

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552a(e)(3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals who supply information to the Nuclear Regulatory Commission on NRC Form 313. This information is maintained in a system of records designated as NRC-3 and described at 40 Federal Register 45334 (October 1, 1975).

1. **AUTHORITY:** Section 81 and 161(b) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2111 and 2201(b)).
2. **PRINCIPAL PURPOSE(S):** The information is evaluated by the NRC staff pursuant to the criteria set forth in 10 CFR Parts 30, 32, 33, 34, 35 and 40 to determine whether the application meets the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations, for the issuance of a radioactive material license or amendment thereof.
3. **ROUTINE USES:** The information may be (a) provided to State health departments for their information and use; and (b) provided to Federal, State, and local health officials and other persons in the event of incident or exposure, for their information, investigation, and protection of the public health and safety. The information may also be disclosed to appropriate Federal, State, and local agencies in the event that the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding. In addition, this information may be transferred to an appropriate Federal, State, or local agency to the extent relevant and necessary for an NRC decision or to an appropriate Federal agency to the extent relevant and necessary for that agency's decision about you.
4. **WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION:** Disclosure of the requested information is voluntary. If the requested information is not furnished, however, the application for radioactive material license, or amendment thereof, will not be processed. A request that information be held from public inspection must be in accordance with the provisions of 10 CFR 2.790. Withholding from public inspection shall not affect the right, if any, of persons properly and directly concerned need to inspect the document.
5. **SYSTEM MANAGER(S) AND ADDRESS:** U.S. Nuclear Regulatory Commission
Director, Division of Fuel Cycle and Material Safety
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555

LIBERTY MUTUAL INSURANCE COMPANY

RE: RENEWAL OF NRC
LICENSE NO. 20-01006-01

ITEM 5 - RADIOACTIVE MATERIAL - ELEMENT PHYSICAL FORM AND MAXIMUM AMOUNT
POSSESSED AT ONE TIME

<u>ELEMENT AND MASS NUMBER</u>	<u>CHEMICAL/PHYSICAL FORM</u>	<u>MAX AMOUNT POSSESSED</u>
1) Nickel 63	Radioactive foil	25 millicuries total
2) Any material atomic #3 through 83 inclusive	Sealed source	25 millicuries total

ITEM 6 - PURPOSE FOR LICENSE MATERIAL

- 1) Nickel 63 foil is used in a Hewlett Packard electron capture device for a gas chromatograph.
- 2) All sealed sources in line 2 of item number 5 are used as reference sources or as calibration standards for radiation detection and counting equipment.

CHANGES SINCE LAST APPLICATION DATED OCTOBER 22, 1982

The Cesium 137 seal source (model 469, source serial no. A511) has been returned to Amersham-Tech/Ops, 40 North Avenue, Burlington, Massachusetts. Included in this application is a receipt for the return of that source.

Amersham - Tech/Ops RPD
40 North Avenue
Burlington, Massachusetts 01803
Telephone (617) 272-2000

TO: Liberty Mutual Ins. Co.
71 Frankland Road
Hopkinton, MA 01748
Attn: Ed Stevenson

SUBJECT: ISOTOPE RECEIPT

ATTACHED PLEASE FIND A COPY OF AN ISOTOPE RECEIPT FOR
THE RETURN OF 1 MODEL 469, SN 3
CONTAINING CS 137, SOURCE SN A511
RECEIVED AT AMERSHAM CORPORATION ON 9/14/87.

THANK YOU,

DATE: 9/17/87

AMERSHAM CORPORATION
(formerly Tech/Ops RPD, Inc.)
40 NORTH AVENUE
BURLINGTON, MA 01803
U.S.A.

TEL: (617) 272-2000



SALES COPY

Tech/Ops, Inc.

RADIATION PRODUCTS DIVISION

ATTN: ED STEVENSON

Received From LIBERTY MUTUAL INS. CO.

