

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

NO.: CA-0406-S-223-S

DATE: September 25, 2001

PAGE: 1 OF 5

(Supercedes NR-0476-S-115-S)

SOURCE TYPE: Photon Disc Source

MODEL: NER-474

MANUFACTURER/DISTRIBUTOR:

Isotope Products Laboratories  
24937 Avenue Tibbitts  
Valencia, CA 91355  
Phone (818) 843-7000  
FAX (818) 843-6168

ISOTOPE:

Barium-133

MAXIMUM ACTIVITY:

50 millicuries (1.85 GBq)

LEAK TEST FREQUENCY:

6 Months

PRINCIPAL USE:

(U) X-Ray Fluorescence

CUSTOM SOURCE:

\_\_\_\_ YES X NO

NM5512

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SOURCE TYPE: Photon Disc Source

DESCRIPTION:

Model NER-474 source consists of up to 50 millicuries of Barium-133 as a vitreous ceramic fused to a tungsten insert or as a barium chloride deposited in the recess of a tungsten insert. The insert is then encapsulated in a 316L stainless steel capsule which is sealed by TIG welding. The sources come in two sizes. The dimensions of each are shown in Attachment 1. The thickness of the source window in both designs is 0.009" to 0.011" (0.229 mm to 0.279 mm).

LABELING:

Each source is engraved with the isotope, activity, serial number, and date of manufacture.

DIAGRAM:

See Attachment 1

CONDITIONS OF NORMAL USE:

The sources are designed for use in both fixed and portable x-ray fluorescence analyzers, in density thickness gauging systems and densitometers of transmission and backscatter type.

PROTOTYPE TESTING:

A prototype of the source design has been tested in accordance with the specifications of ANSI N542-1977 and the design achieved an ANSI classification of 77C64444.

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SOURCE TYPE: Photon Disc Source

EXTERNAL RADIATION LEVELS:

The characteristic radiation doses from the window of a source are listed below:

<u>Distance</u> <u>(cm)/(in.)</u>	<u>Radiation Dose Level</u> <u>(mR/hr/mCi)/(mSv/hr/GBq)</u>
Contact	300/81.1
5/1.97	75/20.3
30/11.8	3.5/0.946

The radiation levels at the back of a source are not expected to exceed 0.5 mR/hr/mCi (0.135 mSv/hr/GBq).

QUALITY ASSURANCE AND CONTROL:

The sources are manufactured and distributed under the guidelines of Isotope Products Laboratory's quality assurance and control program. The California Department of Health Services has deemed the program acceptable for licensing purposes. A copy of the program is on file with the California Department of Health Services.

REVIEWERS NOTE:

The Model NER-474 source is manufactured and distributed by Isotope Products Laboratories from two locations in California. However, only one address is listed on PAGE 1, since mail service is no longer available to the second location. The second address that is not listed is:

Isotope Products Laboratories  
1800 North Keystone Street  
Burbank, CA 91504

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SOURCE TYPE: Photon Disc Source

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- The source shall be distributed only to persons specifically licensed by the NRC, an Agreement State or Licensing State.
- These sources shall not be subjected to environmental and operating conditions which exceed its ANSI Classification.
- These sources shall be leak tested at 6 month intervals using techniques capable of detecting 0.005 microcurie (185 Bq) of removable contamination.
- Handling, Storage, Use, Transfer, and Disposal: To be determined by the licensing authority.
- This registration certificate and the information contained within the references shall not be changed without the written consent of the California Department Health Services.

SAFETY ANALYSIS SUMMARY:

Based on our review of the Model NER-474 sealed source, the information and test data cited below, we continue to conclude that the sealed source is acceptable for specific licensing purposes.

Furthermore, we continue to conclude that the sealed source would be expected to maintain its containment for normal conditions of use and accident conditions, which might occur during the uses specified in this certificate.

REFERENCES:

The following supporting documents for the sources are hereby incorporated by reference and are made a part of this registry document.

