CONSTRUCTION
ENGINEERING
CONSULTANTS, INC.

December 10, 2004
CEC 95825

License No. 37-18456-02
Docket No. 030-15116

'04 DEC 17 P1:55

RECEIVED
REGION 1

Licensing Assistant Section
Nuclear Materials Safety Branch
U.S. Nuclear Regulatory Commission, Region I
475 Allendale Road
King of Prussia, PA 19406-1415

03015116

RE: Application for Renewal of License No. 37-18456-02

Dear Sir or Madam,

We are requesting a renewal of License No. 37-18456-02 which is scheduled to expire February 28, 2005.

NRC form 313 is attached to this letter. Relative to items 5 thru 11, no changes have been made regarding source materials, facilities & equipment, personnel, training, location of use, etc. (see enclosed copies of current license and the March 30, 2000 Revision of our Radiation Safety Program).

Also enclosed is a check in the amount of $ 1200.00 to cover the required application fee.

The contact person for this renewal application and our Radiation Safety Program is:

David R. Mitrik, RSO
(412-351-6465)

Sincerely,

Ralph Artuso
President

Enclosures
cc: D. Mitrik
File

2018 WAVERLY STREET
PITTSBURGH, PA 15218-2402
(412) 351-6465
FAX: (412) 351-6401
E-MAIL: lab@cectesting.com

136158

NMSS/RGN1 MATERIALS-002

NRC FORM 313 (8-2000) 10 CFR 30, 32, 33, 34, 35, 36, 39, and 40

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR MATERIAL LICENSE

APPROVED BY OMB: NO. 3150-0120 EXPIRES: 08/31/2002

Estimated burden per response to comply with this mandatory collection request: 7.4 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. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0000), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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:

SAM NUNN ATLANTA FEDERAL CENTER
U. S. NUCLEAR REGULATORY COMMISSION, REGION II
61 FORSYTH STREET, S.W., SUITE 23T85
ATLANTA, GEORGIA 30303-8931

IF YOU ARE LOCATED IN:

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

MATERIALS LICENSING BRANCH
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

030 15116

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 _____
- [X] C. RENEWAL OF LICENSE NUMBER 37-18456-02

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

Construction Engineering Consultants, Inc.
2018 Waverly Street
Pittsburgh, PA 15218-2402

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

2018 Waverly St., Pittsburgh, PA; and at temporary jobsites of the licencee anywhere in the United States where the U.S. N.R.C. maintains jurisdiction for regulating the use of licensed material..

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

David R. Mitrik

TELEPHONE NUMBER

412-351-6465

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. (See Letter

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AEAS.

9. FACILITIES AND EQUIPMENT. CEC 95825)

10. RADIATION SAFETY PROGRAM. See Attachment

11. WASTE MANAGEMENT.

12. LICENSE FEES *(See 10 CFR 170 and Section 170.31)*
FEE CATEGORY 3P | AMOUNT ENCLOSED $ 1200.00

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

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
Ralph Artuso - President	Ralph Artuso	12-10-04

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS
			$		
APPROVED BY				DATE	136158

NRC FORM 374

U.S. NUCLEAR REGULATORY COMMISSION

Amendment No. 14

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 I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 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 purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). 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	In accordance with the letter dated April 6, 2000,
1. Construction Engineering Consultants, Inc.	3. License number 37-18456-02 is amended in its entirety to read as follows:
2. 2018 Waverly Street Pittsburgh, Pennsylvania 15218-2402	4. Expiration date February 28, 2005
	5. Docket No. 030-15116 Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Cesium 137	A. Sealed sources	A. 200 millicuries
B. Americium 241	B. Sealed neutron sources	B. 1000 millicuries

9. Authorized use:

A. and B. For possession and use in Troxler Electronic Laboratories, Inc., Campbell Pacific Nuclear Corp., Humboldt Scientific, Inc., Seaman Nuclear Corp., or Soiltest, Inc. devices which have been evaluated and approved for licensing purposes under a license issued by the U.S.

CONDITIONS

10. Licensed material may be stored at the licensee's facilities located at 2018 Waverly Street, Pittsburgh, Pennsylvania and may be used only at temporary job sites of the licensee anywhere in the United States where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material.

11. A. Licensed material shall only be used by, or under the supervision and in the physical presence of, individuals who have received the training described in application dated November 13, 1989 and letter dated June 1, 1994 and have been designated in writing by the Radiation Safety Officer.

B. The Radiation Safety Officer for this license is David R. Mitrik.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
37-18456-02

Docket or Reference Number
030-15116

Amendment No. 14

12. A. Sealed sources shall be tested for leakage and/or contamination at intervals not to exceed the intervals specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or under equivalent regulations of an Agreement State.

    B. In the absence of a certificate from a transferor indicating that a leak test has been made, within the intervals specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or under equivalent regulations of an Agreement State, prior to the transfer, a sealed source received from another person shall not be put into use until tested and the test results received.

    C. Sealed sources need not be tested if they are in storage and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

    D. The leak test shall be capable of detecting the presence of 0.005 microcurie (185 becquerels) of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie (185 becquerels) or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission in accordance with 10 CFR 30.50(c)(2) and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations.

    E. Tests for leakage and/or contamination, limited to leak test sample collection, shall be performed by the licensee or by other persons specifically licensed by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such services. The licensee is not authorized to perform the analysis; analysis of leak test samples must be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.

    F. Records of leak test results shall be kept in units of microcuries and shall be maintained for 3 years.

13. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.

14. The licensee shall conduct a physical inventory every six months to account for all sealed sources and devices containing licensed material received and possessed under the license.

15. Each portable nuclear gauge shall have a lock or outer locked container designed to prevent unauthorized or accidental removal of the sealed source from its shielded position. The gauge or its container must be locked when in transport, storage or when not under the direct surveillance of an authorized user.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
37-18456-02

Docket or Reference Number
030-15116

Amendment No. 14

16. The licensee shall not acquire licensed material in a sealed source or device unless the source or device has been registered with the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.210 or equivalent regulations of an Agreement State.

17. Any cleaning, maintenance, or repair of the gauge(s) that requires removal of the source rod shall be performed only by the manufacturer or by other persons specifically licensed by the Commission or an Agreement State to perform such services.

18. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

19. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

    A. Application dated November 13, 1989
    B. Letter dated October 26, 1992
    C. Letter dated November 17, 1994
    D. Letter dated October 8, 1996
    E. Letter dated October 31, 1996
    F. Letter dated November 19, 1996
    G. Letter dated April 6, 2000
    H. Letter dated May 2, 2000

For the U.S. Nuclear Regulatory Commission

Date May 12, 2000

By ***Original signed by Sattar Lodhi, Ph.D.***

Sattar Lodhi, Ph.D.
Nuclear Materials Safety Branch 2
Division of Nuclear Materials Safety
Region I
King of Prussia, Pennsylvania 19406

25164842

CONSTRUCTION
ENGINEERING
CONSULTANTS, INC.

NUCLEAR DENSITY GAUGES
RADIATION SAFETY MANUAL

Revision March 30, 2000

2018 WAVERLY STREET
PITTSBURGH, PA 15218-2402
(412) 351-6465
FAX: (412) 351-6401

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

PART I

GENERAL RESPONSIBILITIES

NUCLEAR DENSITY GAUGES

RADIATION SAFETY MANUAL

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

I. MANAGEMENT'S RESPONSIBILITY AND ACCOUNTABILITY FOR RADIATION SAFETY

1.1 President/Vice President

Overall responsibility for the Company's Radiation Safety Program is vested with the President of Construction Engineering Consultants. He shall have direct supervisory responsibility for the organization (Appendix 1) and operation of CEC Safety Program. He may serve as Liasion Officer with the NRC and other agencies on matters related to the licensing. He may designate the Vice-President to conduct supervisory activities for the program and to act as a contact in emergency situations.

1.2 Radiation Safety Officer (RSO)

The President has delegated responsibility for the overall control of radiological operations, and authority for the fulfillment of this responsibility to the Radiation Safety Officer (RSO). The RSO is accountable to the President for (a) maintenance of office records, (b) overall training of employees, (c) certification of personnel after a review of the training and qualifications, (d) inspection of Field preparation of license renewals and amendments, (g) assistance to the Radiation Safety Supervisor in any emergencies or situation that may arise, (h) maintaining overall personnel monitoring and survey instrument services, (i) preparation of any necessary reports for the NRC or other applicable agencies and (j) enforcements of this manual's directives and regulations of Federal, State and local agencies as related to the Company's Radiation Safety Operations. He may serve as the Liaison Officer with the NRC and other agencies.

1.3 Radiation Safety Auditor (RSA)

Audits of the Radiation Safety Program shall be conducted by the President or a designated member of CEC management familiar with applicable federal codes and regulations and the Construction Engineering Consultants radiation safety program requirements. Auditors shall report all findings and results to the President.

1.4 Field Supervisor

Will be appointed by the RSO and is accountable to the RSO for the following responsibilities: (a) maintaining records, (b) maintenance of equipment and facilities for storage of equipment, (c) assuring leak tests are performed within prescribed time limits, (d) maintaining control and inventories associated with the nuclear densities gauges.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

II RADIATION SAFETY INSPECTION

2.1 General Information

CEC has established an audit/inspection system for the Radiation Safety Program to check compliance with regulations and operating procedures, and to correct any deviations that might be found.