Address 71 FRANKLAND RD. Date 9/14 19 87

HOPKINTON, MASS. 01748

PREPAID ☐

Via

AMERSHAM (DICK EVANS) COLLECT ☐

469

1 MODEL 469 S/N 3 Cap. S.N. A511

1 CS 137 SOURCE = 225 MCI

S/O

SURFACE RADIATION = 5 MR/HR

TRANSPORT INDEX = 0.1

R 17313

O. Leonin

RECEIVED BY - SIGNATURE

LIBERTY MUTUAL INSURANCE COMPANY

RE: RENEWAL OF NRC
LICENSE NO. 20-01006-01

ITEM 7 - INDIVIDUAL RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR
TRAINING EXPERIENCE

ITEM 8 - TRAINING INDIVIDUALS WORKING IN RESTRICTED AREAS

The sealed sources are used only by E. Stevenson to calibrate counting instruments and to demonstrate radiation monitoring techniques to Liberty Mutual Industrial Hygienists and policyholders.

E. Stevenson is a Certified Safety Professional - Comprehensive Practice and a Certified Industrial Hygienist - Comprehensive Practice. His formal training in Radiation Safety includes:

1. In-house training provided Liberty Mutual Insurance Company, February and March, 1978 - 16 hours of lecture and laboratory works covering the following topics:
 - a. Principles and practices of radiation protection.
 - b. Radioactivity measurement standardization and monitoring techniques and instruments.
 - c. Mathematics and calculations basic to the use and measurement of radioactivity.
 - d. Biological effects of radiation.

This material was presented by Mr. Harold Eriksen, formerly employed by Liberty Mutual as a health physicist, as part of an in-house Industrial Hygiene training program.

2. OCCUPATIONAL AND ENVIRONMENTAL PROTECTION, AUGUST 10-14, 1987

Presented by Dr. Dave Moeller, and Dr. Jacob Shapiro, Harvard School of Public Health, Boston, MA. This one week course (40 hours) include the following:

- a. A review of basic mathematics, physics, units, quantities and dimensions; introduction to atomic structure and radioactive materials; external radiation protection; natural background radiations; gamma spectroscopy in occupational and environmental monitoring; units of radiation dose; physics of radiation detectors; radiation protection standards for workers in the general public; internal dosimetry; calibration and use of portable radiation monitoring equipment; laboratory instrumentation-systems and applications; personal dosimetry; biological effects of ionizing radiation; statistics; university and medical radiation protection; respiratory fitting and use of protective clothing; air cleaning; control of airborne radon decay products; internal hazards - uranium, radon, plutonium; internal dosimetry and hazards of radionuclides in research and medicine; production of sources for industrial radiography; nuclear power plants and nuclear safety; transportation of radioactive materials; federal inspection and regulation of radionuclides; shielding and dosimetry.

(continued)

LIBERTY MUTUAL INSURANCE COMPANY

RE: RENEWAL OF NRC
LICENSE NO. 20-01006-01

ITEM 7 AND ITEM 8 - continued

Since September, 1987, E. Stevenson has held the position of Technical Director - Acoustics and Radiation for Liberty Mutual Insurance Company. This position requires radiation safety consulting services to policyholders which have employees exposed to radiation. This work involves radiation surveys of various sources and radiation generating equipment. The work also includes the analysis of air samples for the purpose of evaluating worker exposure to radioisotopes. The analytical procedures used in our AHIA Accredited Laboratory include gamma spectrometry and gas proportional counting.

E. Stevenson also represents Liberty Mutual's interest in the Nuclear Atomic Energy Reinsurance Pool and the Nuclear Atomic Energy Liability Underwriters. Activities include occasional participation in liability inspections conducted by MAERP and the Atomic Nuclear Insurers staff. As such, E. Stevenson is a member of the ANI Engineering Subcommittee.

Another function of the position is the training of our field industrial hygienist in basic radiation protection and measurement. This training requires formal classroom activity of approximately ten hours per year and on-the-job technical support during field training surveys. Additionally, E. Stevenson must participate in formal classroom training for policyholders covering basic radiation safety. Typically, this is done during a one week policyholder Environmental Health Institute given each year at the Hopkinton Research Center.