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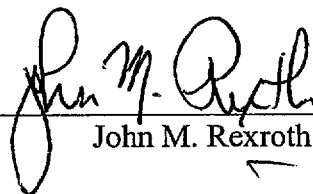
SOURCE TYPE: Photon Disc Source

1. Du Pont Merck's letters dated March 24, 1995, October 6, 1994, February 18, 1994, July 17, 1984, and July 22, 1992 with enclosures thereto.
2. Isotope Products Laboratories letter dated July 26, 2000 with enclosures thereto.

ISSUING AGENCY: California Department of Health Services

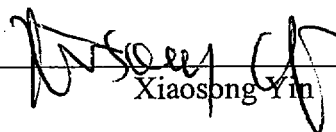
DATE: September 25, 2001

REVIEWED BY:

  
John M. Rexroth

DATE: September 25, 2001

CONCURRED BY:

  
Xiaosong Yin

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

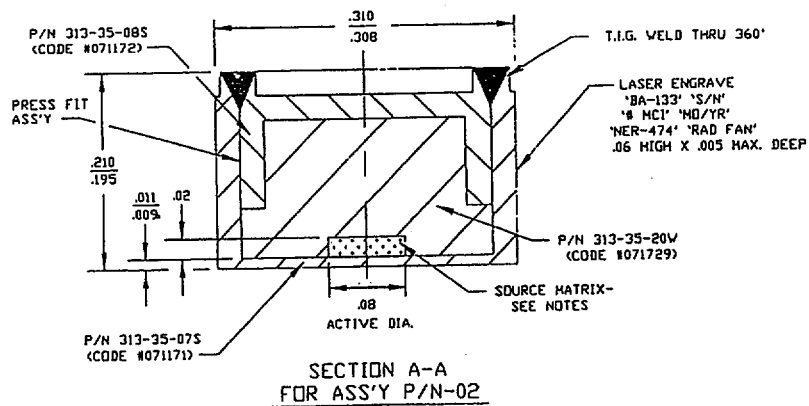
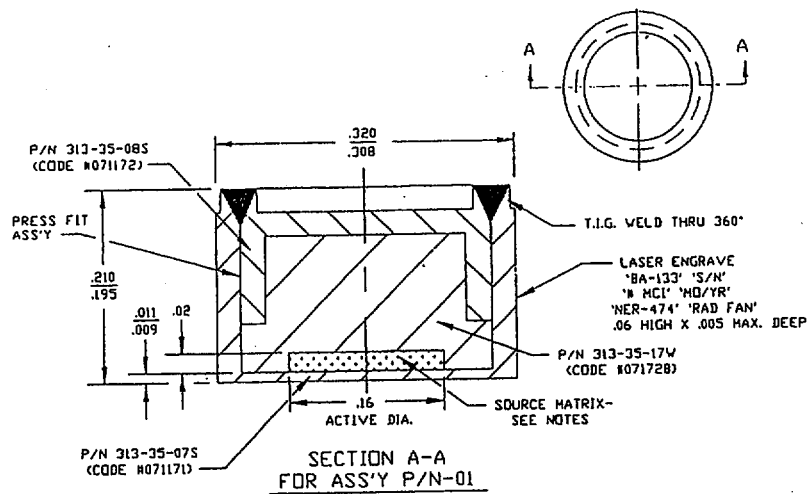
NO.: CA-0406-S-223-S

DATE: September 25, 2001

ATTACHMENT: 1

(Supercedes NR-0476-S-115-S)

NER-474



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

NO.: CA-0406-S-214-S  
(Supercedes MA-0476-S-131-S)

DATE: September 28, 2001

PAGE: 1 OF 6

SOURCE TYPE: Beta Ionizing Source

MODEL: NER-004, NER-004P

MANUFACTURER/DISTRIBUTOR:

