

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

NO.: NR476S146S

DATE: March 18, 1982

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SEALED SOURCE TYPE: Beta Source

MODEL: NER-584

MANUFACTURER/DISTRIBUTOR: New England Nuclear
601 Treble Cove Road
North Billerica, MA 01862

MANUFACTURER/DISTRIBUTOR:

ISOTOPE: Krypton-85

MAXIMUM ACTIVITY: 2200 millicuries

LEAK TEST FREQUENCY:

PRINCIPAL USE: Beta Gauges

CUSTOM SOURCE: ☐ YES ☒ NO

8403020194 840209
PDR FOIA
HAMMITT84-74 PDR

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DESCRIPTION:

See attached diagram for construction and assembly details. The krypton-85 gas is introduced into the source cavity via a copper fill tube which is vacuum brazed to the back of the source. The tube is crimped shut and dripped soldered to affect a seal. The assembled source sizes are as follows:

	<u>Minimum</u>	<u>Maximum</u>
° Outside Diameter	0.30 (7.6mm)	1.25 (32mm)
° Active Diameter	0.19 (4.8mm)	1.00 (25.4mm)
° Overall Height	0.50 (12.7mm)	1.25 (32mm)
° Active Volume	0.1 cc.	9 cc.
° Capsule Weight	7 gms.	70 gms.
° Window thickness is 1 mil (0.025mm)		
° Capsule material to be commercial pure titanium.		

LABELING:

Each source is engraved with "Kr-85," the millicuries, serial number and the month/year. In addition, each source is shipped with a final data package which includes "Certificate of Sealed Source Tests," "Radiation Safety and Instructions Sheet," and a technical data sheet reporting: (a) capsule content activity value in curies, (b) beta emission value, (c) krypton-85 gas enrichment used and (d) capsule internal specific pressure.

DIAGRAM:

See enclosure.

CONDITIONS OF NORMAL USE:

The Model NER-584 krypton-85 source is intended for use in industrial beta gauging applications wherein it will be secured in a shielded and shuttered holder bearing required identification and warning labels. It is not expected to be subjected to temperatures above 70°C or an external pressure greater than 30 psia.

PROTOTYPE TESTING:

Two prototype sources were tested by New England Nuclear and the reported environmental testing results of the NER-584 source indicates qualification pursuant to ANSI N542-1977 requirements for performance classification 77C33232.

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EXTERNAL RADIATION LEVELS:

See enclosure.

QUALITY ASSURANCE AND CONTROL:

New England Nuclear has described an acceptable quality assurance program consisting of the following basic components:

- ° Design Control.
- ° Procurement Control.
- ° Process quality control including content activity measurement, contamination/leakage testing, physical dimensions, and visual inspection.
- ° Final acceptance and records.

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- ° This source shall be distributed only to specific licensees of the NRC or Agreement States.
- ° Handling, Storage, Use, Transfer and Disposal: To be determined by the licensing authority.
- ° This source shall not be subjected to environmental or other conditions of use which exceed the American National Standards Institute (ANSI N542-1977) Classification of 77C33232.
- ° This source shall be used and/or stored in devices and/or shields which are labeled in accordance with the requirements of § 20.203, 10 CFR 20 or equivalent Agreement State regulations.

SAFETY ANALYSIS SUMMARY:

Based on the prototype tests, the claimed ANSI source classification and the stated quality assurance and control program to be carried out by the manufacturer, it is our conclusion that the Model NER-584 source is acceptable for licensing purposes. Furthermore when used in properly designed shielded and shuttered holders by specific licensees who are required to train and equip their personnel to safely

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SAFETY ANALYSIS SUMMARY (CONT'D):

handle and mount the sources and guard against the high beta radiation exposure, it appears unlikely that persons would be exposed to limits in excess of those specified in 10 CFR 20.

REFERENCES:

The following supporting documents for the Model NER-584 are hereby incorporated by reference and are made a part of this registry document.