E. Stevenson's on-the-job training regarding radiation safety and measurements was supervised by Mr. Harold Erikson, formerly employed by Liberty Mutual as a health physicist and Mr. David Burkhardt, formerly our Consultant in Radiation Hygiene and currently working as our Senior Industrial Hygienist in our Charlotte, North Carolina office.

LIBERTY MUTUAL INSURANCE COMPANY

RE: RENEWAL OF NRC
LICENSE NO. 20-01006-01

ITEM 9 - FACILITIES AND EQUIPMENT

The following equipment is used to provide radiation safety consulting service to our policyholders. All survey instruments are calibrated annually by Applied Health Physics, Inc., 2986 Industrial Blvd., Bethel Park, PA.

<u>TYPE OF INSTRUMENT</u>	<u>MANUFACTURER'S NAME</u>	<u>MODEL NUMBER</u>	<u>NUMBER AVAILABLE</u>	<u>RADIATION DETECTED</u>	<u>SENSITIVITY RANGE</u>
Survey Meter	Victoreen	471	1	beta,gamma	0-300,000 mR/hr
G.M. Counter	Victoreen	491	1	beta,gamma	0-100 mR/hr
Proportional Counter	Eberline	PAC 3G	1	alpha	0-10 ⁵ cpm
Proportional Counter	NMC	PC 4	1	alpha,beta	-
Alpha Spectrometer	EG&G	576	1	alpha	-
Sealer	Ludlum	2200	1	gamma	-
Multi Channel Analyzer	D.S. Davidson	1056A	1	gamma	-
Scintillation Detectors	Ludlum	44-2	1	gamma	-
For Sealer & MCA	Ludlum	44-3	1	gamma	-
	Ludlum	43-2	1	gamma	-
	Harshaw	2X1 1/2 NaI	1	gamma	-
* Survey meter	Victoreen	470A	6	beta,gamma	0-1,000,000 mR/hr
* Survey meter	Victoreen	440	3	beta,gamma	0-300 mR/hr
* Survey meter	Eberline	RO-1	2	beta,gamma	0-500,000 mR/hr

* These instruments are located in field offices and are used by Liberty Mutual's Industrial Hygienists.

(continued)

LIBERTY MUTUAL INSURANCE COMPANY

RE: RENEWAL OF NRC
LICENSE NO. 20-01006-01

ITEM 9 - continued

Other facilities remain as previously described in the application dated October 22, 1982. The 15 mCi Nickel 63 foil is an integral component of the electron capture device of the Hewlett Packard Model 5830 A Gas Chromatograph located in our analytical chemistry laboratory.

The sealed prepared calibration sources, with an activity of less than 25 millicuries total are located in a locked draw in the laboratory bench of the radiation counting room.

CHANGES SINCE LAST APPLICATION DATED OCTOBER 22, 1982

Since our last license application dated 10/22/82, we have returned the Cesium 137 sealed source (source serial number A511) to Amersham-Tech/Ops, 40 North Avenue, Burlington, Massachusetts. This sealed source was previously used for calibration of radiation detecting equipment and was housed in a custom designed storage facility described in the application dated October 22, 1982. This storage facility still physically exists however there is no radioactive material contained within it. Calibration of survey meters located in Hopkinton and various Liberty Mutual field offices will be done by an outside contractor, Applied Health Physics, Inc.

LIBERTY MUTUAL INSURANCE COMPANY

RE: RENEWAL OF NRC
LICENSE NO. 20-01006-01

RE: ITEM 10 - RADIATION SAFETY PROGRAMS

The sealed sources are used only by E. Stevenson to calibrate radiation counting instruments and to demonstrate radiation monitoring techniques to Liberty Mutual Industrial Hygienists and policyholders. All calibration and demonstration work is conducted at 71 Frankland Road, Hopkinton, Massachusetts 01748.