Isotope Products Laboratories  
24937 Avenue Tibbitts  
Valencia, CA 91355  
Phone (818) 843-7000  
FAX (818) 843-6168

ISOTOPE:

Nickel-63

MAXIMUM ACTIVITY:

50 millicuries (1.85 GBq)

LEAK TEST FREQUENCY:

Six (6) months

PRINCIPAL USE:

(S) Foil Source

CUSTOM SOURCE:

\_\_\_\_\_ YES X NO

# REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES

## SAFETY EVALUATION OF SEALED SOURCE

NO.: CA-0406-S-214-S

DATE: September 28, 2001

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(Supercedes MA-0476-S-131-S)

SOURCE TYPE: Beta Ionizing Source

### DESCRIPTION:

The sources consist of radioactive Ni-63 electroless plated or electroplated onto components fabricated from the approved materials in the following table:

MODEL	APPROVED BASE MATERIALS
NER-004	Gold, platinum, copper, or monel (copper-nickel alloy)
NER-004P	Gold, platinum, copper, monel, or stainless steel

The NER-004 indicates a foil configuration of IPL's design and manufacture. The NER-004P allows plating onto components of other manufacturer's design and manufacture. All sources must meet the following constraints:

Maximum Activity: 50 mCi (1.85 GBq)

Minimum Specific Activity: 5 mCi/mg (0.185 GBq/mg)

Radiopurity of Ni-63: > 99.9%.

### LABELING:

The Model NER-004 foils are serialized by scribing or laser engraving on the non-radioactive side. A self-adhesive label is affixed to the primary container for the source foil. The label states the model number, activity, date, and serial number; and has the words "Caution Radioactive Material" along with the manufacturer's name and address.

The Model NER-004P sources are permanently marked on a non-radioactive surface of the component with the radiation symbol, serial number and model number (i.e. "NER-004P"). If space permits, the sources will also be labeled with the isotope, activity, and the words "Caution, Radioactive Material".



# REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES

## SAFETY EVALUATION OF SEALED SOURCE

NO.: CA-0406-S-214-S

DATE: September 28, 2001

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(Supercedes MA-0476-S-131-S)

SOURCE TYPE: Beta Ionizing Source

### DIAGRAM:

Attachment 1: NER-004 Dose Rate Report

Attachment 2 NER-004 Source Foil Diagram

### CONDITIONS OF NORMAL USE:

The Models NER-004 and NER-004P are beta ionizing sources and are routinely used in gas chromatography systems, gas detection equipment, and aerosol neutralizing applications. The source shall not be subjected to temperatures which exceed 752°F (400°C).

### PROTOTYPE TESTING:

The manufacturer tested prototype models NER-004 and NER-004P sealed sources to the ANSI N542-1977 77C32211 requirements. In addition, the prototypes were subjected to 752°F (400°C) in air for 2 hours. Wipes of the inactive side of the sources after the test revealed no removable contamination above 0.005 microcurie (185 Bq).

### EXTERNAL RADIATION LEVELS:

The manufacturer reports the maximum external levels as follows:

Model	Location	Dose Rate (deep/shallow) mRem/hr/mCi	Dose Rate (deep/shallow) mSv/hr/GBq
NER-004	On contact with active side	0.15/12.3	0.04/3.32
	inactive side	1.1/1.1	0.30/0.30
NER-004P	At mouth of cavity*	0.11/6.7	0.03/1.81

See Attachment 1 for diagrams of dose rate locations.

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SOURCE TYPE: Beta Ionizing Source

\* The electroplating is typically within a cavity of the component and this is the typical radiation dose when installed in the cavity.

### QUALITY ASSURANCE AND CONTROL:

The sources are manufactured and distributed under the guidelines of Isotope Products Laboratories' quality assurance and control program. The California Department of Health Services has deemed the program acceptable for licensing purposes. A copy of the program is on file with the California Department of Health Services.

