

EXHIBIT I

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES

SAFETY EVALUATION OF SEALED SOURCE

NO.: CA598S119SDATE: April 2, 1990PAGE: . 1 of 6 PagesSEALED SOURCE TYPE: Gamma SourceMODEL: 6810DISTRIBUTOR: J. L. Shepherd and Associates
1010 Arroyo Street
San Fernando, California 91340MANUFACTURERS: General Electric Company, Nuclear Center
P.O. Box 460, Pleasanton, CA 94566Westinghouse Hanford
P.O. Box 1970, Richland, WA 49352Oak Ridge National Laboratory Note: (Old mfr.)
Bldg. 3037, Oak Ridge, TN 37830C.E.A. Department Des Radioelements
B.P.No. 2, 91 Gif-Sur-Yvette, FranceISOTOPE: Cesium-137MAXIMUM ACTIVITY: Up to 14,000 curies per
capsuleLEAK TEST FREQUENCY: Six monthsPRINCIPAL USE: Gamma Irradiator or Calibrator Category I (J)CUSTOM DEVICE: ☐ YES ☒ NOCUSTOM USER: ☐ YES ☒ NO

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SEALED SOURCE TYPE: Gamma SourceModel: 6810Description:

The Model 6810 source capsules are designed to be used in irradiators, calibrators and dry well facilities (Category 2 facilities). Sources used in free air calibration will be low-curie levels (less than 500 Curies) and can be independent of a device other than a storage shield. Generally the empty capsules are fabricated at the distributor's facility from stainless steel and shipped to an encapsulator (General Electric Co., Westinghouse Hanford, or CEA Department Des Radioelements) where they are loaded with radioactive material (provided by Oak Ridge National Labs.), doubly encapsulated and sealed by heliarc welding. "Special Form" certification is by the company that provides the capsule body (usually J.L. Shepherd but sometimes the encapsulator). Note: Older sealed sources were encapsulated by ORNL and the reviewer may encounter some of these sources.

There are three source categories based on physical dimensions and quantity of radioactivity in the source capsule. The basic categories are listed below in Table 1. A source holder is provided (Figure 2) that is machined to fit each category of capsule. Each source holder is designed to have a clearance of 0.25 inches with each source capsule. These sources should be used only in the J.L. Shepherd and Assoc. devices and/or shielding containers where a source holder is provided that is of compatible size to the source.

Table 1 Source Categories

Category	Diameter	Length	Minumum Tubing	End	Final
			Thickness	Cap size	Cap Size
1	11/16" or less	1/2 to 15.5"	.02"	.035"	.05"
2	11/16 to 1.5"	1" to 15.5"	.035"	.035"	.05"
3	1.5 " to 3.5"	1" to 15.5 "	.049"	.04"	.10"

Sources greater than 3.5 inches in diameter are considered to be custom sources and must have an independent evaluation.

LABELING: Each capsule is etched with the following information; GEC ----(4 digits corresponding to the J.L. Shepherd and Associates P.O., --- (3 digits, serial number of source). The sources containing large curie quantities are normally in heavily shielded devices bearing a label revealing the type, quantity of radioactive material and serial number. Low-curie sources designed to be handled outside of devices are normally fixed in a holder that provides the additional information (date, source type, activity level).