Thermoluminescence dosimeters (TLD) and Landsverk Quartz fiber dosimeters are worn by all personnel when potentially or actually exposed to external ionizing radiation. Records of doses received quarterly from Landauer are kept per requirements of 10-CFR-20.

The 15 millicurie nickel 63 source is leak tested every six months by E. Stevenson. Leak test kits are obtained from Bolton and Galanek, Inc., P.O. Box 366 MIT Branch, Boston, Massachusetts, each six months and are analyzed by them. Alternatively, leak tests can be performed by E. Stevenson by wiping the source with a 1-1/8 inch diameter Whatman No. 41 filter paper, using a sponge rubber pad on a 2 inch long stick to hold the filter paper. The filter paper is attached to the sponge by means of a small drop of adhesive. The filter paper is counted for B activity with the NMC B Gas Flow Proportional Counter. Prior to analyzing the leak test samples, the Gas Flow Proportional Counter is calibrated with appropriate alpha and beta sources. Sample calculations and instrument calibration procedures are enclosed.

COUNTING PROCEDURE

NMC - PC4 PROPORTIONAL COUNTER

- Method of Collection:
1. Membrane filters
 2. Wipe samples.
- Apparatus:
1. NMC-PC4 Proportional Counter
 2. Planchets
- Reagents:
- Standards from Radiation Drawer
Different Standard for Different Radiation
- Procedure:
1. Turn on Methane-Argon Gas and open valve box behind NMC - PC4. Adjust flow rate with valve on tank to read between 2 & 3 pounds per square inch.
 2. Switch on Power & High Voltage
Adjust High Voltage for Correct Voltage
(1100 for Alpha; 1700 Beta)
 3. Test L/T. Board should display all eights (8).
 4. Place input mode to T. Turn preset time to 1 min (1 x 1 x 1). Set purge time to 100 seconds and depress purge. The output should be 3600.
 5. Place input mode to P. Set time 1 minute for Beta's; 10 minutes for Alpha's. This will be your background count. Switch count control switch to N, operations control to M.
 6. Place standard within chamber. Set purge time of 30 seconds. Time, same as background.
 7. Place samples in planchets and place in chamber. Purge and time to be set as background and standards were. Record all values.
- Shutdown:
1. Slowly lower high voltage with dial. Switch off H.V.
 2. Turn off Methane-Argon Gas. Shut valve box off and release excess gas with cutoff.
 3. Turn off power.

If a series of activity measurements are to be made on different filter paper samples and if during the counting period the background count rate remains unchanged,* the error term or the standard deviation for the count should be computed as follows:

*The background rate will be higher for beta radiation (40-80 CPM) than for alpha radiation (0.3 CPM). The background count rate should be determined prior to making activity measurements.

The standard deviation at the 95% confidence level for the net count is defined as follows:

$$s_n = 1.96 \left[s_g^2 + s_b^2 \right]^{1/2}$$

where s_g = standard deviation of the observed gross count

s_b = standard deviation of the observed background count

s_n = standard deviation of the net count

If the gross sample count, C_g is 500 counts as measured over a 30 minute period, and the background count, C_b is 9 counts, also measured over a 30 minute period, the gross and background count rates are determined as follows:

$$\text{The gross count rate, } R_g = \frac{500}{30} = 16.7 \text{ CPM}$$

$$\text{The background count rate, } R_b = \frac{9}{30} = .3 \text{ CPM}$$

$$\text{The standard deviation for the gross count, } s_g = \frac{C_g}{30}^{1/2}$$

$$\text{or, } s_g = \frac{500}{30}^{1/2} = .75 \text{ CPM}$$

$$\text{The standard deviation for the background, } s_b = \frac{C_b}{30}^{1/2}$$

$$\text{or, } s_b = \frac{9}{30}^{1/2} = 0.1 \text{ CPM}$$

The standard deviation for the net count at the 95% level of confidence is

$$\begin{aligned} s_n &= 1.96 \left[s_g^2 + s_b^2 \right]^{1/2} \\ &= 1.96 \left[(.75)^2 + (.1)^2 \right]^{1/2} \\ &= 2.25 \text{ CPM} \end{aligned}$$