REVIEWERS NOTE: The Models NER-004 and NER-004P sources are being manufactured and distributed by Isotope Products Laboratories from two locations in California. However, only one address is listed on PAGE 1 OF 6, since mail service is no longer available to the second location. The second address that is not listed is:

Isotope Products Laboratories  
1800 North Keystone Street  
Burbank, CA 91504

### LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- The maximum activity concentration shall be 15 millicurie (0.555 GBq) per square centimeter.
- The sources shall only be distributed to persons specifically licensed by the NRC, an Agreement State, or Licensing State.
- The sources shall not be exposed to environments which exceed their ANSI Classification.
- The sources shall not be subjected to temperatures which exceed 752°F (400°C).

# REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES

## SAFETY EVALUATION OF SEALED SOURCE

NO.: CA-0406-S-214-S

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(Supercedes MA-0476-S-131-S)

SOURCE TYPE: Beta Ionizing Source

- The sources shall be leak tested at intervals not to exceed 6 months using techniques capable of detecting 0.005 microcurie (185 Bq) of removable contamination. Removable contamination from the inactive side not exceed 0.005 microcurie and the active side shall not exceed 0.5 microcurie (185 kBq).
- The models NER-004 and NER-004P sources shall only be used in devices which are registered with the NRC or Agreement State.
- Handling, Storage, Use, Transfer, and Disposal: To be determined by the licensing authority.
- This registration certificate and the information contained within the reference shall not be changed without the written consent of the California Department of Health Services.

### SAFETY ANALYSIS SUMMARY:

Based on our acceptance of a previous NRC review of the information and test data cited below, we continue to conclude that the IPL models NER-004 and NER-004P sealed sources are acceptable for registration purposes.

Furthermore, we conclude that the sources would be expected to maintain their containment integrity for normal conditions of use and accidental conditions which might occur during uses specified in this certificate.

### REFERENCES:

The following supporting documents are hereby incorporated by reference and are made a part of this registry document:

- NEN Products letter dated October 1, 1984, with enclosures thereto.
- DuPont Pharmaceuticals Company letters dated December 9, 1991, May 15, 1992, June 11, 1992, July 31, 1992, and May 4, 1993, with enclosures thereto.

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SOURCE TYPE: Beta Ionizing Source

- DuPont Pharmaceuticals Company letter dated May 2, 2000, with enclosures thereto.
- Isotope Products Laboratories' letter dated July 26, 2000, with attachments thereto.

ISSUING AGENCY: California Department of Health Services

DATE: September 28, 2001

REVIEWED BY:

  
John Rexroth

DATE: September 28, 2001

CONCURRED BY:

  
Xiaosong Yin

# REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES

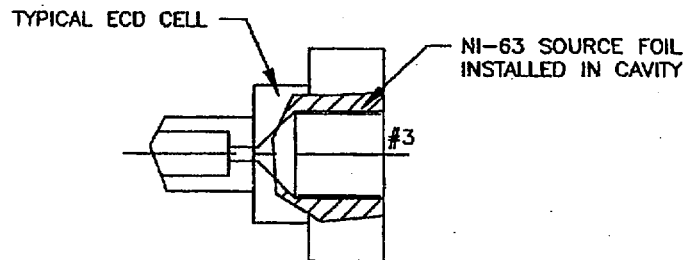
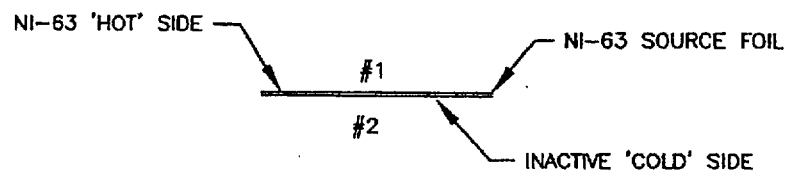
## SAFETY EVALUATION OF SEALED SOURCE

NO.: CA-0406-S-214-S

DATE: September 28, 2001 ATTACHMENT: 1

(Supersedes MA-0476-S-131-S)

### NER-004 DOSE RATE REPORT



LOCATION NO.	DOSE RATE mREM/HR/MCI DEEP / SHALLOW
#1	0.15 / 12.3
#2	1.1 / 1.1
#3	0.11 / 6.7

### NOTES

1. THE 'LANDAUER' DOSE REPORT IS THE DOSIMETRY DATA FOR THE DURATION OF THE SURVEY (6 HOURS) USING A 15 MCI NI-63 SOURCE FOIL.

