The density standard count should be ±1% of the average of the four previous standard counts, and your moisture standard count should be ±2% of the average of the four previous standard counts.

- On different model NDMGs, the electronics may vary, thus changing the location and procedures for the buttons which should be pushed for each model. Consult your instruction manual for information and call the RSO if you are uncertain.

- When testing an area where the surface is not relatively smooth, use the scraper plate provided to smooth the surface. **Do not pound on the scraper plate! Hold the scraper plate by it's handles and use the weight of the scraper plate to smooth the surface. Pounding on the scraper plate causes it to bow in the center, thus rendering it useless as a drill rod guide.**

- When using the drill rod and drill rod guide, you must drive the hole at least 2 inches deeper than the desired test depth.

- Place the source rod in the hole to the desired depth of measurement and pull the NDMG toward you so that the source rod is in firm contact with the side of the hole toward the front of the NDMG.

- Take all measurements in the "Normal" (1 minute) position. **The fast (15 second) position is for troubleshooting purposes only.**

- As noted above, each NDMG model will require variations on the buttons to be used in order to produce the desired end result. Consult your instruction manual and call the RSO if you still are uncertain.

- NDMGs must never be dropped, kicked, or abused in any manner.

- NDMGs are not waterproof. If a client should request testing in wet weather, please take time to point out that water damage can cause erratic readings or render the NDMG totally inoperative. It should also be noted that any repair and shipping charges associated with such preventable damage will be charged to the project.

- If it is decided to continue working in wet weather, it is imperative that the NDMG be kept dry. Also following this wet weather usage, you should closely monitor the NDMG's operation, since water damage does not always show up until days or even weeks after the exposure.

- If the surface of the NDMG is clean, then you should rerun the standard counts procedure outlined above and attempt to attain standard counts within the prescribed limits. If you continue to have problems, call the RSO for assistance.

- Remember that certain soils containing mica, coal, or other organic materials may cause inaccurate NDMG readings. The methods used to correct the readings will vary depending upon the material contained in the soil. Should you encounter this situation, contact the RSO for assistance.

THEORY OF DENSITY MEASUREMENTS

- Density measurements utilize a Cesium-137 source (photon emitter) in conjunction with two Geiger Mueller tubes (photon detectors).

- Cesium-137 emits Gamma Rays (photons) which are best shielded by dense materials.

- When the Cesium-137 source is lowered from its shielding position (safe position), the density of the material is determined by the amount of emitted photons which reach the detectors.

- The lower the number of photons (density count) reaching the detectors, the higher the density of the material and conversely, the higher the number of photons reaching the detectors (density count), the lower the density of the material.

- There are two modes of operation for density measurements: Backscatter Mode, Source Rod retracted (see Figure 1), and Direct Transmission Mode, Source Rod extended (see Figure 2). The direct transmission mode is considered much more accurate and is always used on **soil** density tests.

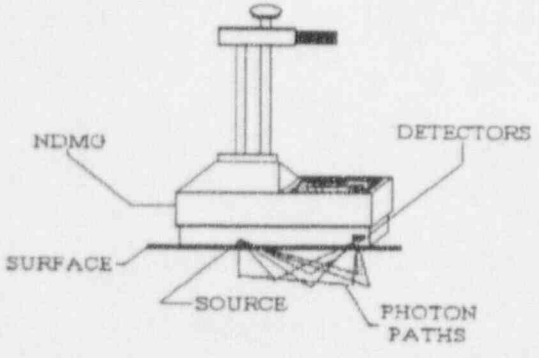


Figure 1
Backscatter Mode

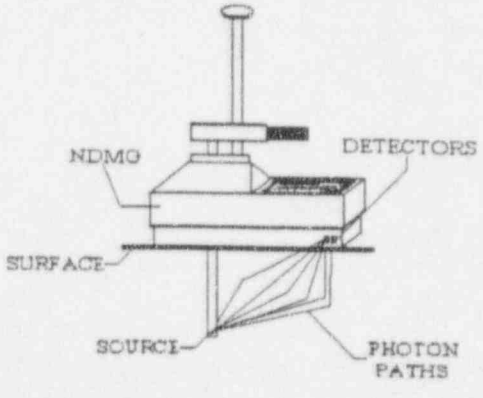


Figure 2
Direct Transmission Mode

THEORY OF MOISTURE MEASUREMENTS

- Moisture measurements utilize an Americium 241:Beryllium source (fast neutron emitter) in conjunction with a He-3 tube (thermalized neutron detector), which is used, due to its high sensitivity to thermalized neutrons and insensitivity to fast neutrons. Thermalized neutrons are fast neutrons that have been slowed to velocities where further collisions with hydrogen or other molecules will not further slow the neutrons.

- When the NDMG is placed on an area to be measured, the fast neutrons emitted by the Americium 241:Beryllium source are thermalized by hydrogen molecules (water content) contained in the measured material. These thermalized neutrons are detected by the He-3 tube and displayed as the moisture count.

- The higher the amount of thermalized neutrons reaching the detector (moisture count), the higher the moisture content in the material and conversely, the lower the amount of thermalized neutrons reaching the detector (moisture count), the lower the moisture content in the material.

- There are some elements such as boron, cadmium, and chlorine that capture neutrons. In these cases a moisture offset or a special calibration may be required. Consult your instruction manual or the RSO for help.

