

MATERIALS LICENSE

Amendment No. 24

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.

301736

Licensee

In accordance with letter dated
August 10, 19963. License Number 34-13011-04 is amended
in its entirety to read as follows:

4. Expiration Date January 31, 2001

5. Docket or
Reference No. 030-09189

1. Medical College of Ohio

2. Radiation Safety Office
C.S. 10008
Toledo, OH 436996. Byproduct, Source, and/or
Special Nuclear Material7. Chemical and/or Physical
Form8. Maximum Amount that Licensee
May Possess at Any One Time
Under This LicenseA. Any byproduct
material identified
in 10 CFR 35.100B. Any byproduct
material identified
in 10 CFR 35.200C. Any byproduct
material identified
in 10 CFR 35.300D. Any byproduct
material identified
in 10 CFR 35.400E. Any byproduct
material identified
in 10 CFR 31.11F. Uranium depleted in
Uranium-235A. Any
radiopharmaceutical
identified in 10 CFR
35.100B. Any
radiopharmaceutical
identified in 10 CFR
35.200C. Any
radiopharmaceutical
identified in 10 CFR
35.300D. Any brachytherapy
source identified in
10 CFR 35.400

E. Prepackaged Kits

F. Cadmium plated metal

A. As needed

B. As needed

C. As needed

D. As needed

E. As needed

F. As needed

9610280065 961016
PDR ADOCK 03009189
C PDR

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all
ML
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SD

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number

34-13011-04

Docket or Reference Number

030-09189

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- | | | |
|--|---|---|
| 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 |
| G. Any byproduct material with atomic numbers 1 to 83 except as specified below. | G. Any | G. Not to exceed 200 millicuries per radionuclide. Total possession limit not to exceed 2 curies, except as listed below: |
| H. Hydrogen-3 | H. Any | H. 1500 millicuries |
| I. Cesium-137 | I. Sealed source (Technical Operations, Inc. Model No. 726) | I. One source not to exceed 96 millicuries |
| J. Nickel-63 | J. Sealed source (Hewlett-Packard Model No. 18713A) | J. 15 millicuries each source, total not to exceed 75 millicuries |
| K. Iridium-192 | K. Source wire (Amersham Corporation Model ICW 100) | K. 200 millicuries |
| L. Nickel-63 | L. Foil source (Detector Cell assembly Varian Model No. 01-001028-01) | L. 8 millicuries each source, total not exceed 50 millicuries |
| M. Americium-241 | M. Foil source (NRD, Inc. Model A-001) | M. 1.0 microcurie each source, total not to exceed 50 microcuries |
| N. Cesium-137 | N. Sealed source (Technical Operations, Inc. Model No. 773) | N. One source not to exceed 165 millicuries |
| O. Cesium-137 | O. Sealed source | O. 1000 curies (U.S. Nuclear Type 3252) |

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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

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6. Byproduct, source,
and/or special
nuclear material

P. Americium-241

7. Chemical and/or
physical form

P. Sealed source
(Thermo NUTech/TMA
Eberline Model DNS-
5sp)

8. Maximum amount that
licensee may possess at
any one time under this
license

P. One source not
to exceed 21.6
microcuries \pm 20%

9. Authorized Use:

A. Medical use described in 10 CFR 35.100.

B. Medical use described in 10 CFR 35.200.

C. Medical use described in 10 CFR 35.300.

D. Medical use described in 10 CFR 35.400.

E. In vitro studies.

F. Shielding in a linear accelerator.

G. To be used for medical research and therapeutic research and for research and development as described in letter dated December 21, 1990 (Item 2 of attachments).