2. TLD BADGES ARE 'LANDAUER' TYPE K.

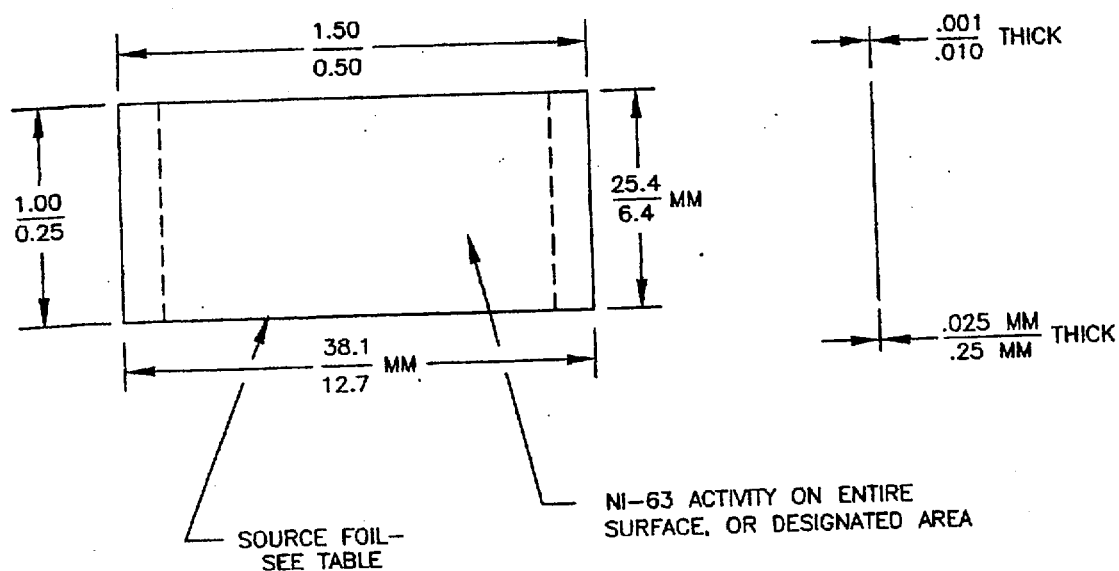
# REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES SAFETY EVALUATION OF SEALED SOURCE

NO.: CA-0406-S-214-S

DATE: September 28, 2001 ATTACHMENT: 2

(Supercedes MA-0476-S-131-S)

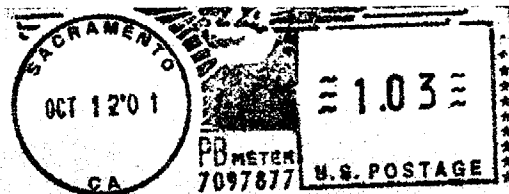
NER-004 SOURCE FOIL DIAGRAM



FOIL THICKNESS	FOIL MATERIAL
0.001 — 0.010 IN. (.025 — .25 MM)	COMMERCIAL PURE GOLD, 24K
	COMMERCIAL PURE PLATINUM
	COMMERCIAL PURE NICKEL
	COMMERCIAL PURE COPPER
	NICKEL ALLOY: NICKEL 50 — 100% COPPER 0 — 50% OTHERS 10% MAX.

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Sacramento, CA 94234-7320

FIRST  
CLASS



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