- ° New England Nuclear Corporation letter with attachments dated January 11, 1982.

Date March 18, 1982

Reviewed by /s/
Earl G. Wright

Date March 18, 1982

Concurrence /s/
Bernard Singer

ISSUING AGENCY:

U.S. Nuclear Regulatory Commission

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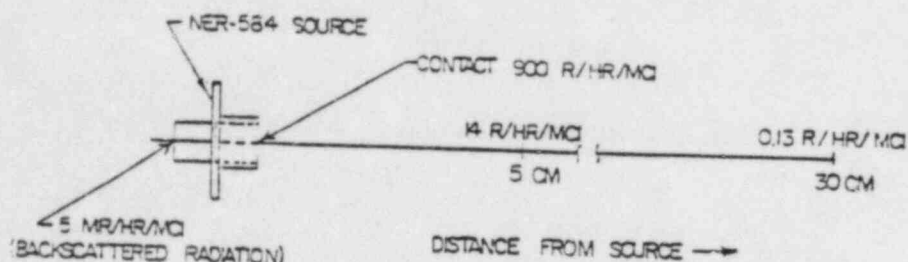
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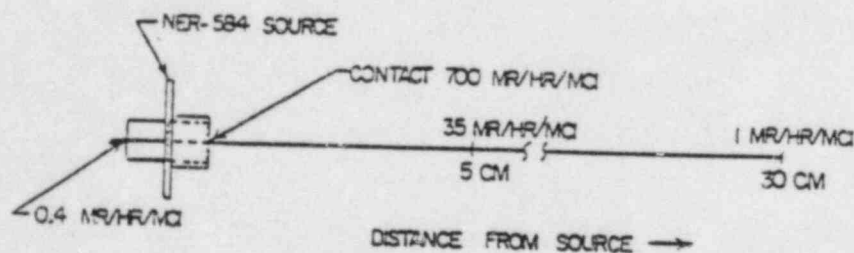
SEALED SOURCE TYPE: Beta Source

NER-584 ^{85}Kr Source
Dose Rate Report

EXTERNAL RADIATION LEVELS



BETA RADIATION SURVEY



GAMMA RADIATION SURVEY

NOTES

1. Beta radiation dose rates are measured with a survey meter thru an aluminized mylar window which is less than 7 mg/cm² thick.
2. Gamma radiation dose rates are measured with a survey meter thru a plastic window which is 500 mg/cm² thick and filters all the beta radiation.
3. The survey meter is calibrated to $\pm 15\%$ and the test sources contain approximately 1 mCi Kr-85.

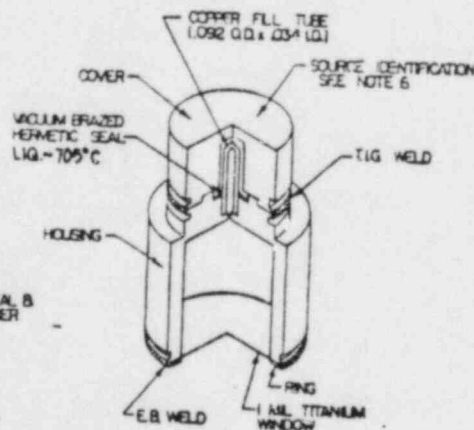
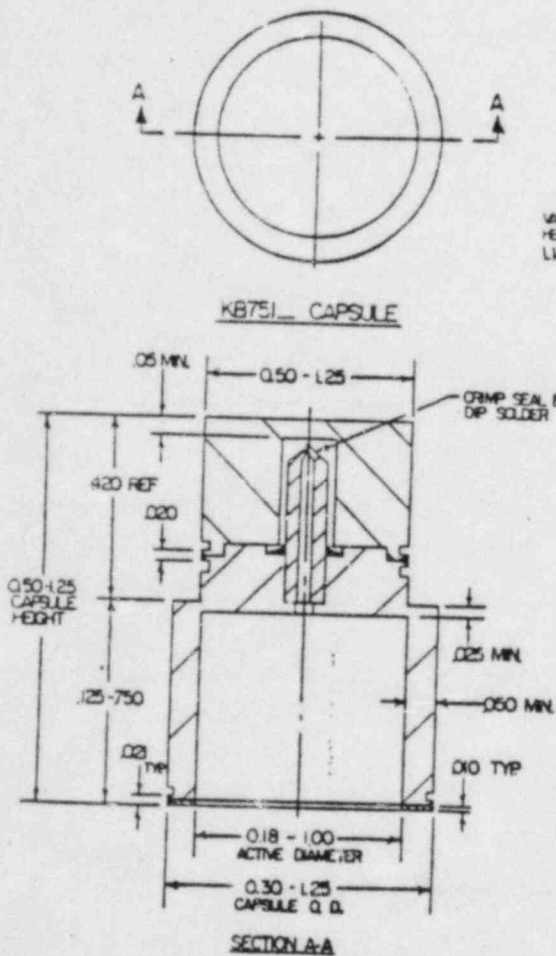
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SEALED SOURCE TYPE: Beta Source