2.2 Audits

2.2.1 The RSO or Field Supervisor will conduct an annual audit of each operator during actual or simulated field testing conditions to establish the individual's continued competence and compliance with nuclear density gauge operation and safety procedures.

2.2.1.1 Results of audits will be documented on the CEC form titled, "Field Examination or Audit of Nuclear Density Gauge Operators".

2.2.1.2 Requirements for annual audits begin one year after initial training and certification of operators.

2.2.2 The President or a member of CEC Management, familiar with Regulatory Requirements and the CEC Radiation Safety Program, shall conduct an annual audit of the CEC Radiation Safety Program content and implementation.

2.2.2.1 Results of the audit shall be documented in accordance with CEC procedure AP-1, "Quality Control Procedure for Internal Audits".

2.3 Inspection by Official Agencies

Representatives of the U.S. Nuclear Regulatory Commission and Officials of State and local agencies having jurisdiction over the use of radiation, will be permitted to make such inspections as needed to carry out their official responsibilities. Th RSO will assist in these inspections wherever possible.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

III PROCEDURE FOR MAINTAINING CALIBRATED AND OPERABLE SURVEY INSTRUMENTS

3.1 General

Radiation Survey meters are a part of the CEC Nuclear Density Gauge Operations. It is mandatory that a calibrated and operable survey meter be maintained and used.

3.2 Responsibility

The RSO or Field Supervisor shall be responsible for returning survey meters to an approved Service/Calibration Center when they are due for calibration or repair.

Calibration due date will appear on the calibration label attached to each survey meter and on the Survey Meter Calibration and Maintenance Record.

3.3 Calibration Requirements

Regulations require that each radiation survey meter used in Nuclear Density Gauge Operations must be calibrated at intervals not to exceed six (6) months, and after any meter repairs. Records must be maintained to show the latest calibration date.

3.4 Type of Survey Meters

a. Gamma Industries Model 252B. Incorporating a Gieger-Mueller Tube. This survey meter has three (3) ranges as follows:

0 - 10 mr/hr
0 - 100 mr/hr
0 - 1000 mr/hr

b. Trox-a-Lert - Troxler electronics Laboratory range of 0 - 50 mr/hr.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

IV RECEIVING OF SEALED SOURCES FROM COMMON CARRIER

4.1 General Requirements

This section must be followed when receiving shipments of radioactive material from common carrier, either by delivery by carrier at the storage area, or by pick-up by CEC personnel at the destination terminal.

4.2 Delivery by Common Carrier

The RSO or his Designer must make arrangements to receive the shipment when it is delivered.

4.3 Pickup by CEC Personnel

4.3.1 Upon notification of the arrival of the shipment, the RSO or his designee shall arrange for Pick-up as soon as possible and delivery to the CEC storage area.

4.3.2 During the trip to and from the pickup terminal, the procedure outlines in "Operating and Emergency Procedures" Part III, Section VII shall be followed at all times.

4.4 Procedure for Safely Opening Packages of Radioactive Materials Received

4.4.1 A survey of the shipping container shall be made by the RSO or his designee within (3) hours of receipt of the shipment at the storage area, during normal working hours, or within (3) hours after the start of the next working day if received after normal working hours.

4.4.2 If radiation levels at 1 meter from the external surface of the shipping container are found to be in excess of the transport index, the levels shall be recorded, and the RSO shall investigate to ascertain the reason for high readings.

4.4.3 If radiation levels at 1 meter from the external surface of the shipping container are at or below the transport index, record the reading(s) and open the package.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

4.4.4 Remove the unit from the package and place the unit in the storage area. Record all surveys readings on the "Source Utilization Log".

4.5 Authorized Persons for Receiving Shipments

4.5.1 Nuclear Density Gauges

a. Radiation Safety Officer
b. Field Supervisor
c. Nuclear Density Gauge Operator

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

V PROCEDURE FOR SOURCE REPLACEMENT

5.1 Nuclear Density Gauge Source, replacement shall be done by the manufacturer only.

VI SHIPPING OF SEALED SOURCES BY COMMON CARRIER

6.1 General

This procedure is to be followed when shipping any radioactive material by common carrier.

6.2 Authorized Persons to Prepare Shipments

6.2.1 Nuclear Density Gauges

a. Radiation Safety Officer
b. Field Supervisor
c. Nuclear Density Gauge Operator

6.3 Preparing Shipments

6.3.1 Nuclear Density Gauges shall be shipped or transported in approved Type "A" shipping containers that have been designed and tested for density gauges. Records of acceptable testing of Type A packages shall be obtained from the manufacturer and maintained on file.

6.3.2 Packages shall be affixed with two (2), Yellow II Labels showing the Transport Index, Nuclide(s), Activity and Hazard Class. The "Danger-Pellegro" tag or sticker should also be affixed to the package.

6.3.3 Packages shall be marked with the proper shipping name and identification number (preceded by "UN" or "NA" as appropriate), Package Type and the name and address of the Consignee (not required when transported from one motor carrier to another).

6.3.4 Packages shall be closed and sealed during transport.

6.3.5 Prior to transport, radiation surveys shall be Conducted and a "Report of Nuclear Density Gauge Transfer", shall be filled out completely. A copy of this document shall be sent to the consignee with the package and a copy shall be maintained for CEC files.

6.3.6 The package shall be kept no closer than 12 inches or 30 cm from the driver or any occupant when transporting.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

VII PROCEDURE FOR LEAK TESTING

7.1 General

Each sealed source containing byproduct material shall be tested for leakage and/or contamination at intervals not to exceed six (6) months.

Construction Engineering Consultants, Inc. authorized personnel will conduct the actual sampling and submit the leak test kit to approved vendors as shown in Appendix 3, who will conduct the analysis and report the removable contamination levels to CEC.

7.2 Authorized Persons for Conducting Leak Testing

a. Radiation Safety Officer
b. Field Supervisor
c. Nuclear Density Gauge Operator

7.3 Procedure

Use only the G.P. Instrument Services or Applied Health Physics leak test kits. The procedure for leak testing is outlined in Section 6.0 of Part III, "Operating and Emergency Procedures."

VIII PROCEDURES FOR NOTIFICATION REQUIREMENTS

8.1 General

Any incident which may cause or threatens to cause an emergency listed in Item 1 through 4 of Appendix 2, (Notification Requirements) of this procedure must be reported to the Radiation Safety Officer or an authorized person listed in the applicable section of the "Operating and Emergency Procedures", immediately, giving complete details of the emergency so proper regulatory agencies can be notified in accordance with our license conditions.

Never under-estimate the seriousness of an incident.

8.6 Responsibility

It is the responsibility of the Radiation Safety Officer to collect all facts surrounding an incident, so proper reporting and corrective action can be taken. The Radiation Safety Officer must follow Appendix 2 of Part I for reporting emergencies and incidents.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

IX PROCEDURE FOR CONDUCTING INVENTORIES

9.1 Responsibility

It is the responsibility of the Radiation Safety Officer to conduct an inventory to assure the President that the sealed sources under his license are in his possession and at proper locations.

9.2 Frequency

Nuclear Density Gauges shall be inventoried at 6 Month intervals.

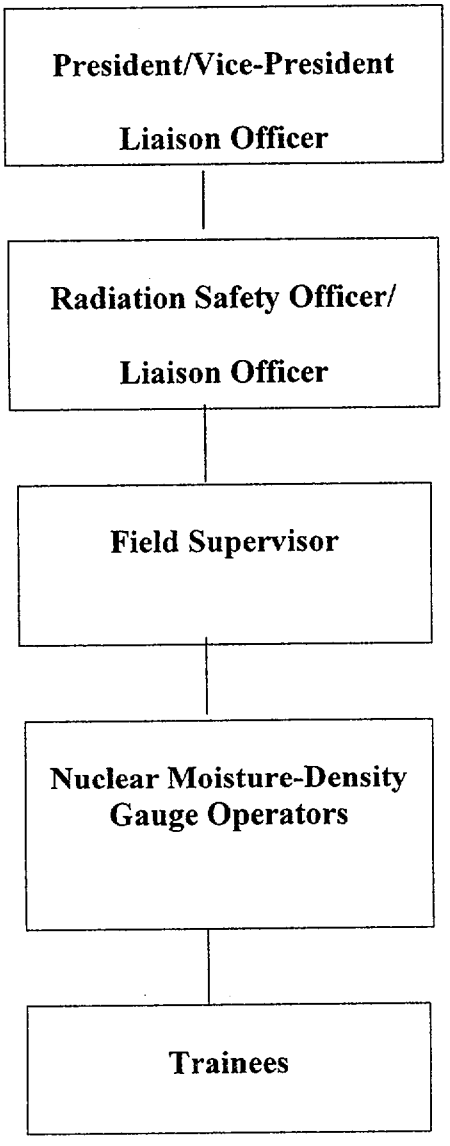
1st Calender half - January - June
2nd Calender half - July - December

9.3 Records

All inventories will be recorded on CEC Form Nuclear Density Gauge Inventory file for review by the regulatory agency.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

STRUCTURE OF CONSTRUCTION ENGINEERING CONSULTANTS, INC.



NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

SUMMARY OF NOTIFICATION REQUIREMENTS

ITEM	SECTION AND WHEN REQUIRED	WHOM	METHOD
1. Loss or Theft of Source	20.2201 and/or State Regulation; **IMMEDIATELY**	Nearest NRC Compliance Office and/or State Agency of Agreement State (whichever is applicable).	Telephone or Telegraph
2.A) Exposure of 25 Rems or more B) Release of Source from Capsule C) Loss of any Work Area for 1 Week D) Property Damage Over $200,000	20.2202(a) and/or State Regulation; **IMMEDIATELY**	Nearest NRC Compliance Office, NRC Operations Center and/or State Agency	Telephone or Telegraph
3.A) Exposure of 5 Rems or more B) Loss of any Work Area for 1 Day C) Property Damage over $2,000	20.2202(b) and/or State Regulation; **WITHIN 24 HOURS**	Nearest NRC Compliance Ofc. NRC Operations Center and/or State Regulation	Telephone or Telegraph
4.A) Any incident in 1, 2 or 3 above B) Any other over-exposure C) Levels over 10 Times Allowable in unrestricted areas	20.2203(a) and/or State Regulation; **WITHIN 30 DAYS**	Director, (Div. of State and Licensee Relations) U.S. RC Washington D.C. cc: Nearest NRC Compliance Office and/or State Agency	In writing describing a) extent of exposure b) Levels of radiation c) Cause d) Corrective steps taken or planned.

Note: If accidents or incidents occur during transportation of radioactive materials, reporting to D.O.T. per 49 CFR, 171.15 and 171.16 may be required.

EMERGENCY PHONE NUMBERS

1. Troxler 24 Hours Per Day Emergency Response: 919-839-2676
2. NRC Region I Office: 800-432-1156
3. NRC Operations center: 310-816-5100
4. U.S. Department of Transportation: 800-424-8802

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

SHIPPER'S DECLARATION FOR DANGEROUS GOODS (Provide at least two copies to the airline.)

Shipper
Construction Engineering
Consultants, Inc.
7702 Edgewood Ave.
Pittsburgh, PA 15218

Air Waybill No. 8904946120
Page 1 **of** 1 **Pages**
Shipper's Reference Number (optional)

Consignee
Troxler Electronics
7466 New Ridge Road
Suite 8
Hanover, MD 21076

Federal Express Corporation

Two completed and signed copies of this Declaration must be handed to the operator.

WARNING

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder or an IATA cargo agent.

TRANSPORT DETAILS

This shipment is within the limitations prescribed for: (delete non-applicable)
~~PASSENGER AND CARGO AIRCRAFT~~ | CARGO AIRCRAFT ONLY

Airport of Departure

Airport of Destination:

Shipment type: (delete non-applicable)
NON-RADIOACTIVE | RADIOACTIVE

NATURE AND QUANTITY OF DANGEROUS GOODS

Dangerous Goods Identification				Quantity and type of packing	Packing Inst.	Authorization
Proper Shipping Name	Class or Division	UN or ID No.	Subsidiary Risk			
Radioactive Material Special FOrm N.O.S.	7	UN2974		CS137 8MCI Am241:BE 40 MCI Metal Solid I-Type A Package x .30 GBq 1:43 GBq	II Yellow	Spec. Form Certificate GB/140/S GB/7/S Dim - 35x56x96CM

Additional Handling Information

I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labelled, and are in all respects in the proper condition for transport by air according to the applicable International and National Government Regulations.

Name/Title of Signatory Ray McFeaters RSO
Place and Date Pittsburgh, PA
Signature (see warning above)

FEC M-1421 (1/87) FedEx Reproduction

EXTRA COPY

Applied HEALTH PHYSICS inc.

2986 Industrial Blvd. -- Bethel Park, PA 15102 -- Phone 412 -- 835-9555 -- Fax No. 412 -- 835-9559

MARK V LEAK TEST DATA AND CERTIFICATE

Complete this form in a legible fashion and return with appropriate leak test specimen to Applied Health Physics, Inc., 2986 Industrial Blvd., Bethel Park, PA 15102. Phone Area Code (412) 835-9555 or FAX (412) 835-9559. NOTE: Please do not test more than one (1) sealed source per kit.

This is to certify that I have followed the instructions governing the procurement of the enclosed leak test specimen using the Mark V Leak Test Kit. This specimen D010204 (leak test tube label number) was taken by: WM. KOCH (person performing test) on 3-14-95 (date).

SOURCE DESCRIPTION:

Radioisotope	Activity(mc)	Model #	Serial #	Manufacturer
AM241:BE	4C	3411-B	CA9-4391	TROXLER

INSTALLED IN: ✓ GAUGE ___ EXPOSURE DEVICE ___ THERAPY ___ OTHER

Make	Model #	Serial #	Manufacturer
TROXLER	3411-B	8065	TROXLER

NOTIFICATION

In event this specimen indicates leakage and/or contamination of 0.005 microcuries or more, we request that you notify us promptly by telephone or Fax collect and it is agreed that we will take appropriate action required by governing agency.

Company: CEC INC
Person to be contacted: RAY MC FEATERS
Street: 7702 Edgewood AVE
City: Pgh State: PA Zip Code: 15221
Telephone: 412-351-6465
Fax: 351-6461

By-product Materials License #: 37-18456-02

DO NOT WRITE BELOW THIS LINE

Analysis of leak test specimen No. D010204 by Applied Health Physics, Inc. indicated the presence of <.005 microcurie of ∝ β activity on 3/14/95.

Pursuant to the results of this leak test, the following action is recommended:

☐ Analysis indicated 0.005 microcurie of more of radioactivity on the leak test specimen. Immediately withdraw source from use. Decontaminate and repair it or conduct disposal in accordance with applicable regulations. File a report with the regulatory agency within the time period prescribed.

☑ Analysis indicated less than 0.005 microcurie of radioactivity on the leak test specimen. The sealed source may be used as authorized. This source must be leak tested again, on or before 9/14/95 or within any such time period required by the regulatory agency.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.
CERTIFICATE #: 03495-58 BY: Thomas Lucic (Analytical Dept.) DATE: 3/14/95

CONSULTATION • SERVICES • PRODUCTS • RADIATION APPLICATIONS
CONSULTATION • SERVICES • PRODUCTS • RADIATION APPLICATIONS

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

Applied HEALTH PHYSICS inc.
2986 Industrial Blvd. • Box 197 • Bethel Park, Pa. 15102 • Phone 412 • 835-9555

CALIBRATION CERTIFICATE

SHIPPING ADDRESS	BILLING ADDRESS (If Different)
C. E. C., Inc.	Same
[illegible] Blvd. Ave.	
[illegible] PA 15218	

CONTACT: [illegible] PHONE # ( ) [illegible] DATE 8 / 16 / 89 P.O.# [illegible]

condition of equipment received ——

Mfg. Inst. Eberline Ind. Mod# 2500 Ser# 1156
Detector [illegible] Mod# —— Ser# ——

[X] CALIBRATION [ ] REPAIR [ ] SALE [ ] LOAN By: [illegible]

scale	source	reading	scale	source	reading	scale	source	reading
	mR/hr			mR/hr			mR/hr	
X1	2.8	3	X10	27.2	28	X100	312	303
	7.6	7.7		66	66		696	650

Calibration Source [X] GAMMA [ ] ELECT [ ] ALPHA [ ] BETA [ ] OTHER

Description [X] ra-226 [ ] cs-137 [ ] sr-90 [ ] pu-239 [ ] MP-1 [ ] ______

Response Graph N/A

Probe Efficiencies N/A
ALPHA —— % BETA —— %
Check Source Reading N/A
Battery Check Reading OK
Detector Angle Perpendicular
Correction Factor N/A ±10%

Maintenance & Comments (4) Replaced (2) D Cells. Charger OK.

Tested, Inspected & Calibrated

Calibration		$60.00/Cal	60.00
DOS CHECK		$60.00/Get	
LABOR		$60.00/Hr	
MATERIALS & SALES	(2) D Cells	2.00 ea	4.00
Shipping	Pick-up	——	——

Shipping DATE Pick-up ——

QA DEPT [signature]

PICK-UP DATE X [signature] X 8 / 22 / 89

NOTICE: Under Applied Health Physics license #37-09135-01 & in accordance with Federal, Local or State regulations sources are traceable to the National Bureau of Standards. This certificate expires in 3 months and should be recalibrated on or before 11 / 16 / 89. The frequency of this recalibration may vary due to governmental requirements. A copy of this record should be maintained for future inspection by the appropriate authorities.

CONSULTATION • SERVICES • PRODUCTS • RADIATION APPLICATIONS

AHP RIS Rev 3.38 [Calibration Per NRC Regulations 10-CFR-34 and 10-CFR-35]

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

CONSTRUCTION ENGINEERING CONSULTANTS, INC.