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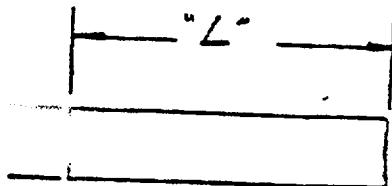
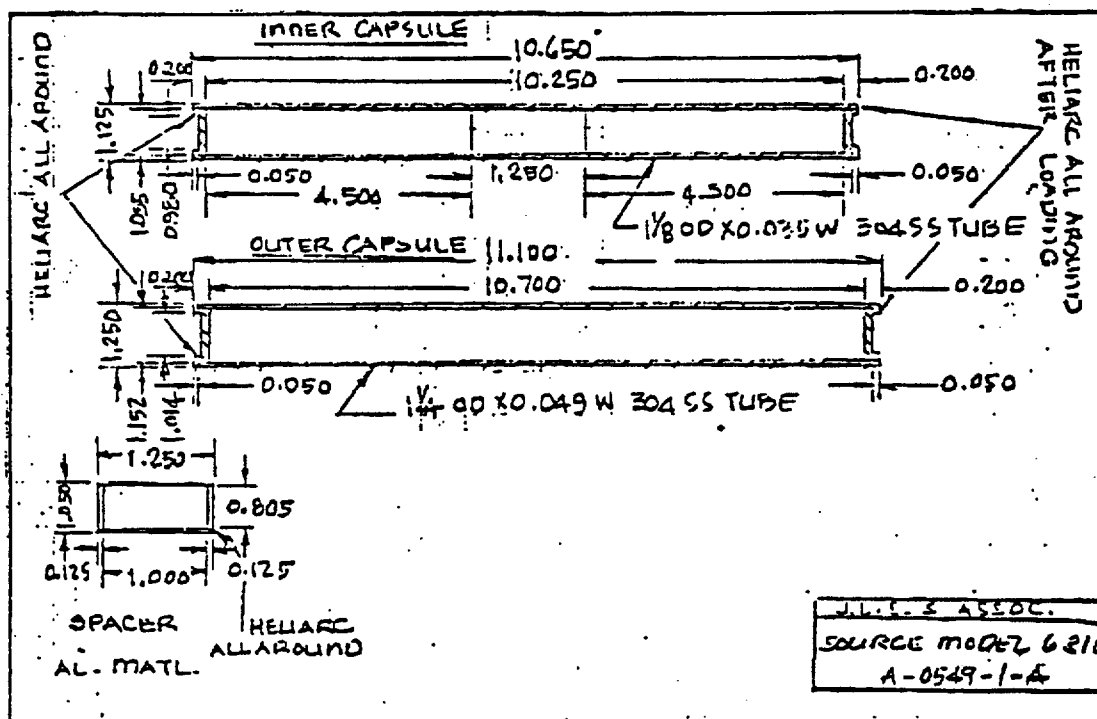
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Model: 6810

SEALED SOURCE TYPE: Gamma Source

DIAGRAM: Figure 1



	CAT. (1)	CAT. (2)	CAT. (3)
D	$\frac{1}{4}" \text{ DIA} \rightarrow \frac{11}{16}" \text{ DIA}$	$\frac{11}{16}" \text{ DIA} \rightarrow 1.5" \text{ DIA}$	$1.5" \text{ DIA} \rightarrow 3.5" \text{ DIA}$
L	$\frac{1}{2}" \rightarrow 15.5"$	$1" \rightarrow 15.5"$	$1" \rightarrow 15.5"$

Figura 1

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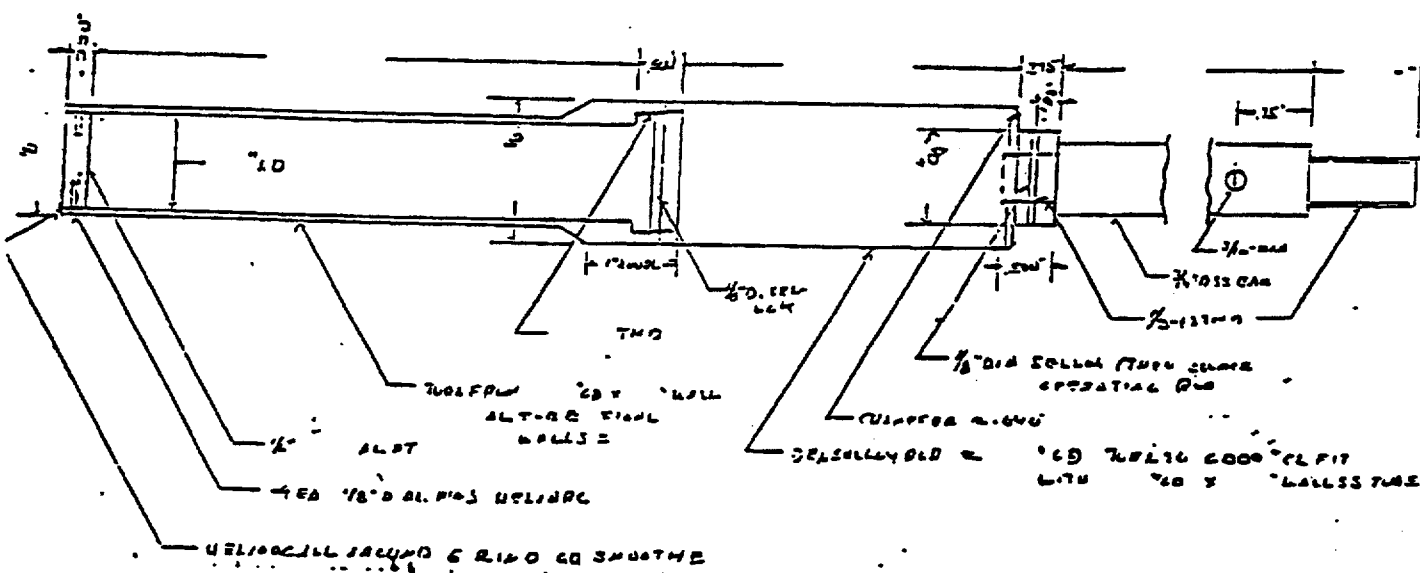
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DIAGRAM (Cont) :