NOTES

1. RADIOISOTOPE SPECIFICATIONS
NUCLIDE - KRYPTON-85
FORM - GASEOUS, AIR ENRICHMENT
MAXIMUM RADIOACTIVITY - 2 CURIES
MAXIMUM INTERNAL PRESSURE - 10 ATMOSPHERES
2. ANSI N542-1977 PERFORMANCE CLASSIFICATION: FC33232
3. PRE-ASSY TEST EACH CAPSULE SHALL BE HELIUM LEAK TESTED
N/CERTIFICATION OF $\leq 1 \times 10^{-10}$ STD CC HE/SEC. BY APPROVED
PROCEDURE PRIOR TO KR-85 CHARGING.
4. LEAK TESTS
A. LEAK TEST PER NEN PROCEDURE NO. 235-023, LIMIT TO BE
ONE MICROCURIE/24 HOURS AT INITIAL FILL PRESSURE.
B. SOURCE SURFACE AND SHIPPING CONTAINER CONTAMINATION TO
BE $\leq 1 \times 10^{-3}$ uCi BY MOIST SWEEP TEST.
5. MODEL NER-584 SOURCE CAPSULE DESIGNATION TO BE KB751...
HAVING A SINGLE LETTER SUFFIX (A, B, ETC.) TO SPECIFY
A UNIQUE CAPSULE SIZE. AN ASS'Y SPECIFICATION IS RE-
QUIRED FOR EACH CONFIGURATION WITH ATTACHMENT OR
MOUNTING HARDWARE INCORPORATED.
6. MINIMUM SOURCE 'LABEL' TO BE ENGRAVED INTO SOURCE CAPSULE
TO BE: P, HEI, HE/YY, AND SERIAL NO.
7. CAPSULE MATERIAL TO BE C.P. TITANIUM WHICH CONFORMS TO
'AMS SPEC. NO. 4901' FOR SHEET STOCK AND 'AMS SPEC. NO.
4901' FOR BAR STOCK.

NOTE: ATTACHMENT B MOUNTING HARDWARE
SPECIFICATIONS NOT SHOWN - SEE NOTE 5.

QUANTITY		PART NO. OR IDENTIFYING NO.		NOMENCLATURE OR DESCRIPTION		FIGURE NO.	
PARTS LIST							
NEW ENGLAND NUCLEAR CORP. Billerica, Massachusetts							
DRAWN BY: P. LADANCE		DATE: 4/8/82		NER-584 SOURCE DESIGN CONTROL SPECIFICATION			
CHECKED BY: J. SUMNER		DATE: 4/8/82					
CAPSULE MFG.:		REV. NO.:		REV. NO.:		REV. NO.:	
SEE NOTE 7		B		313-467		REV.	
TOTAL ASSY:		SCALE:		TEST ASSY:		SHEET	
		N = 5				OF	