H. To be used for research and development as described in letter dated December 21, 1990 (Item 2 of attachments).

I. To be used for instrument calibration.

J. To be used in a gas chromatograph for sample analysis.

K. To be used for interstitial treatment of cancer in humans.

L. To be used in a gas chromatograph for sample analysis.

M. To be used as static elimination devices.

N. To be used for instrument calibration.

O. To be used in a U.S. Nuclear Model GR-6 irradiator.

P. To be used for in-vitro biological research and development as described in letter dated September 25, 1996.

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**MATERIALS LICENSE
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CONDITIONS

10. Licensed material may be received, possessed, used and stored at the licensee's facilities located at 3000 Arlington Avenue, Toledo, Ohio, 3355 Glendale Avenue, Toledo, Ohio and at temporary job sites of medical facilities 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 be used by, or under the supervision of, individuals designated by the Radiation Safety and Radioisotope Committee, Robert J. Coombs, M.D., Chairman.
 - B. The use of licensed material shall be by or under the supervision of individuals that meet the minimum criteria as specified in 10 CFR 33.15(b).
 - C. The use of licensed material in or on humans shall be by a physician as defined in Section 35.2 of 10 CFR Part 35.
 - D. Physicians designated to use licensed material in or on humans shall meet the appropriate training and experience criteria in 10 CFR Part 35, Subpart J.
 - E. The Radiation Protection Officer for the activities authorized by this license is Eddie Brentlinger, B.S., R.T.
12.
 - A.
 - (1) Each sealed source acquired from another person and containing licensed material, other than hydrogen-3, with a half-life greater than 30 days and in any form other than gas shall be tested for contamination and/or leakage before use. In the absence of a certificate from a transfer or indicating that a test has been made within 6 months before the transfer, a sealed source received from another person shall not be put into use until tested.
 - (2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting materials or 10 microcuries or less of alpha emitting material.
 - (3) Except for alpha sources, the periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage before any use or transfer to another person unless they have been leak tested within 6 months before the date of use or transfer.

COPY

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- B. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source. If the inspection or test reveals any construction defects or 0.005 microcurie or greater of contamination, the source shall not be used or transferred as a sealed source until it has been repaired, decontaminated and retested.
- C. Each sealed source containing licensed material, other than hydrogen-3, with a half-life greater than 30 days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed 6 months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed 3 months.
- D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission. Records may be disposed of following Commission inspection.
- E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region III, 801 Warrenville Road, Lisle, Illinois 60532-4351, ATTN: Chief, Nuclear Materials Safety Branch, describing the equipment involved, the test results, and the corrective action taken.
13. Sealed sources containing licensed material shall not be opened or removed from their respective source holders by the licensee.
14. Detector cells containing licensed material shall not be opened or the sources removed from the detector cell by the licensee.
15. Experimental animals administered licensed materials or their products shall not be used for human consumption.
16. Licensed material shall not be used in or on human beings or in field applications where activity is released except as provided otherwise by specific condition of this license.
17. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 2 years from the date of each inventory.

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18. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
19. The licensee is authorized to hold radioactive material with a physical half-life of less than 100 days for decay-in-storage before disposal in ordinary trash in accordance with the statements, representations and procedures in letters dated September 28, 1992, December 10, 1992, January 12, 1993 and February 9, 1993.
20. The licensee shall not perform repairs or alterations of the irradiator involving removal of shielding or access to the licensed material. Removal, replacement, and disposal of sealed sources in the irradiator shall be performed by a person specifically licensed by the Commission or an Agreement State to perform such services.
21. The procedures contained in Manufacturer instruction manual for irradiator shall be followed and a copy of this manual shall be made available to each person using or having responsibility for the use of the device.
22. 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 June 29, 1990 (with attachments, excluding Item 11.2.4. and Attachment 11.2B. (incineration)); and
 - B. Letters dated December 21, 1990 (with attachments), April 10, 1991, September 28, 1992 (excluding request to release restricted area to unrestricted use), December 10, 1992, January 12, 1993, February 9, 1993, April 4, 1993, April 11, 1993, July 22, 1993, July 12, 1994, December 22, 1994, and September 25, 1996; and
 - C. Letter received September 3, 1993.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date Oct 16, 1996

By

Ernest R. Watson
Nuclear Materials Licensing Branch, Region III

COPY

R9

(FOR LFMS USE)
INFORMATION FROM LTS

BETWEEN:

License Fee Management Branch, ARM
and
Regional Licensing Sections

Program Code: 02110
Status Code: 0
Fee Category: 7B EX 3E 2B
Exp. Date: 20010131
Fee Comments: 170.11(A)(4)
Decom Fin Assur Req'd: Y

LICENSE FEE TRANSMITTAL

A. REGION

1. APPLICATION ATTACHED

Applicant/Licensee: MEDICAL COLLEGE OF OHIO
Received Date: 960816
Docket No: 3009189
Control No.: 301736
License No.: 34-13011-04
Action Type: Amendment

2. FEE ATTACHED

Amount: 0
Check No.: 0

3. COMMENTS

Signed
Date

D. Hersey
8-23-96

B. LICENSE FEE MANAGEMENT BRANCH must be entered 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

SC
8/27/96

SEP 03 1996

| | |
|------------------|-------------|
| Log | Aug 11 III |
| Remitter | |
| Check No. | |
| Amount | |
| Fee Category | 7B EX 3E 2B |
| Type of Fee | AMTD |
| Date Check Rec'd | |
| Date Completed | 8/27/96 |
| By: | SC |

1996 AUG 26 AM 11:19

419-381-4172

419-381-4301



3000 Arlington Avenue
Mailing Address: C.S. 10008
Toledo, Ohio 43699

August 10, 1996

United States Nuclear Regulatory Commission
Licensing Section
Region III
801 Warrenville Road
Lisle, Illinois 60532-4351

Re: License Number 34-13011-04

Reviewer,

The Medical College of Ohio, license number 34-13011-04, requests an amendment to add a 21.6 microcurie Am-241 sealed source, model number DNS-5sp, serial number 2173-96 that will be purchased from Thermo NUtech. This source will be used to irradiate cells. Leak tests of the source will be performed as per our license condition.

Please direct any questions to Eddie Brentlinger at the above address or at (419) 381-4301 or FAX (419) 381-4282.

Sincerely,

Eddie A. Brentlinger, B.S., R.T.
Radiation Safety Officer

RECEIVED
AUG 16 1996
REGION III

Pm: 8-13-96

AUG 16 1996
301736

OCT 17 1996

Eddie A. Brentlinger
Radiation Safety Officer
Medical College of Ohio
C.S. 10008
Toledo, OH 43699

Dear Mr. Brentlinger:

Enclosed is Amendment No. 24 to your NRC Material License No. 34-13011-04 in accordance with your request.

Please review the enclosed document carefully and be sure that you understand all conditions. If there are any errors or questions, please notify the U.S. Nuclear Regulatory Commission, Region III office at (630) 829-9887 so that we can provide appropriate corrections and answers.

Please note that the expiration date on the license has been changed to reflect the automatic 5 year extension authorized by changes to 10 CFR Part 30.

In addition, please note that the previous License Condition No. 15 regarding color labels has been deleted. This is because the regulations under 10 CFR 20.1901(a) now address this issue.

Please be advised that your license expires at the end of the day, in the month, and year stated in the license. Unless your license has been terminated, you must conduct your program involving byproduct materials in accordance with the conditions of your NRC license, representations made in your license application, and NRC regulations. In particular, note that you must:

1. Operate in accordance with NRC regulations 10 CFR Part 19, "Notices, Instructions and Reports to Workers; Inspections," 10 CFR Part 20, "Standards for Protection Against Radiation," and other applicable regulations.
2. Notify NRC, in writing, within 30 days:
 - a. When the Radiation Safety Officer permanently discontinues performance of duties under the license or has a name change; or
 - b. When the licensee's mailing address changes (no fee is required if the location of byproduct material remains the same).
3. In accordance with 10 CFR 30.36(b) and/or license condition, notify NRC, promptly, in writing, and request termination of the license when you decide to terminate all activities involving materials authorized under the license.