NUCLEAR GAUGE INVENTORY

DATE: ______________

MODEL NO. ________ SERIAL NO. ________	MODEL NO. ________ SERIAL NO. ________
LOCATION ________	LOCATION ________
RADIOACTIVITY AT PRESENT ________	RADIOACTIVITY AT PRESENT ________
LEAK TEST DUE DATE ________	LEAK TEST DUE DATE ________
MODEL NO. ________ SERIAL NO. ________	MODEL NO. ________ SERIAL NO. ________
LOCATION ________	LOCATION ________
RADIOACTIVITY AT PRESENT ________	RADIOACTIVITY AT PRESENT ________
LEAK TEST DUE DATE ________	LEAK TEST DUE DATE ________
MODEL NO. ________ SERIAL NO. ________	MODEL NO. ________ SERIAL NO. ________
LOCATION ________	LOCATION ________
RADIOACTIVITY AT PRESENT ________	RADIOACTIVITY AT PRESENT ________
LEAK TEST DUE DATE ________	LEAK TEST DUE DATE ________
MODEL NO. ________ SERIAL NO. ________	MODEL NO. ________ SERIAL NO. ________
LOCATION ________	LOCATION ________
RADIOACTIVITY AT PRESENT ________	RADIOACTIVITY AT PRESENT ________
LEAK TEST DUE DATE ________	LEAK TEST DUE DATE ________
MODEL NO. ________ SERIAL NO. ________	MODEL NO. ________ SERIAL NO. ________
LOCATION ________	LOCATION ________
RADIOACTIVITY AT PRESENT ________	RADIOACTIVITY AT PRESENT ________
LEAK TEST DUE DATE ________	LEAK TEST DUE DATE ________
MODEL NO. ________ SERIAL NO. ________	MODEL NO. ________ SERIAL NO. ________
LOCATION ________	LOCATION ________
RADIOACTIVITY AT PRESENT ________	RADIOACTIVITY AT PRESENT ________
LEAK TEST DUE DATE ________	LEAK TEST DUE DATE ________
MODEL NO. ________ SERIAL NO. ________	MODEL NO. ________ SERIAL NO. ________
LOCATION ________	LOCATION ________
RADIOACTIVITY AT PRESENT ________	RADIOACTIVITY AT PRESENT ________
LEAK TEST DUE DATE ________	LEAK TEST DUE DATE ________
MODEL NO. ________ SERIAL NO. ________	MODEL NO. ________ SERIAL NO. ________
LOCATION ________	LOCATION ________
RADIOACTIVITY AT PRESENT ________	RADIOACTIVITY AT PRESENT ________
LEAK TEST DUE DATE ________	LEAK TEST DUE DATE ________
MODEL NO. ________ SERIAL NO ________	MODEL NO. ________ SERIAL NO. ________
LOCATION ________	LOCATION ________
RADIOACTIVITY AT PRESENT ________	RADIOACTIVITY AT PRESENT ________
LEAK TEST DUE DATE ________	LEAK TEST DUE DATE ________
MODEL NO. ________ SERIAL NO. ________	MODEL NO. ________ SERIAL NO. ________
LOCATION ________	LOCATION ________
RADIOACTIVITY AT PRESENT ________	RADIOACTIVITY AT PRESENT ________
LEAK TEST DUE DATE ________	LEAK TEST DUE DATE ________

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

Form NRC-4
(6-77)
10 CFR 20

U. S. NUCLEAR REGULATORY COMMISSION

Approved by GAO
B-180225 (R0043)
Expires — 4-30-80

OCCUPATIONAL EXTERNAL RADIATION EXPOSURE HISTORY

See Instructions on the Back

IDENTIFICATION

1. NAME (PRINT – LAST, FIRST, AND MIDDLE)	2. SOCIAL SECURITY NO.
3. DATE OF BIRTH (MONTH, DAY, YEAR)	4. AGE IN FULL YEARS (N)

OCCUPATIONAL EXPOSURE – PREVIOUS HISTORY

5. PREVIOUS EMPLOYMENTS INVOLVING RADIATION EXPOSURE–LIST NAME AND ADDRESS OF EMPLOYER	6. DATES OF EMPLOYMENT (FROM–TO)	7. PERIODS OF EXPOSURE	8. WHOLE BODY (REM)	9. RECORD OR CALCULATED (INSERT ONE)

10. REMARKS	11. ACCUMULATED OCCUPATIONAL DOSE – TOTAL	

13. CALCULATIONS – PERMISSIBLE DOSE WHOLE BODY:

(A) PERMISSIBLE ACCUMULATED DOSE = 5(N–18) = _____ REM

(B) TOTAL EXPOSURE TO DATE (FROM ITEM 11) = _____ REM

(C) UNUSED PART OF PERMISSIBLE ACCUMULATED DOSE (A–B) = _____ REM

12. CERTIFICATION: I CERTIFY THAT THE EXPOSURE HISTORY LISTED IN COLUMNS 5, 6, AND 7 IS CORRECT AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

EMPLOYEE'S SIGNATURE DATE

14. NAME OF LICENSEE

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

Form No. CEC - 0024
Rev. 0

CONSTRUCTION ENGINEERING CONSULTANTS, INC.

TRAINING RECORD

DATE	PAGE OF

EMPLOYEE NAME	TITLE	EMPLOYEE NO.

TRAINING/CLASSES

	DESCRIPTION/TITLE	INSTRUCTOR	DATE	SCORE	TOTAL CLASS HOURS
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

CEC-0035 (REV. 0)

Construction Engineering Consultants, Inc.
7702 Edgewood Avenue, Pittsburgh, PA 15218
SOURCE UTILIZATION LOG

Troxler Serial No._____

Date	Curies	Time Out	Surface Survey MR/HR	Survey at 1 Meter MR/HR	Work Location	Time In	Storage Location	Storage Survey MR/HR	Respons-ible Operator

NUCLEAR DENSITY GAUGE
RADIATION SAFETY MANUAL
PART I APPENDIX 3

Date March 17, 1995
Revision 4
Approval REM

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

CONSTRUCTION ENGINEERING CONSULTANTS, INC.
2018 WAVERLY STREET, PITTSBURGH, PA 15218

(412)-351-6465

REPORT OF NUCLEAR DENSITY GAUGE TRANSFER

DATE:_____

TRANSFERRED TO: Customer_____

Location_____

TRANSFERRED FROM: Customer_____

Location_____

MANUFACTURER:_____ MODEL NO._____ S/N _____

RQ, Radioactive Materials, Special Form, Nos.,7, UN2974
Type "A" Package Containing;

Source/Activities: Am-241: BE _____ GBq Cs-137_____ GBq

_____ _____ mCi

Leak Test Due Date:_____

Radiation Surveys: Reading at container surface_____ mR/hr

Reading at 1 meter_____ mR/hr

PACKAGING (Check and insure the following before transporting):

1) Transport package proper for gauge _____

2) Transport Index & Radioactive material category II label on package_____

3) Danger/Pellegro label attached _____

4) Shippers Certification with Driver _____

5) Unit is safely secured in vehicle _____

REMARKS: (note any unusual conditions)_____

_____

_____

_____
Operator's Signature Date

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

PART II

TRAINING REQUIREMENTS

TRAINING COURSE OUTLINE

WRITTEN EXAMINATION

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

1.0 TRAINING

1.1 Types of Training

Initial and on the job training shall be conducted in accordance with approved Construction Engineering Consultants, Inc. Operating and Emergency procedures, and the surface moisture-density gauge instruction manual for each appropriate device.

1.2 Examination

A written examination shall be administered at the completion of training to determine competency of operator. A minimum passing score of 75% is required.

1.3 Refresher Training

Periodic training updates will be given when:

a. applicable rules and regulations have been revised
b. revisions to license or operating procedures that would be of such nature that refresher training would be necessary
c. operators are not performing to the standards or requirements of license

2.0 TRAINING COURSE OUTLINE

2.1 Purpose

The purpose of this procedure is to establish the training requirements for CEC personnel utilizing sealed sources of by-product material in nuclear density gauges.

2.2 Scope

The requirements of this procedure apply to all CEC supervisory personnel working under the by-product license issued by the NRC or Agreement State.

2.3 Responsibility

2.3.1 Radiation Safety Officer

It is the responsibility of the RSO to assure that all instructors have/received radiological safety training prior to instructing and training nuclear density gauge personnel.

2.4 Instructors

It is the responsibility of the person giving instructions and teaching the outlined subjects of this procedure to follow that outline and to assure the RSO that personnel receive the training in the outline.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

2.5 Personnel Classification and Requirements

2.5.1 Classifications

a. Instructor
b. Trainee
c. Operator

2.5.2 Instructors

a. Radiation Safety Officer (RSO)
b. Radiation Field Supervisor
c. Any accredited health physicist
d. Qualified CEC personnel working under the direct supervision of the RSO.

2.5.3 Trainee

An inexperienced individual employed by CEC will be classified as a trainee until he has received instruction and initial training (see outline of Part II), has completed the written examination requirements of the procedure, and has completed required on-the-job training.

2.5.4 Operator

Having been qualified as an operator, he will be given periodic refresher training at intervals established by the RSO covering safety precautions, knowledge of license requirements, and CEC Nuclear Density Gauge Personnel Operating and Emergency Procedures. He may be given periodic written examination, evaluated by RSO. He will be subject to an annual audit/inspection as described in paragraph 2.2, Part I of this manual.