The net counting rate is expressed as the

$$\text{Gross Count Rate} - \text{Background Count Rate} \pm s_n$$

$$\text{or } 16.7 - .3 \pm 2.25 \text{ CPM}$$

$$\text{or } 16.4 \pm 2.25 \text{ CPM}$$

To obtain the number of disintegrations per minute, divide by the efficiency of the counting system. Efficiency is assumed to be 50% for alpha and beta counting until problems associated with backscatter, field distortion caused by filter paper and absorption in the filter have been defined. Thus, the above becomes

$$32.8 \pm 4.5 \text{ DPM}$$

To express the activity in terms of μCi 's, divide the above by 2.22×10^6 (number of disintegrations per μCi).

$$1.5 \times 10^{-5} \pm 2.0 \times 10^{-6} \mu\text{Ci}$$

To obtain the activity per cubic centimeter of air sampled, simply divide the above by the total volume (cubic centimeters) of air sampled.

LIBERTY MUTUAL INSURANCE COMPANY

RE: RENEWAL OF NRC
LICENSE NO. 20-01006-01

RE: ITEM 11 - WASTE MANAGEMENT

Application is for sealed sources and devices. Any disposition of sources and devices will be by returning them to the manufacturer. Included in this application is a copy of the isotope receipt for the return of the previously listed Cesium 137 (source serial number A511).

107945

Research Center
71 Frankland Road
Hopkinton, Massachusetts 01748
Telephone: (617) 435-9061



November 10, 1987

Glenda Jackson
Room #AR2015
United States Nuclear Regulatory Commission
Washington DC 20555

RE: RENEWAL OF MATERIALS LICENSE 20-01006-01
CONTROL #107945

Dear Glenda:

In your absence, I talked to Maurice Messier of your office about our renewal fee and your November 5, 1987 letter to me. He suggested that I write to you explaining my reasons why I feel we are best classified under the license category 3P rather than 3M.

As an insurance company, one of our main lines of business is workers compensation. That is, we insure our policyholders against accidents and injuries to their workers. As part of our ability to assess (and underwrite) a risk, we retain a right to check a company's control of hazards so that we can determine if it is insurable or in some instances what price structure should be assigned to the risk. This is the case when our loss prevention department personnel make policyholder surveys for radiation safety. The surveys are usually program evaluations to determine the typical types of controls the policyholder has in place and occasionally, physical measurements with survey meters. These surveys are initiated by us, we are under no contract to perform them, and we do not get paid extra for this type of service. Further, this type of survey is for our evaluation of a hazard and is not a substitute for service to policyholders to maintain their own licenses. For example, we do not set up periodic monitoring at a hospital to meet the needs of the hospital to maintain their own license, and neither would we set up a separate contract to provide safety surveys separate from the insurance contract.

Our largest materials source listed in the license renewal is a sealed Nickel 63 foil used on a gas chromatograph in our laboratory. The gas chromatograph is used to analyze chemical contaminants (ie. solvents) which may be in air samples taken at our policyholders location. These air samples are taken for our own information to evaluate the insurability of the risk as it relates to chemical exposures in the workplace. It is not done under separate contract nor are we paid extra for it. Since the analysis is for solvent vapor exposure, this could not be categorized as "services for other licensees", as listed under category 3M.



Liberty Mutual Insurance Group/Boston
Equal Opportunity Employer

RECEIVED

'87 NOV 13 A9:28

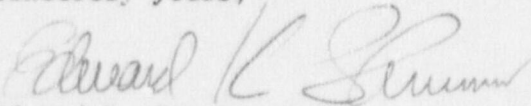
DS 487
1 C. FEE MONT. BRAN

3P fee OK
see 6/16/88 note
to file

The remaining part of our materials inventory (less than 1 mill⁴curie) could be used to calibrate radiation analyzing equipment such as a proportional counter. This could be used to analyze an air sample taken at a policyholder location. However, since all our surveys are initiated by us to assess the insurability of a risk, and we are not under separate contract to do this survey nor do we get an extra fee for the service and further since the surveys are not a substitute for a service needed to maintain a license by others, I feel that we should not be classified as a category 3N, but rather as a category 3P.