301734

4. Request and obtain a license amendment before you:
 - a. Change Radiation Safety Officers;
 - b. Order byproduct material in excess of the amount, or radionuclide, or form different than authorized on the license;
 - c. Add or change the areas of use or address or addresses of use identified in the license application or on the license; or
 - d. Change ownership of your organization.
5. Submit a complete renewal application with proper fee or termination request at least 30 days before the expiration date of your license. You will receive a reminder notice approximately 90 days before the expiration date. Possession of byproduct material after your license expires is a violation of NRC regulations. A license will not normally be renewed, except on a case-by-case basis, in instances where licensed material has never been possessed or used.

In addition, please note that NRC Form 313 requires the applicant, by his/her signature, to verify that the applicant understands that all statements contained in the application are true and correct to the best of the applicant's knowledge. The signatory for the application should be the licensee or certifying official rather than a consultant.

You will be periodically inspected by NRC. Failure to conduct your program in accordance with NRC regulations, license conditions, and representations made in your license application and supplemental correspondence with NRC will result in enforcement action against you. This could include issuance of a notice of violation, or imposition of a civil penalty, or an order suspending, modifying or revoking your license as specified in the General Policy and Procedures for NRC Enforcement Actions. Since serious consequences to employees and the public can result from failure to comply with NRC requirements, prompt and vigorous enforcement action will be taken when dealing with licensees who do not achieve the necessary meticulous attention to detail and the high standard of compliance which NRC expects of its licensees.

Sincerely,
Original Signed By
Evelyn R. Matson
Nuclear Materials Licensing Branch

License No.: 34-13011-04
Docket No.: 030-09189
Enclosure: Amendment No. 24

DOCUMENT NAME: M:\03009189.CL6

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

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|--------|---------------------|---------------------------------------|--|--|--|--|--|--|--|
| OFFICE | DNMS/RIII <i>EM</i> | <input checked="" type="checkbox"/> N | | | | | | | |
| NAME | EMATSON:jaw | | | | | | | | |
| DATE | 10/11/96 | | | | | | | | |

OFFICIAL RECORD COPY

419-381-4172

419-381-4301

3000 Arlington Avenue
Mailing Address: C.S. 10008
Toledo, Ohio 43699



September 25, 1996

Evelyn R. Matson
Licensing Section
U.S. Nuclear Regulatory Commission
Region III
801 Warrenville Road
Lisle, IL 60532-4351

Dear Ms. Matson,

In response to our phone conversation on Monday September 23, here is a more detailed description of how the Am-241 source we are requesting approval of will be used.

Biomedical researchers at the Medical College of Ohio are presently studying lung carcinogenesis and need to use an alpha-radiation source to expose immortalized bronchial epithelial cells to induce chromosomal damage. This is an in-vitro procedure preformed by personnel experienced in this technique. Once irradiated, the cells are cultured and then injected into mice. The mice are observed for the production of lung tumors.

In reference to the Am-241 source, it has come to my attention that the activity of the source is 21.6 microcuries + or - 20%. Please adjust the stated activity in our original request to reflect this difference.

I hope this answers your questions regarding the use of this source. If you have any further questions please do not hesitate to contact me.

Sincerely,

Eddie A. Brentlinger
Radiation Safety Officer

RECEIVED
OCT 03 1996
REGION III

OCT 03 1996

UNITED STATES NUCLEAR REGULATORY COMMISSION
REGION III
CONVERSATION RECORD

(X) TELEPHONE (X) OUTGOING () INCOMING () CONVERSATION

TIME: 9:15 DATE: 9/23/96

NAME OF PERSON(S) CONTACTED: ORGANIZATION: TELEPHONE NO.:

Eddie Brentlinger, RSO
Medical College of Ohio
419-381-4301
fax 419-381-4282

NOTE:

Letter dated August 10, 1996 requesting an amendment to add americium-241.
Control No. 301736

SUMMARY:

The NRC needs that following additional information:

1. Provide a more detailed description of how the americium-241 sealed source will be used. What kind of cells will be irradiated? Is the use for research, development, treatment? Is the use in-vitro, non-human? In general, who (approved biologists, chemists?) will use the source?
2. In accordance with 10 CFR 30.32(g) an application for a specific license to use byproduct material in the form of a sealed source must identify that the source is registered with the NRC or an Agreement State or must submit the information listed in 10 CFR 32.210(c). After checking our records, no evidence was located that shows the Thermo NUtech model number DNS-5sp was registered and approved by the NRC or an Agreement State. Therefore, please verify that Thermo NUtech is the original manufacturer and check the model number. If possible, you should obtain information from them that demonstrates that the sealed source has been registered and approved. Submit a copy of the Registry certificate if possible.

per my phone conversation with John Lubinski, I will authorize the source w/o a certification because it meets the criteria described in Policy & Guidance Directive FC 84-22 "What Sources and Device Designs Require an Evaluation."

ACTION REQUIRED:

Please respond in writing within 15 days, provide two copies of your response and refer to Control No.301736.

ACTION TAKEN:

NAME OF PERSON DOCUMENTING CONVERSATION

Evelyn R. Matson
630-829-9822

SIGNATURE



DATE

9/17/96
a3

Charles R. Lamborn
Source Manufacturing and
Radiometric Supervisor

Thermo NUTECH

A Subsidiary of Thermo Remediation, a Thermo Electron Company

7021 Pan American Hwy. NE
Albuquerque, NM 87109

(505) 345-3461
FAX (505) 751-5416

FACSIMILE
COVER
SHEET

DATE: 9-23-96

TO: COMPANY NAME: US NRC
INDIVIDUAL: Evelyn Matson
FAX NUMBER: (630) 515-1259
TELEPHONE #: (630) 829-9822
FROM: Charles Lamborn

Number of pages being sent (including this page): 4

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If you have received this facsimile in error, please immediately notify us by telephone and return the original facsimile to us at the above address via the United States Postal Service. Thank you.

IF YOU DO NOT RECEIVE ALL OF THIS TRANSMISSION, PLEASE CALL THE FACSIMILE OPERATOR (Receptionist) AT (505) 345-3461.

COMMENTS:

Friendly Greetings

Charles Lamborn

**Check Sources,
Certified
Standards,**

Thermo NUTech

7021 Pan American Hwy. NE

Albuquerque, NM 87109

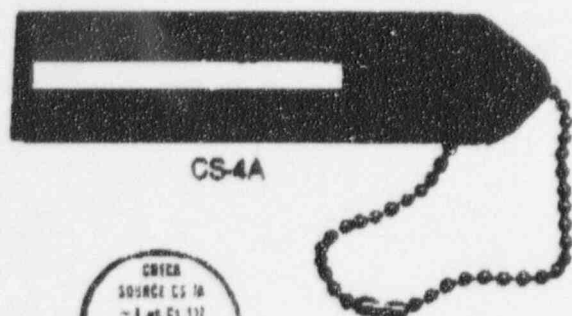
(505) 345-3461 • FAX (505) 761-5416



CS-1, CS-15



CS-3, CS-16



CS-4A



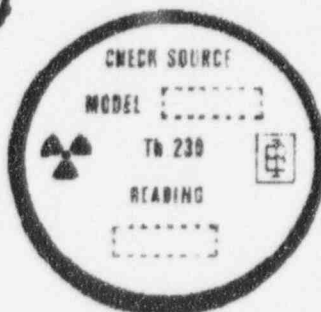
CS-14

RADIOACTIVE SOURCES AND STANDARDS

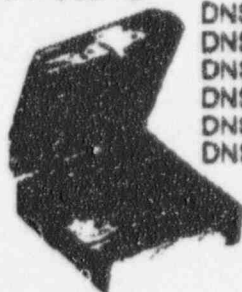


CS-7A, CS-7B

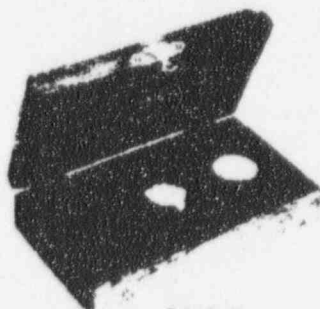
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DNS-3, DNS-4,
DNS-5, DNS-6,
DNS-11, DNS-12,
DNS-14, DNS-16,
DNS-16S, DNS-21