2.5.5 Variation of Requirements for Experienced Personnel

If a new employee has had previous experience with the Troxler or soil test gauges with another employer, he will be required to meet only the requirements established under Para. 2.7.2 Part b, of the Certifications portion of this procedure.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

2.5.6 The Radiation Safety Officer (RSO) will have administrative ability and experience. He will have been trained in the operation of exposure devices and the nuclear density gauge. He will have received special indoctrinations in procedures to be followed in the event of any malfunctions of such equipment, and in procedures to be followed in case of accidents. He will be thoroughly familiar with applicable NRC and Agreement State Regulations.

He will have satisfactorily completed at least 40 hours of Radiation Safety Training conducted by a qualified instructor such as an accredited health physicist. The instruction will be based on the following:

1. Structure of Matter and Nature of Radiation
2. Fundamentals of Radiation Safety
3. Radiation Detection Instrumentation
4. Radiological Effects of Radiation
5. Calculation of Radiation Intensities
6. NRC and Agreement State Regulations
7. CEC Procedures including CEC Nuclear Density Gauge Procedures
8. Operations of Troxler Soils Gauge

2.6 Examination requirements for Operations of Nuclear Density Gauges

Before using Nuclear Density gauges, related handling equipment, and survey meters, all personnel must first successfully complete and pass the following type examinations:

a. Practical Examination - demonstration of Nuclear Density Gauge Set-up
b. Written Examination - (50) Questions minimum

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

2.7 Qualification and Certification

2.7.1 Admission into the Program

CEC will not permit any individual into the program unless the individual:

a. has an equivalent of high school education
b. has reached the age of 18
c. has completed all paper work necessary for acquiring the individual radiation exposure history from previous employers (i.e., NRC-4 Form "Occupational External Radiation Exposure History")

2.7.2 Operator's Certification

The RSO will not certify any individual as an "Operator" unless the individual:

a. has had previous verified gauge experience of at least twenty (20) hours or at least twenty (20) hours of on-the-job training (OJT) from a certified CEC operator which will consist of actual hands-on operation of the soils gauge and safety devices used and the requirements of the CEC Operating and Emergency Procedures.

NOTE: If the RSO does not have direct knowledge of the OJT sessions, written confirmation of the fulfillment of the OJT requirement must be received by the RSO before the trainee will be certified as an "Operator".

b. The individual must achieve at least 75% grade on the Operator's written examination, which will test him on the subject material of the Initial Training Program, the State and Federal Regulations and Requirements for Operators, the CEC Operating and Emergency Procedures and the equipment he will use to complete his assignment.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

2.7.3 Recertification

Recertification of operators is required each year that the individual remains in the Operator's Program. After an individual has completed the initial training course, he must maintain current certification by maintaining a high degree of safety practices during operation of the gauges as determined by audits, as shown in records, and through supervisory personnel monitoring. The RSO will issue a list of certified operators annually or more often as necessary.

2.7.3.1 Any individual not achieving at least a grade of 75% on initial or periodic examinations will have failed the examination and will either not be certified, or will have certification suspended. The individual may take a second exam without additional training within the next seven (7) days, provided that:

a. if the second examination is not taken at the end of seven days, the individual is disqualified from the program

b. if the second examination is also failed, , the individual is disqualified from the program and must be rescheduled to take the course in order to be certified, and

c. if the individual passes the second exam, he shall either be initially certified or have his certification reinstated, whichever is applicable

NOTE: All examinations will be reviewed with the individual with emphasis on the questions missed.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

2.7.3.2 It should be noted that certified individuals will be audited on an announced and unannounced basis during the performance of his duties. Any individual found practicing in violation of the Rules, Regulations or Licensing Requirements of the NRC, State and Local Municipalities or the Operating and Emergency procedures of CEC will be subject to disciplinary action, which may result in disqualification as an Operator, dismissal from the Program and/or separation of employment.

2.8 Initial Training Course Outline

Phase I - Operator

Part 1 - Fundamentals of Radiation Safety (4 hours)

A. Characteristics of Radiation

1. Origin/Types

a. gamma
b. neutron
c. alpha
d. beta

2. Penetrating Ability/Shielding/ALARA

3. Various Usages

B. Units of Radiation Dose and Quantity of Radioactivity

1. Definitions of terms associated with radiation.

a. Curie, Millicurie, Bequerel
b. Roentgen, Rem, Sievert
c. dose and dose rate
d. half life

C. Hazards of Excessive Exposure of Radiation

1. Biological Effects

a. absorption by cells of the human body
b. effect of excessive exposure
c. psychological effect

D. Levels of Radiation from Licensed material

1. Gamma and Neutron Dose rate of Isotopes

a. Cesium - 137
b. Americium - 241
c. Beryllium Neutron

2. Radiation Levels at Selected Distances

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

E. Personnel Monitoring Equipment

1. Film Badge

a. Types used
b. Method of Recording
c. Handling and Services
d. Recording of Monthly Totals

Part 2 - Troxler Equipment (3 hour)

A. Use of Equipment for Testing Purposes

1. Standard Counts
2. Density Readings/Moisture readings

B. Calculations
C. Conducting Radiation Surveys

Note: Operating manual to be used and issued for calculations and specific test methods.

Part 3 - Instructions in the Requirements of Federal Regulations to the Use of Byproduct material (0.5 hour).

A. Title 10 - Part 20

1. Paragraphs: 20.1201 to 20.1301

a. Premissable dose levels

2. Paragraphs: 20.1501 through 20.1704

a. Precautionary procedures

B. Title 10 - Part 19

1. Paragraphs: 19:11 to 19:13

Part 4 - CEC Operating and Emergency Instructions (1 hour)

A. Review of Operating Procedures
B. Emergency Procedures

1. Operators (Responsibilities)

2. President, RSO, Field Supervisor (Responsibilities)

C. Leak Testing Procedure
D. Cleaning and Lubrication
E. Transporting Gauges

a. Packaging requirements
b. Securing device during transport
c. Radiation Levels expected
d. Usual circumstances

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

Part 5 - Records and Reports

A. Completing Radiation Records

B. Reports

1. Incidents

2. Unusual circumstances

Part 6 - Written Exam (1 hour)

2.9 Training Records

Initial and periodic training must be documented on CEC Training Record as to subjects on which instructions were given, name of the instructor(s) and results of examinations.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

RADIATION SAFETY & NUCLEAR DENSOMETER OPERATION
CEC NDO-3

NAME_____ SCORE_____

DATE_____ GRADED BY_____

1. Radioactive sources, if determined to be quire small, need not be controlled.

   TRUE or FALSE

2. Gauges emit 4 types of radiation; they are_____,
   _____,_____, _____

3. Units of radiation measurement with which the operator of the gauge should be familiar with are the sievert and the rem.

   TRUE or FALSE

4. Alpha particles and neutrons are completely stopped by the walls of the source container.

   TRUE or FALSE

5. Gamma rays are a form of_____ _____ and neutrons are extremely small and very_____.

6. Gamma rays and neutrons are electrically_____.

7. The gauge on site uses as source material_____
   _____ and _____.

8. Curies are used to calculate the amount of radiation absorbed by a human being.

   TRUE or FALSE

9. What are two basic ways of protecting oneself from a radioactive source?_____
   _____

10. Radiation can be either particles or energy emitted by a disintegrating atom within a radioactive isotope.

    TRUE or FALSE

11. When radiation encounters matter it either; passes through, is absorbed or is_____.

12. An alpha particle consists of _____ and _____.

13. An alpha particle is electrically_____.

14. A beta particle consists of_____.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

PAGE 2
CEC NDO-3

15. Half-life is the time required for_____percent of a radioactive isotope to decay.

16. The radiation level measured a 1 meter from a transport package is called_____.

17. Survey meters must be calibrated every_____.

18. Density gauges must be leak tested every_____.

19. All storage areas must be placarded with a conspicuous sign (s) bearing the yellow and magenta radiation symbol and the words "Caution, Radiation Area".

TRUE or FALSE

20. All vehicles transporting density gauges must be placarded with a conspicuous sign(s) bearing the yellow and magenta radiation symbol and the words "Caution, Radiation Area".

TRUE or FALSE

21. The NRC has established an annual occupational dose limit of_____for individual adults.

22. In addition to the "Source Utilization Log", name two locations where the Transport Index value can be found. _____ and _____

23. One Becquerel is equal to _____ disintegrations per second.

24. One sievert is equal to _____rems.

25. Film badges and dosimeters are required to be worn by all operators of density gauges.

TRUE or FALSE

26. Radiation survey values recorded above the value of 0.1 mr/hr can be approximate values.

TRUE or FALSE

27. By limiting exposure time and utilizing shielding and distance to minimize exposure we are practicing_____priciples.

28. CEC, Inc. nuclear density gauges are transported in approved containers under a Yellow III label

TRUE or FALSE

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

PAGE 3
CEC NDO-3

29. Gauge shall be radiation surveyed when picking up and returning the gauge to the storage area.

TRUE or FALSE

30. Gauge radiation surveys need not be recorded.

TRUE or FALSE

31. The test area shall be kept under constant surveillance while tests are being conducted to keep unauthorized personnel a minimum of _____ away from the test area.