I hope this provides you with the information that you need to make this decision. If you have any other questions, please contact me.

Sincerely yours,



Edward K. Stevenson
Technical Director - Acoustics & Radiation

EKS:fp

cc: US Nuclear Regulatory Commission, Region I Licensing Staff
Nuclear Material Section B
631 Park Avenue
King of Prussia, PA 19406



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUN 18 1988

NOTE FOR: License File 20-01006-01
FROM: Glenda Jackson
License Fee Management Branch, ARM/DAF
SUBJECT: LICENSE FEE CLASSIFICATION

Although License 20-01006-01 authorizes calibration of equipment other than the licensee's, the calibration is not service for other licensees, and therefore, the license is correctly classified for license fee purposes in Category 3P. In their letter of November 10, 1987, the licensee stated that they calibrate the instruments only for the purpose of determining the radiation safety of their clients' facilities in order to insure the clients. The clients obtain separate instrument calibration services.

Glenda Jackson
Glenda Jackson
License Fee Management Branch
Division of Accounting and Finance
Office of Administration and
Resources Management

Liberty Mutual Insurance Company
ATTN: Mr. Edward K. Stevenson
Technical Director
71 Frankland Road
Hopkinton, MA 01748

NOV - 5 1987

Gentlemen:

This refers to your application dated October 6, 1987, for renewal of Materials License 20-01006-01.

We received your check for \$120. Your application, however, is subject to a renewal fee of \$930 as specified in §170.31 (3N) of 10 CFR 170, copy enclosed. Payment of the additional \$810 should be made to the U.S. Nuclear Regulatory Commission and mailed to my attention at our Washington, D.C. address.

Your application will be processed by the Region I Licensing staff located at 631 Park Avenue, King of Prussia, Pennsylvania 19406. The additional fee, however, is required prior to issuance of the renewal. When submitting the fee, please refer to CONTROL NUMBER 107945.

Sincerely,

Signed by:
Glenda Jackson

Glenda Jackson
License Fee Management Branch
Division of Accounting and Finance
Office of Administration and
Resources Management

Enclosure:
10 CFR 170

cc: Region I

DISTRIBUTION:
Pending Fee File
ARM/DAF R/F
LFMB R/F (2)
DW/RI/Liberty

*3 P fee OK
see 11/10/87 ltr
930*

OFFICE: ARM/LFMB *Me*
SURNAME: SKimberley:rej
DATE: 11/4 /87

ARM/LFMB ✓
GJackson
11/ ✓ /87

BETWEEN: LICENSE FEE MANAGEMENT BRANCH, ARM
AND
REGIONAL LICENSING SECTIONS

03004592

(FOR LFMS USE)
INFORMATION FROM LMS

PROGRAM CODE: 03221
STATUS CODE: 2
FEE CATEGORY: ~~3N~~ 3P - *extend 2ms 6/16/88*
EXP. DATE: 19871130
FEE COMMENTS: *Not Service - 11/10/87*
.....

LICENSE FEE TRANSMITTAL

A. REGION I

1. APPLICATION ATTACHED
APPLICANT/LICENSEE: LIBERTY MUTUAL INSURANCE CO.
APPLICATION DATE: 871016
CONTROL NO.: 107945
LICENSE NO.: 20-01006-01
ACTION TYPE: RENEWAL

2. FEE ATTACHED
AMOUNT: 120.00
CHECK NO.: 11547

3. COMMENTS

SIGNED *Goster*
DATE 10/23/87

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED 1-4)

1. FEE CATEGORY AND AMOUNT: ~~3N~~ 3P #120

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:
AMENDMENT _____
RENEWAL / _____
LICENSE _____

3. OTHER _____

SIGNED *S. Kimberly*
DATE 11/12/88