CS-10, CS-12, CS-13



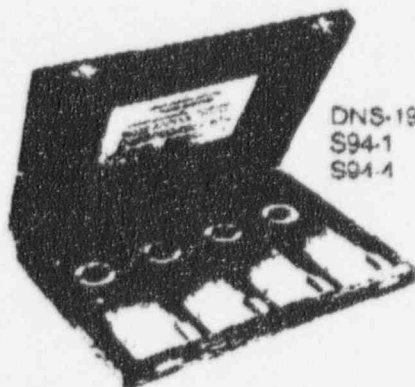
DNS-7, DNS-8



DNS-9



DNS-18



DNS-19
S94-1
S94-4

TMA

Thermo Analytical Inc.

TMA/Eberline

5635 Jefferson Street NE

Post Office Box 3874

Albuquerque, NM 87190-3874

(505) 346-9931 • FAX (505) 761-5410

COPY 70

C. LAMBORN

May 24, 1993

EA-0111

Susan Greene
Division of Industrial and Medical Nuclear Safety
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

RE: NRC Radioactive Materials License #30-23706-01E
Exempt Quantity Distribution License
License Renewal

Dear Ms. Greene:

This letter is submitted to request renewal of TMA/Eberline's Radioactive Materials License (#30-23706-01E) for exempt quantity source distribution. A check in the amount of \$1300 is enclosed for the license renewal fee.

The following byproduct material radioisotopes would be distributed at activities not to exceed the indicated exempt quantity amount:

| <u>Radioisotope</u> | <u>Exempt Quantity Limit (uCi)</u> |
|----------------------|------------------------------------|
| Barium-133 | 10 |
| Cesium-137 | 10 |
| Cobalt-60 | 1 |
| Strontium/Yttrium-90 | 0.1 |
| Technetium-99 | 10 |

Radioactive sources are electroplated or evaporated on various substrate media. Typically the radioactive material is electroplated onto a nickel or stainless steel disk or, evaporated onto a filter paper or plastic disk.

Enclosed are sheets describing the various model sources which are distributed to customers. These 'specification sheets' describe the general fabrication, radioisotope, activity levels, and method of counting used to determine the activity for the particular model source. A few of the source model specification sheets describe source sets which also include radioactive material which is not byproduct material (e.g. Model No. DNS-7). It is understood that this non-byproduct material is not covered under TMA/Eberline's Exempt Quantity Distribution License. TMA/Eberline is requesting that the renewal of license #30-23706-01E permit only the distribution of the five byproduct materials listed above.

TMA/Eberline will often make customized sources for a client upon request. These 'special' sources are designated by adding the notation "SP" to the end of the existing corresponding source model number. For example, a Model DNS-2 is nominally a SrY-90 source electroplated onto a nickel disc. If a client required the material to be electroplated onto a stainless steel disc the source would be identified as a Model DNS-2SP. These 'special' sources may vary from the description of the corresponding model by:

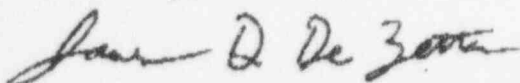
- containing a radioisotope not indicated for that model. The possible options would be limited to the five byproduct material radioisotopes listed above.
- containing an activity outside the indicated radioactivity range for that model. This activity would not exceed the limit for exempt quantity distribution.
- being electroplated or evaporated on a substrate media not indicated for that model.
- having a different size active area or substrate disk size not indicated for that model.

A summary report of distribution of byproduct material is also enclosed. This report is submitted in accordance with the regulations in 10 CFR 32.20.

Examples of brochures and of the labeling of source containers included with the distributed sources are also provided as you requested.

If you have any questions regarding this matter, please contact me at (505) 345-9931.