32. If the gauge sustains damage or for any reason the source cannot be retracted to the safe position or any other emergency that cannot be handled by the unit operator shall:

1) _____.

2) _____.

3) _____.

33. Each sealed source shall be leak tested at intervals not to exceed 6 months.

TRUE or FALSE

34. If a device is found to be contaminated, it should be quickly transported to a safe holding area.

TRUE or FALSE

35. Calibration curves for the gauge supplied by the manufacturer shall be checked and adjusted if necessary.

TRUE or FALSE

36. Calibration curves should be checked by comparing a minimum of _____ nuclear test results with Washington Densometer test results taken from the _____ _____.

37. Gauge must be warmed up for at least _____ minutes.

38. The reference standard block is placed on a high density surface at least _____ feet from any vertical structure when standard counts are performed.

39. When taking standard counts, the pwr/time switch is set to the fast position.

TRUE or FALSE

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

40. Standard counts are taken at the beginning of each work week.

TRUE or FALSE

41. Standard counts shall be recorded on the Standard Count Log.

TRUE or FALSE

42. The hole for the source rod should always be at least _____ inches deeper than the depth of measurement.

43. Moisture and density measurements are taken with the pwr/time switch set to norm.

TRUE or FALSE

44. While not in the test mode, the source rod should be in the safe position with the lock in place on the trigger.

TRUE or FALSE

45. Gauges shall not be left unattended in the field.

TRUE or FALSE

46. Test area need not be marked with caution radiation area signs if adequate surveillance is maintained.

TRUE or FALSE

47. The source rod should never be touched with fingers, hand or any part of the body.

TRUE or FALSE

48. All test data shall be recorded on the appropriate data forms.

TRUE or FALSE

49. Test area shall be smooth and have all loose and disturbed material removed.

TRUE or FALSE

50. The maximum void beneath the gauge shall not exceed _____ inches.

51. If any questions concerning radiation safety or in case of emergency, the following person(s) should be contacted. _____, _____ or _____.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

PART III

OPERATING AND RADIATION SAFETY PROCEDURE FOR USE OF NUCLEAR SURFACE MOISTURE DENSITY GAUGES

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

CONTENTS

1.0 INTRODUCTION

1.1 General

The quanities of radioactive material contained in moisture-density gauges are quite small, and an operator may safely use a gauge day after day without receiving any bodily damage due to radiation. In addition, each radioactive source is doubly sealed to afford even greater protection for the operator. However, all radioactive sources, no matter how small, should be handled with care.

The purpose of this procedure is to acquaint the operator with the types and characteristics of radiation he will be working with, and to describe the routine handling procedures and precautions which should be followed in order to maintain safe and efficient operation of gauges.

1.2 Radiation Characteristics

Types of Radiation - The radioactive materials in gauges emit four (4) types of radiation which the operator should know about: alpha particles, beta particles, gamma rays and neutrons. Of these four, the alpha and beta particles are completely stopped by the walls of the source container. Therefore, only the characteristics of the gamma rays and neutrons need to be discussed in detail.

Gamma rays (sometimes called photons) are a form of electromagnetic radiation, somewhat similar to radio waves and rays of light. They travel in straight lines with the speed of light, and are electrically neutral. However, unlike light rays, gamma rays are extremely penetrating and may pass through several inches of lead or concrete without being deflected. The energy of a gamma ray is usually expressed in units of millions of electron volts, or MEV. This need not be discussed any further, except to state that, in general the higher the energy, the more penetrating the gamma ray will be.

a. Characteristics of Radiation

When a gamma ray (photon) enters a slab of material any of three (3) things may happen. First, the photon may be absorbed (stopped) by the material. Second, the photon may be deflected or "scattered" in the material, and come out of the material with a different direction and lower energy than when it entered, (of course sometimes the photon is scattered several times before being absorbed or coming out of the material). Third, the photon may pass through the material without being scattered or absorbed.

a. (cont.)

It is impossible to accurately predict what will happen to a single gamma ray entering a certain material. However, if a beam of photons is directed at the material, it is possible to calculate the percentages of the beam that will be absorbed, scattered or transmitted. The percentage of photons what will pass through a material depends mostly on the energy of the photons and the density of the material. For example, if a beam of 1.25 MEV photons were directed at a concrete block 11.2 inches thick, 10% of the beam would be transmitted. However, only 1.73 inches of lead would be required to cut this same beam down to 10%, because lead is much denser than concrete.

Neutrons, instead of being rays, are extremely small, very dense particles. They are electrically neutral and quite penetrating. Unlike gamma rays, the penetrating power of neutrons through a material does not depend on the density of the material, but on the material composition. Neutrons are slowed down most effectively by a material containing hydrogen atoms (such as water or polyethylene). For this reason, neutrons are used to measure the moisture content of soils or other materials.

b. Characteristics of Radioactive Source Materials

Almost all gauges use as source materials Radium-226, Cesium-137, Americium-241, and Beryllium, either singly or in combination. A brief description of the characteristics of each type of source is now given.

Radium-226 emits alpha particles and low-energy gamma rays. It has a half life of 1620 years, which means that in a given sample of pure Radium-226 atoms, half of these atoms would decay in 1620 years. Of the Radium-226 atoms remaining after the first 1620 years, half again would decay in 1620 years, and so on. However, when a Radium-226 atom undergoes radioactive decay, it is transformed into Radium-222, which is also radioactive and in turn decays into still another radioactive element. Actually, each original atom of Radium-226 must decay a total of eight times before it finally becomes a stable (non-radioactive) element. For each decay process, energy is given off in the form of alpha particles, beta particles, gamma rays, or combinations of these. Therefore, even though the Radium-226 atom gives off a low energy gamma ray, several members of it's following decay chain emit gamma rays with high energies.

Americium-241 emits alpha particles and low energy gamma rays. It has a half life of 475 years. The gamma emissions being of low level are mostly absorbed by the capsule. Some of the alpha particles are absorbed by the Beryllium target material, while others are absorbed by the ceramic matrix and self absorption by the Americium-241.

b. (cont.)

Cesium-137 decays with the emission of a beta particle, which is stopped by the walls of the source container. However, when Cesium-137 decays, it is transformed into an unstable Barium-137 atom, which in turn decays to a stable state with the emission of a gamma ray. Cesium-137 has a half life of 30 years.

c. Radiation Units

Although there are several units of radiation measurement, there are only two (2) with which the operator of a gauge needs to be familiar. These are the curie and the rem.

The curie is defined as the quantity of any radioactive material giving 3.7×10^{10} disintegrations per second (dps). That is, in a curie of radium, 3.7×10^{10} atoms would decay each second.

The strength of sources used in gauges is usually expressed in millicuries (one millicurie is one-thousandth of a curie, or 3.7×10^{7} dps). Therefore, a 10 millicurie Americium source would yield 37×10^{7} dps, or 370 million dps.

Note: Operators should also be familiar with the SI (Standard International) unit of radioactive activity, the becquerel. One becquerel is equal to one disintegration per second.

In order to calculate the amount of radiation absorbed by a human being, a unit called the "REM" is used. Because, the amount of absorbed radiation is usually small, doses are usually expressed in millirem (thousands of a rem). The millirem is actually a measure of the effectiveness of the body in absorbing radiation, and depends on the type and energy of the radiation.

Note: The SI unit for the amount of radiation absorbed by a human being is the sievert. One sievert is equal to 100 rems.

d. Exposure Limitations

In order to protect personnel from overexposure to radiation the Nuclear regulatory Commission has established an annual (deep dose) exposure limit of 5 Rem for radiation workers. This limit is intended to be highly conservative, and does not represent the absolute minimum exposure a person could receive without being ill or suffering radiation damage. However, it is advisable to remain under the limit when possible. This can be done quite easily with gauges, by following established handling precautions and by application of ALARA principles at all time.

d. (cont.)

Higher exposure limits are permitted by the NRC for skin and other extremities, however, CEC radiation workers will not be permitted to continue working in radiation areas if more than 5 Rems have been received during the calender year for any reason.

e. Shielding

There are two (2) basic ways in which a person can protect himself from a radioactive source: distance and the interposition of shielding material.

As a person moves away from a source, the amount of radiation which is received from the source falls off sharply. In fact, radiation intensity falls as the inverse square of the distance from the center of the source to the "target". For example, if a person standing one (1) foot from a source were receiving forty millirem per hour, moving back another foot would cut the intensity to ten millirem per hour. By moving back, the person represents a small "target area" to the source.

The other method of shielding is obtained by placing matter between the source and the target. To a reasonable approximation, it makes no difference where the shielding material is placed between the source and the target, as long as the thickness of the material provides the best shielding against gamma radiation, while hydrogeneous (hydrogen-containing) material affords good protection against neutrons.

The type of shielding in general use is as follows for the various encapsulated source materials:

Ra226	Heavy Material
Cs137	Heavy Material
Ra226: Be	Heavy material and hydrogeneous material
Am241: Be	Hydrogenous Material

Limiting the time of exposure is also an essential technique for minimizing the amount of radiation received. By utilizing the techniques for minimizing exposure by time, shielding and distance, operators are implementing the ALARA principles of radiation safety. By ALARA principles we attempt, by all means possible, to keep radiation exposure "As Low As Reasonably Achievable".