FIGURE 2
SOURCE HOLDER



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SEALED SOURCE TYPE: Gamma SourceModel: 6810CONDITIONS OF NORMAL USE:

These sources are designed to be used only in J. L. Shepherd and Associates, irradiators/calibrators, where a standard size source holder is used. Sources and devices in turn are designed for use under standard laboratory conditions: temperature range 10-50 degrees C, non-corrosive atmospheres and vibration levels associated with normal laboratories.

PROTO-TYPE TESTING:

Prototype sources have been tested and certified to meet "Special Form" requirements according to 49 CFR 173.469 and designated as having an ANSI classification of ANSI 77E-43424. A record of production of these types of sources has been established over at least 20 years with no reported breach of source integrity.

EXTERNAL RADIATION LEVELS:

At a maximum loading of 14,000 curies of Cs-137, radiation levels are calculated to be:

- A. 5 cm: 1,840,000 R/hr
- B. 30 cm: 51,300 R/hr
- C. 100 cm: 4,620 R/hr

QUALITY ASSURANCE AND CONTROL:

All capsule bodies are constructed in accordance with J. L. Shepherd and Associates Quality Control Manual QA-RM-001-A, which covers engineering design through final fabrication approval. Quality Control of source encapsulation is also controlled by the manufacturer's Quality Assurance Programs.

LIMITS AND/OR OTHER CONSIDERATIONS OF USE:

- A. These sources shall be distributed only to specific licensees of the U.S. NRC or Agreement States.
- B. These sources shall be tested for leakage and/or contamination at intervals not to exceed six (6) months. Such tests shall be done by qualified individuals and shall be capable of detecting 0.005 microcurie of removable radioactive material.

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LIMITS AND/OR OTHER CONSIDERATIONS OF USE - (Continued)

- C. The sources are designed to be used in irradiators, calibrators or dry well facilities.
- D. The sources are designed for use only in J.L. Shepherd and Assoc. source holders and devices.
- E. The sources shall be used only in a laboratory environment of noncorrosive atmosphere and normal temperature.
- F. This registration sheet and the information contained within the references shall not be changed without the written consent of the California Department of Health Services.

SAFETY ANALYSIS SUMMARY:

Based on the review of the information and data contained in references listed below, the Department concludes that the Model 6810 sealed source can be safely used for purposes intended.

REFERENCES:

- A. Application for Radiation Safety Evaluation and Registration of Sealed Source; J. L. Shepherd and Associates, March 2, 1989 with letters modifying application dated June 15, 1989, and April 12, 1990, signed by J. L. Shepherd.
- B. J. L. Shepherd and Associates California Radioactive Material License Number 1777-70.
- C. J. L. Shepherd and Associates Quality Control Manual Q.A.-RM-001-A.

DATE: 5-15-90REVIEWED BY: RO FunderburgDATE: May 15, 1990CONCURRENCE: Edwin Njoh

ISSUING AGENCY: Department of Health Services