Sincerely,



James D. De Zetter
Radiation Safety Officer

cc: U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive
Suite 1000
Arlington, TX 76011
(cover letter and summary distribution report only)

Enclosures

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF SEALED SOURCE

NO.: NM270S104B

DATE: June 4, 1976

PAGE 1 OF 3

SEALED SOURCE TYPE: Alpha Instrument Calibration Source

MODEL: DNS-5

MANUFACTURER/DISTRIBUTOR: Eberline Instrument Corp.
P. O. Box 2108
Santa Fe, NM 87501

MANUFACTURER/DISTRIBUTOR:

ISOTOPE: Americium-241

MAXIMUM ACTIVITY: 5 microcuries

LEAK TEST FREQUENCY:

PRINCIPAL USE: Other

CUSTOM SOURCE: ☐ YES ☒ NO

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF SEALED SOURCE

NO.: NM270S104B

DATE: June 4, 1976

PAGE 2 OF 3

SEALED SOURCE TYPE: Alpha Instrument Calibration Source

DESCRIPTION:

This source consists of Am-241 electrodeposited on nickel and firmly bonded to the nickel metal by heat treatment at about 900°C. The chemical form is americium oxide or an alloy of americium and nickel, fused into the nickel support. The DNS-5 is 1-1/4" diameter with a 1" diameter active area. The Am-241 is permanently bonded to the metal with loose or wipeable contamination well below the 0.005 uCi limit. The source will withstand a fire (up to 1000°C) or soaking in water, without any adverse effect or adherence. Each source is checked by alpha counting, gamma counting, or ionization current measurement to ensure that the activity is within specified limits. Each source is also wipe tested, individually, or in groups, to ensure compliance with the 0.005 uCi limit for removable activity.

LABELING:

The back side of the DNS-5 source is engraved with radionuclide identification (Am-241) and serial number. It is supplied in a box which is labeled "Caution Radioactive Material" and with additional information about the source.

PROTOTYPE TESTING:

Prototype testing specified in 32.57 of 10CFR32 was completed in December 1966 and demonstrates less than 0.00001 uCi of removable activity by dry wipe testing, wet wipe testing, water soak testing, and dry wipe following water soak testing. Sources manufactured in 1966 have not shown any deleterious aging effects after approximately 10 years of use. Additional testing was performed in 1976 with activities near the upper limit of 5 uCi/source.

The following results were obtained:

Dry Wipe Tests

All less than 0.00001 uCi

Wet Wipe Tests

All less than 0.00001 uCi

Solubility in Water (24 hours)

All less than 0.00001 uCi

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SEALED SOURCE TYPE: Alpha Instrument Calibration Source

PROTOTYPE TESTING (CONT'D):

Solubility in body fluids (24 hours)

Saliva - less than 0.00001 uCi

Urine - less than 0.00001 uCi

Solubility in 1N HNO₃ (24 hours)

Less than 0.00001 uCi

Solubility in ethanol (24 hours)

Less than 0.00001 uCi

Solubility in 0.1N HCl (24 hours)

0.10 uCi dissolved from a 5 uCi source

The amount dissolved in HCl at the upper concentration limit of what might exist in a person's stomach is similar to the intake of soluble Am-241 in 1 liter of water at the MPC listed in Table 1, column 2, Appendix B of 10 CFR 20. Although the source is not a "sealed source" with the usual meaning of being encapsulated, it meets the standard for classification designation C-22222.

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

Prior to 1974 Eberline Instrument Corporation held an AEC license to manufacture and distribute subject sources to persons generally licensed under 10CFR31.8. Sources of recent manufacture require a specific license.

ISSUING AGENCY:

Radiation Protection Section, Environmental Improvement Agency
State of New Mexico

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SEALED SOURCE TYPE: Alpha Source

MODEL: DNS-5A

MANUFACTURER/DISTRIBUTOR: Eberline Instrument Corp.
P. O. Box 2108
Santa Fe, NM 87501

MANUFACTURER/DISTRIBUTOR:

ISOTOPE: Americium-241

MAXIMUM ACTIVITY: 5 microcuries/source

LEAK TEST FREQUENCY:

PRINCIPAL USE: Other

CUSTOM SOURCE: ☐ YES ☒ NO