- "Depth of Measurement", or the depth at which 95 percent of the counted neutrons pass before reaching the detector, is generally a function of the moisture content. The normalized curve shown in Figure 3 illustrates the effects of moisture content on the radius of measurement.

This function may be expressed by :

Depth (inches) = 11 - (0.17 x M) where M = Moisture in PCF (pounds per cubic foot):

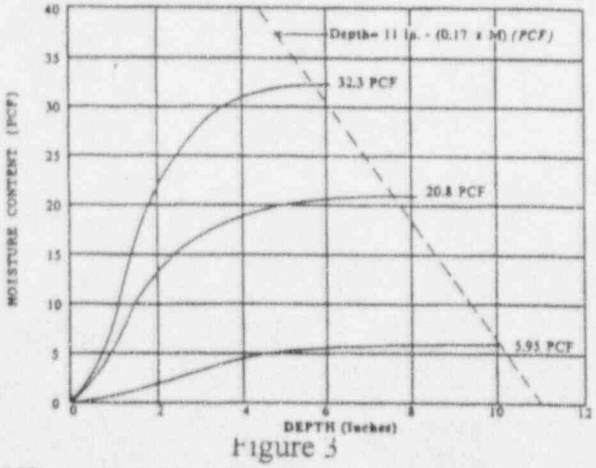


Figure 3
Effect of Moisture on Depth of Measurement

COMMON ABBREVIATIONS AND FORMULAS

PCF - Pounds per Cubic Foot (Unit of Measurement)
WD - Wet Density (measured in pcf)
DD - Dry Density (measured in pcf)
M - Moisture (measured in pcf)
MS - Moisture Standard (a count given by the NDMG)
DS - Density Standard (a count given by the NDMG)
MC - Moisture Count (a count given by the NDMG)
DC - Density Count (a count given by the NDMG)
WD (pcf) = DC/DS
M (pcf) = MC/MS; DD (pcf) = WD (pcf) - M (pcf)
% M = M (pcf)/DD (pcf) x 100

MECHANICAL MAINTENANCE

NOTE: NDMG operators are not authorized to remove either of the sources from their source holders, nor remove the source rod from the gauge. Only individuals authorized by the NRC or agreement state regulatory agency may perform these tasks.

Maintenance of the scraper ring or tungsten shield may be required if the following problems are encountered while using the NDMG:

1. Difficulty in lowering or raising the source rod (may indicate a need to replace the scraper ring).

2. No "click" is heard from the tungsten shield cavity when the source rod is raised to the "safe" position.

3. Erratic or incorrect density standard counts.

Corrective Procedures:

1. With the source rod in the "safe" position, place gauge on its side.

2. Clean the four screw heads to make removal easier and to prevent the screw heads from "stripping". Using a screwdriver, remove the bottom plate.

3. Remove the sliding tungsten shield. **To reduce exposure when removing the shield, Troxler recommends that the user stands to the side of the gauge.** With a stiff brush or rag, remove as much dirt as possible from the cavity.

4. Clean the sliding tungsten block. Replace the sliding block with the angled side up. If installed incorrectly the source rod will not extend into the measurement position.

5. Apply a light coating of the lubricant, provided with each NDMG, to the block. **CAUTION: Use only the lubricant which is provided with each NDMG. Other lubricants may cause permanent damage to the bearings.**

6. Replace the bottom plate. **CAUTION: Do not over tighten screws in the aluminum base.** Ensure that the source rod moves up and down freely.

If this doesn't correct the problem, then contact the RSO at (513) 671-8144.

ITEM 11:

Disposal of radioactive material will be accomplished by transferring it to a licensee specifically authorized to possess it.

Purchases of nuclear density/moisture gauges will be made by the RSO. Upon receipt of a device, the "TYPE A" container will be visually inspected. If damage is present a survey of the package will be performed.

ITEM 12:

License Category - 3P, Amount Enclosed - $ 550.00.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
801 WARRENVILLE ROAD
LISLE, ILLINOIS 60532-4351

March 27, 1997

Daniel R. Kennedy
Radiation Safety Officer
Foppe Technical Group, Inc.
11415 Century Boulevard
Cincinnati, OH 45246

SUBJECT: ACKNOWLEDGEMENT OF CORRESPONDENCE
(Application Dated 03/21/97)

Dear Licensee:

In response to your request, we have completed the initial processing, which is an administrative review of your application for a(n):

X New License	___ Amendment	___ Renewal
___ Termination	___ Auth User (Amendment not required)	
___ Other_____		

No administrative deficiencies were identified during this initial review. However, it should be noted that a technical review may identify omissions in the submitted information.

It appears that your request is routine (see 1-3 below, as applicable).

1. New and amendment actions are normally processed within 90 days, unless we find major deficiencies, or policy issues requiring central program office assistance.

2. Renewal actions are normally processed within 180 days, however, under timely filing (before expiration), you may continue to operate under your existing license.

3. Termination actions are normally processed within 90 days, unless confirmatory surveys following decontamination/decommissioning activities are involved.

A copy of your correspondence has been forwarded to our Licensing Fee and Debt Collection Branch (301/415-6097) for approval of the fee category and amount, if required.

If you have a compelling safety or business-related reason for requesting expedited review, please contact the Materials Licensing Branch at (630) 829-9887. We will try to complete your request as soon as practicable. Any correspondence about this request should reference the control number.

Nuclear Materials Support Branch

Mail Control No. 302449
License No. 34-26794-01