

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

NO: NR-476-S-148-S

DATE: DEC 27 1982

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SEALED SOURCE TYPE: Low Energy Photon Annular Source

MODEL: NER-468 R (reactor-produced Cd-109)
A (accelerator-produced Cd-109)

MANUFACTURER/DISTRIBUTOR:

New England Nuclear
601 Treble Cove Road
North Billerica, MA 01862

MANUFACTURER/DISTRIBUTOR:

ISOTOPE: Cadmium-109

MAXIMUM ACTIVITY: 1150 millicuries

LEAK TEST FREQUENCY: 6 months

PRINCIPAL USE: (U) X-ray Fluorescence Excitation

CUSTOM DEVICE: ☐ YES ☒ NO

8403020201 840209
PDR FOIA
HAMMITT84-74 PDR

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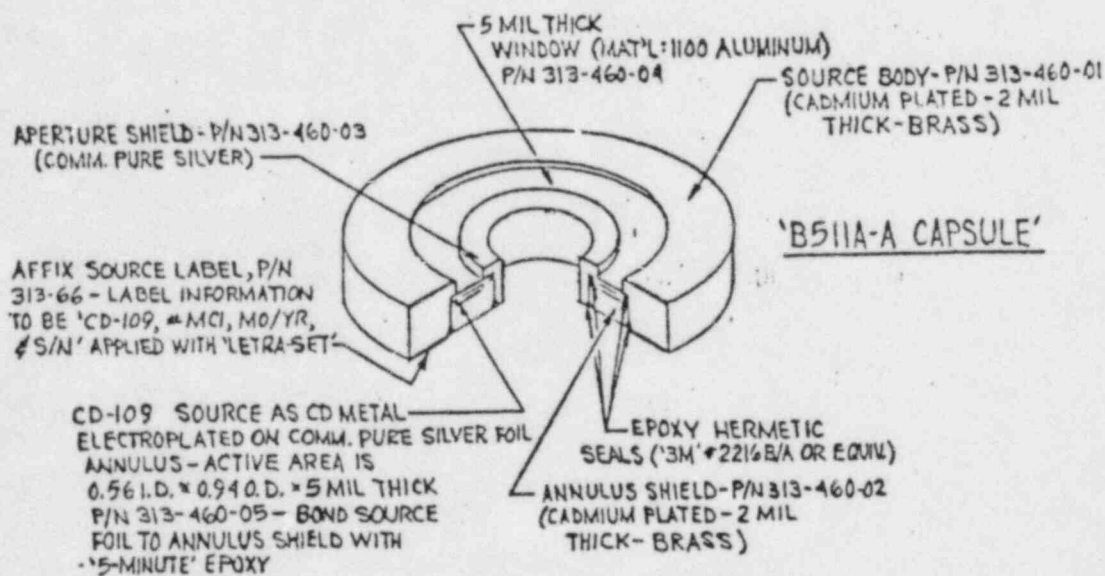
DESCRIPTION:

The Cadmium-109 metal is electroplated to one side of a 5 mil thick silver foil. The foil is then encapsulated in a cadmium (not radioactive) plated brass capsule with a 5 mil thick aluminum window. The capsule is sealed by gluing the components together with epoxy. Thus, producing a B511A-1 capsule with the shape of a donut and having dimensions of 2.000" x 0.38" ID x 0.25" high and a total weight of 110 grams.

LABELING:

A pressure sensitive label containing the trefoil symbol, the words, "Caution-Radioactive Material," the manufacturers logo, the nuclide, date of assay, activity and serial number is applied to the source.

DIAGRAM:



CONDITIONS OF NORMAL USE:

The source is designed for use in various X-ray fluorescence measurement systems. These systems will be used in both laboratory and field environs.

PROTOTYPE TESTING:

The manufacturer has tested these sources in accordance with ANSI N542-1977. The sources passed the requirements for an ANSI Classification of C33322. ANSI recommends a performance classification of 33222 for X-ray fluorescence analysis sources. Please note that the NER-468R source exceed the class of impact by one level of severity. Additionally, the epoxy used to seal the source was temperature

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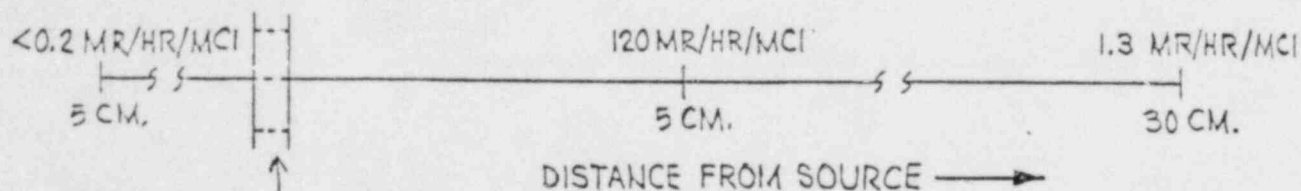
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EXTERNAL RADIATION LEVELS:

The manufacturer measured the dose rate at 5 cm and 30 cm using a survey meter with an aluminized mylar window (1 mg/cm² thick). The measurements are shown below.



Source Model NER-468R

QUALITY ASSURANCE AND CONTROL:

The manufacturer has demonstrated, an acceptable quality assurance and control program which has been previously approved by the NRC.

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- A. The source shall be distributed only to specific licensees of the NRC or an Agreement State.
- B. Frequent and/or prolonged contact with the radiation emission of the NER 468R source by the user can result in significant radiation exposure. Specific radiation protection procedures for handling the source are required.
- C. The NER-468R source should not be subjected to environmental conditions which exceed its ANSI N542-1977 performance classification C33322.
- D. Leak testing: This source shall be leak tested at six-month intervals, using techniques approved by the licensing authority and capable of detecting 0.005 microcurie of activity.
- E. The reviewer should note a 1150 millicurie source will give a dose rate of 138000 mr/hr at 5 cm. Therefore, extremity monitoring should be used during handling of the source.

SAFETY ANALYSIS SUMMARY

Based on our review of the prototype test data, materials of construction, method of construction and the information contained in the references cited below, we conclude that the sealed source Model NER-468R is acceptable for licensing purposes.

We conclude that the source would be expected to maintain containment integrity for the normal uses previously described.

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SAFETY ANALYSIS SUMMARY (Cont'd):

Generally, this source will be contained in a source/sample holder apparatus, thus vulnerability to adverse conditions is further limited.

Fire is an adverse condition that the source might confront. Cadmium has a melting point of 320°C, Silver -960°C and Aluminum 660°C all are insoluble in water. This would indicate that if the source did melt that the water used to put the fire out would limit contamination of the surrounding area by solidifying the metals in a given area, therefore limiting the contamination of persons in the area.

REFERENCES:

The following supporting document for the Model NER-468R sealed source is hereby incorporated by reference and is made a part of this registry document:

° NEN letter dated October 28, 1982 with enclosures thereto.

ISSUING AGENCY:

U.S. Nuclear Regulatory Commission

Date: DEC 17 1982

Reviewer: *John D. [Signature]*

Date: DEC 27 1982

Concurrence: *Joseph W. [Signature]*