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

2.0 RESPONSIIBILITY

2.1 It is the responsibility of the Radiation Safety Officer, or Field Supervisor to assure management that this procedure will be followed to achieve radiation safety to our personnel as well as general public.

2.2. This procedure must be given to all persons who will handle and/or use these devices for the purpose of giving them instructions into radiation safety and emergency procedure.

3.0 PERSONNEL MONITORING

3.1 Construction Engineering Consultants has reviewed historical records of film badge exposure for nuclear density gauge operators and has determined that gauge operators who handle and transport nuclear density gauges in accordance with procedures and practices established by federal codes and the CEC, Inc. Radiation Safety Manual will not receive in excess of 10 percent of the annual limits permitted in 10 CFR 20.1502.

3.2 A limited number (2 or more) of spare (unassigned) film badges shall be maintained and processed monthly for use or assignment by the RSO, as deemed necessary. Should these badges be used the RSO will insure that any dosages measured are registered in the radiation history file for the appropriate individual.

3.2.2 Annual reports for exposure will only be required for those individuals who used a film badge for some time period during that year.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

4.0 PHYSICAL RADIATION SURVEYS

4.1 Radiation Survey Meters

a. A survey meter will be available at the laboratory for making radiation surveys of each unit.

b. Whenever possible, CEC, Inc operators who are transporting or operating a nuclear density gauge should have in their possession a calibrated survey meter so that immediate surveys can be conducted in the event of accident or any other type of unusual condition.

c. Survey meters must be calibrated every six (6) months.

d. Survey meters must be capable of detecting at least 0 to 50 milliroentgens per hour of gamma radiation.

e. Operators must be instructed on the exact use of the survey meter prior to being responsible for conducting radiation surveys. Survey readings recorded shall reflect the exact reading on the meter except that readings below 0.1 mr/hr shall be recorded as 0.1 mr/hr.

4.2 Radiation Surveys

a. A radiation survey will be made on each unit and recorded on the Source Utilization Form at the following times:

1. upon receipt from either the manufacturer or authorized Repair Service

2. upon removal from storage areas, prior to use or transport to jobsites

3. prior to leak test

4. at time of any malfunction or suspected problem

b. A radiation survey will be made at the exterior surface of storage areas to verify radiation levels of less than 2 mRem/hr. and recorded on the Source Utilization Form;

1. immediately upon securing a density gauge unit within the storage location

2. whenever questions arise as to the suitably of the storage location

c. A radiation survey will be made on each unit and recorded on the Report of Nuclear Density Gauge Transfer form;

1. prior to transfer of gauges to an outside agency such as the manufacturer or authorized repair service.

4.3 Controlling Access to Test Area

It is the responsibility of the gauge operator to keep the unit under constant surveillance and immediate control at all times. Other personnel should be at least 6 feet away from the unit during operation. It is adviseable to return the unit to a locked storage area whenever testing is interrupted or has been completed.

5.0 OPERATING AND EMERGENCY REQUIREMENTS

5.1 Operating Procedure

Each operator will be issued the manufacturer's instruction manual for the technical operation of the gauges. The following are basic operations:

a. Gauging device shall not be moved unless it is locked and in the "OFF" position.

b. Make the test set-up by positioning the gauge unit for operations per manufacturer's instructions.

c. Clear all unauthorized persons from work area.

d. Unlock gauging device.

e. Prepare gauge for operations.

f. Release trigger and depress source rod to desired position.

SPECIAL NOTE: Do not touch source rod with finger, hands, or any part of the body.

g. Return source to safe position in device.

h. Lock gauging device.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

5.2 In order to insure safe operation of gauges, the following general precautions should be observed:

a. Do not operate or attempt to operate gauge unless you have been authorized to do so.

b. Keep the gauge in the "SAFE" or storage position when not in use.

c. Wear your film badge.

d. Keep unauthorized persons away from work area.

e. Keep gauge locked at all times when not in use.

f. follow gauge operating instructions.

5.3 Emergency Procedure

a. If the source should, for any reason, fail to be returned to its shielded position in the device, or any other emergency arises (such as hit by a moving vehicle, dropped a great distance, vehicle road accident, etc...) survey and restrict the area from all unauthorized personnel and immediately notify your supervisor or Radiation Safety Officer.

b. Contact the following:

1) Supervisor - Pittsburgh

Name: David R. Mitrik
Phone: [redacted] (home)
(412)-351-6465 (Bus.)

2) Radiation Safety Officer

Name: David R. Mitrik
Phone: [redacted] (home)
(412)-351-6465 (Bus.)

3) Vice-President

Name: Ralph Artuso
Phone: [redacted] (home)
(412)-351-6465 (Bus.)

PERSONAL INFORMATION WAS REMOVED BY NRC. NO COPY OF THIS INFORMATION WAS RETAINED BY THE NRC.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

c. Recommended Emergency Response Actions

1. Restricted area around damaged units should extend approximately 15 feet in radius from the gauge parts.

2. Priority responses for life saving, control of fire and other hazards and first aid may be performed prior to taking radiation surveys or contacting RSO.

3. Delay moving damaged units whenever possible, until after contacting the RSO and receiving instructions. The RSO will determine whether or not the assistance of radiation specialists is required.

4. Operators should never attempt to move instruments when surveys or other evidence indicates the presence of radioactive contamination.

   NOTE: Density gauge sources are double or triple encased to minimize the possibility of rupture and contamination. Source capsules are designed to withstand temperatures of approximately 1475°F (800°C).

5. Notification requirements and phone numbers for regulatory agencies are given in Part I, Appendix 2 of the CEC Radiation Safety Manual. The Troxler, 24 hour emergency response number is 919-839-2676.

6.0 LEAK TESTING REQUIREMENTS

6.1 General Information

Each sealed source containing byproduct material shall be tested for leakage and/or contamination at intervals not to exceed six (6) months. The test sample will be taken by authorized personnel of Construction Engineering Consultants, Inc. from the sealed source or from the surface of the device in which the sealed source is permanently mounted.

Qualified Construction Engineering Consultants personnel will conduct the actual sampling and submit the leak test kit to an authorized organization who will conduct the analysis and report the removable contamination levels to us.

The following leak test kits are authorized for use:

Applied Health Physics	Model No. Mark V Licensing # 37-09135-01
G.P. Instrument Services	Model No. RSLTK-01 Licensing # 37-17010-02

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

Troxler Electronics Model No. PCC-11T
Licensing # 32-05998-03

6.2 Procedure

a. Read Instructions in leak test kit.

b. Complete the data form of the leak test sample to identify the source being tested.

c. Be sure the person performing the test is wearing a film badge and has an operable survey meter to monitor the area during test.

d. Prepare the applicator that will swab the area being tested per instructions in leak test kit.

e. Perform the test in accordance with the proper method as described in paragraph 6.4.

f. Return applicator to leak test kit per instructions outlined in kit.

g. Monitor exterior of the kit containing the sample with appropriate instruments to be certain gamma-beta radiation levels do not exceed 0.5 MR/HR for mailing.

h. Providing exterior of kit meets the above requirements, forward kit to appropriate supplier.

6.4 Specific Instructions for Leak Testing Gauging Devices

a. These devices contain Americium-241:BE up to 50 millicuries and Cesium-137 up to 10 millicuries, which are activated remotely by means of the control rod. Cesium sources are mounted in rods which travel from the device, out into the open and return in the same manner. Therefore, these types of devices are likely to receive wear, and possibly lose containment of the source capsule.

b. After the applicator has been prepared for test and all necessary monitoring equipment is available, be sure that the source is exposed two (2) inches.

c. Wipe the exterior of the tube by running the swab around the rod. Rotate the swab around the rod to collect as many particles as possible.

NOTE: Do not touch the rod with hands or any part of the body.

d. Retract the source and sit the gauge in an upright position.

e. Remove the electronic module as noted in Section C of the operating manual.

f. Looking into the cavity, a yellow and magenta label will be seen just forward of the printed circuit board assembly. Wipe the edges of this label with the swab.

g. Return applicator per instructions in kit and follow the monitoring requirements.

SPECIAL NOTE: Do not touch swab of applicator with hands. Return applicator with caution.

6.5 Notification of Leak Test Results

Results of all leak tests are reported directly to the Radiation Safety Officer who is responsible for the leak test. If a sample contains in excess of 0.005 microcuries of removable contamination, the Radiation Safety Officer will notify the management and regulatory agencies.

6.6 Device Requirements

A device must not be transported or used unless it has been leak tested at proper intervals and notice of satisfactory results have been received.

When a device is leak tested on its due date, the device must remain in its storage position until results are received.

If device is found to be contaminated, the device must remain in the same location as when discovered and will not be put into use until a certified health physicist has completed the decontamination work and authorizes its use.

6.7 Cleaning and Lubrication

The cleaning and lubrication process is relatively simple and should take only five (5) minutes to accomplish.

During this period of time, the shield is removed thereby increasing the intensity of radiation at the gauge. To reduce unnecessary exposure, the following guidelines should be followed:

a. The cleaning and lubrication should be done in an area providing adequate shielding to personnel who may be within the designated work area.

b. A restricted area may be established using rope and "caution radiation area" signs. The distance for signs should be approximately 8 to 10 feet.

6.7 Cleaning and Lubrication (continued)

c. To reduce exposure as much as possible, place the gauge on its side with the base away from you, all maintenance should be performed from this side.

d. A survey meter should be used to monitor radiation levels at designated radiation restricted areas and at gauge surfaces.

The following procedure is to be used for the cleaning and lubrication of the gauges.

The source rod in the 3400-B Series is supported in linear bearings packed with a molybdenum disulfide grease (Molykote Type G Paste). The grease is retained within the bearing and soil kept out by a system of wipers and seals at the top and bottom of the bearings. The bearings will require little or no service, unless the gauge is overhauled or excess soil is allowed to accumulate.

On the bottom surface of the gauge is a removable plate with a metal wiper ring mounted in it. This ring will remove most of the soil from the source rod. However, under some soil conditions, small amounts will be carried into the sliding shield assembly. If allowed to build up, this soil can cause wear in the shield cavity and can ultimately be forced into the bearings and ruin them.

Cleaning the cavity is relatively simple. Place the gauge on its side on a bench with the base away from the operator. The source rod should be latched in the SAFE position. Using a Phillips screwdriver, remove the four screws holding the bottom plate assembly in position and pry out the assembly using a flat blade screwdriver. Using the screwdriver, remove the sliding shield and spring.

The radiation dose rate at the entrance to the cavity (flush with the bottom surface) is approximately 300 mrem per hour, and the hands should not be exposed to this dose rate for more than four hours per week. The cleaning time should take no more than five minutes, so the procedure is quite safe.

Using a rag, stiff brush, and compressed air (if available) remove all soil and clean the cavity, sliding shield, and bottom plate assembly. Inspect all items for excessive wear and replace if required. Check the scraper ring to insure that it is free to move in its groove. If the ring is damaged or worn excessively, it should be replaced or replace assembly.

Coat all of these items, including the cavity and the inner surface of the plate assembly with a bonded molybdenum disulfide lubricant (Molykote Type 321 Spray). Reassemble all items.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

6.7 cont.

Using the rag, clean the source rod and index rod and coat the index rod with bonded lubricant. Using a cotton tipped stick (Q-Tip), lubricate the visible portions of the trigger and indexer with paste lubricant.

If the last items have soil embedded in the mechanism, they should be removed for cleaning. Lower the handle to the backscatter position and, using a 3/32 pin punch, remove the roll pin in the index rod. Remove the index rod cap by unscrewing.

Depress the trigger and lift the handle clear of the index rod. Before releasing the trigger, note the position of the indexer pin and trigger to facilitate replacement. With the trigger released, the indexer can be slid forward and sideways out of the handle. Clean all moving parts and the handle cavity. If the index shows signs of wear, it should be replaced. Lubricate these parts and reassemble.

To replace the index rod cap, latch the handle in the SAFE position, and screw the cap down until the neoprene bumper puts a <u>light</u> pressure on the handle. Drop the handle, look into the roll pin hole and line up the hole in the index rod by unscrewing the cap if necessary. These holes <u>must be in alignment</u> to replace the roll pin. If the cap is screwed too tightly, pressure against the bumper will prevent the indexer from latching in the SAFE position.

Using a mineral solvent, clean all of the outer surfaces of the instrument.

The source rod shall not be removed by Gauge Operator personnel. If it becomes necessary for the removal of the source rod, the RSO, RSS, or Field Supervisor shall be notified.

7.0 <u>Transport & Security of Gauges</u>

7.1 Transport by Private Motor Vehicle

7.1.1 Density gauges may be transported in their approved "Type A" container by motor vehicle under the "Yellow II" label without placarding the vehicle.

7.1.2 The source rod lock shall be in place and the transport case shall be closed and sealed. The container should be placed on a portion of the vehicle which can be locked. If the unit is transported in an open vehicle, the gauge shall be secured against loss or theft (i.e., locked to the vehicle via chain or steel cable.) The gauge should be braced so as to guard ~~against any~~ movement during transport.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

7.1.3 Due to the fact that Transport Indexes for density gauges may range from 0.1 to 1.0 mRem/hr, containers may not be stored closer than 12 inches (30 centimeters) to passengers per 49 CFR 177.842. Containers also should not be stored within 1 meter of undeveloped film.

7.2 The following labels are displayed on the transport containers as required by 49 CFR.

a. Two (2) "Yellow II" labels indicating the contents as: 8 mCi Cs-137, 40 mCi AM-241/Beryllium (172.403, 172.441)

b.
USA DOT 7A
TYPE "A"
RQ, RADIOACTIVE MATERIAL
SPECIAL FORM
NOS UN2974
(172.301, 306, 310, 312, 324)

7.3 A "Bill of Lading" certificate must be in the vehicle within sight of the driver's seat at all times along with the CEC Emergency Response Information (i.e., Part III of the CEC Radiation Safety Manual).

The "Bill of Lading" certificate for CEC transport of gauges must comply with 49 CFR 172, subpart C in identifying the following:

a. The Shipper

b. Description of the Shipment (proper shipping name, material identification number, hazard class, type of package, name and activity of each nuclide, category of labeling and transport index)

c. 24-Hour Emergency Response Phone Number

d. Document must be Signed by the Shipper

7.4 Security of Nuclear Density Gauges Containing Sealed Sources.

a. Each unit will be provided with a lock designed to prevent unauthorized or accidental removal and shall be kept locked at all times except when in use and under the direct surveillance of an operator.

1. Each device containing a sealed source when not in use, shall be stored in a vault container or such other safeguards as may be needed to protect against unauthorized or accidental removal.

7.4 a. (cont.)

2. A physical radiation survey shall be made at the outside of the vault, container, or area, and the radiation levels at the surface (or perimeter of the area) shall not exceed 2 MR/HR.

3. A sign bearing the radioactive caution symbol with words - "CAUTION" - RADIOACTIVE MATERIALS", shall be posted on all outside surfaces of the vault, container or area.

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

Construction Engineering Consultants, Inc.
7702 Edgewood Avenue, Pittsburgh, PA 15218
SOURCE UTILIZATION LOG

Troxler Serial No. _____

Date	Curies	Time Out	Surface Survey MR/HR	Survey at 1 Meter MR/HR	Work Location	Time In	Storage Location	Storage Survey MR/HR	Respons-ible Operator

NOTATIONS IN THIS COLUMN INDICATE WHERE CHANGES HAVE BEEN MADE

CONSTRUCTION ENGINEERING CONSULTANTS, INC.

Gauge Serial No:

Gauge Model No:

BILL OF LADING

Shipper: Construction Engineering Consultants, Inc.
7702 Edgewood Avenue
Pittsburgh, PA 15218
(412) 351-6465

Consignee: Construction Engineering Consultants, Inc.
Various Temporary Job Sites

RQ, RADIOACTIVE MATERIAL, SPECIAL FORM, NOS, UN2974
CLASS 7, TYPE "A" PACKAGE, CONTAINING:

CESIUM 137, 8 mCi (0.30 GBq)

AMERICIUM 241: BERYLLIUM, 40 mCi (1.48 GBq)

RADIOACTIVE YELLOW II LABEL, TI = 0.1

24 HOUR PER DAY
EMERGENCY RESPONSE TELEPHONE NO.
****** (919) 839-2676 ******

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

BY: _____
Radiation Safety Officer

7702 Edgewood Avenue
Pittsburgh, PA 15218
(412) 351-6465
FAX: (412) 351-6401

This is to acknowledge the receipt of your letter/application dated

12/10/2004, and to inform you that the initial processing which includes an administrative review has been performed.

☑ RENEW 37-18456-02
There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

☐ Please provide to this office within 30 days of your receipt of this card

_____.

A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned **Mail Control Number** 136158.
When calling to inquire about this action, please refer to this control number.
You may call us on (610) 337-5398, or 337-5260.

NRC FORM 532 (RI)
(6-96)

Sincerely,
Licensing Assistance Team Leader

	:	(FOR LFMS USE)
	:	INFORMATION FROM LTS
BETWEEN:	:	----------
	:	
License Fee Management Branch, ARM	:	Program Code: 03121
and	:	Status Code: 2
Regional Licensing Sections	:	Fee Category: 3P
	:	Exp. Date: 20050228
	:	Fee Comments: _____
	:	Decom Fin Assur Reqd: N

LICENSE FEE TRANSMITTAL

A. REGION I

1. APPLICATION ATTACHED
   Applicant/Licensee: CONSTRUCTION ENGR. CONSULTANTS, INC
   Received Date: 20041217
   Docket No: 3015116
   Control No.: 136158
   License No.: 37-18456-02
   Action Type: Renewal

2. FEE ATTACHED
   Amount: $1,200.00
   Check No.: 03072

3. COMMENTS
   NO FEE DUE FOR RENEWAL.

   Signed M. A. Perkins
   Date 12/09/2004

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

1. Fee Category and Amount: _____

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

3. OTHER _____
   _____

   Signed _____
   Date _____