

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

NO.: NR420S107U

DATE: February 4, 1970

PAGE 1 OF 3

SEALED SOURCE TYPE: Sealed Source

MODEL: RXA, RXB, RXC, RXL, RXM, RXN

MANUFACTURER/DISTRIBUTOR: LFE Corporation
1601 Trapelo Road
Waltham, MA 02154

MANUFACTURER/DISTRIBUTOR:

ISOTOPE: Cadmium-109
Iron-55
Americium-241

MAXIMUM ACTIVITY: 10 millicuries
15 millicuries
30 millicuries

LEAK TEST FREQUENCY:

PRINCIPAL USE: Other

CUSTOM SOURCE: ☐ YES ☒ NO

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
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NO.: NR420S107U

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SEALED SOURCE TYPE: Sealed Source

DESCRIPTION:

The cadmium and iron sources are electroplated on copper foil and annealed in a hydrogen atmosphere. The americium is deposited as the nitrate onto an Al_2O_3 or beryllium window to a monel body using eccobond 276 epoxide binder. The radioactive source is placed against the window in the capsule and a rear plug is heliarc welded to the body.

<u>Capsule*</u>	<u>Length</u>	<u>Dimensions (Inches)</u>	
		<u>Diameter</u>	<u>Wall Thickness</u>
RXA and RXL	0.2	0.32	0.06
RXB and RXM	0.2	0.43	0.1
RXC and RXN	0.2	0.6	0.1

*Note: RXA, RXB and RXC capsules have 4 mil Be windows
RXL, RXM and RXN capsules have 40 mil Al windows

<u>Isotope</u>	<u>Maximum Activity (mCi)</u>	<u>Capsule Designations</u>
Cd-109	10	RXA, RXB, RXC
Fe-55	15	RXA, RXB, RXC
Am-241	10	RXA, RXB, RXC
Am-241	30	RXL, RXM, RXN

For their own administrative purposes, the manufacturer will identify sources using a designation which identifies the source capsule type, isotope and activity. For example, an RXA-Am-10 source would contain 10 millicuries of americium-241.

LABELING:

The isotope, activity and serial number will be engraved on each source.

The outer container in which the source is packaged will contain the same information and will in addition include: date, radiation symbol, words "Caution, Radioactive Material," and the name of the manufacturer.

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SEALED SOURCE TYPE: Sealed Source

PROTOTYPE TESTING:

These sources have been tested in accordance with USASI N5.10 1968 and have been classified as C-32231. In addition, the manufacturer has performed special tests to verify that the eccobond 276 epoxide binder retains its adhesive properties after being irradiated with up to 3×10^6 Rads.

ISSUING AGENCY:

U.S. Atomic Energy Commission



A Mark IV Company

July 12, 1995

Mr. John W. Lubinski, Mechanical Engineer
Sealed Source Safety Section
Source Containment and Devices Branch
Division of Industrial and Medical Nuclear Safety
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Mr. Lubinski:

This letter concerns the Group 3 registrations listed in your letter of April 13, 1995. This group consists of products designed, manufactured, and distributed by LFE prior to 1969. In 1969, these products and others were sold to International Chemical and Nuclear Corporation (now known as ICN Pharmaceuticals). The current address is:

3300-T Hyland Avenue
Costa Mesa, CA 92626
Tel. (714) 545-0100

With the sale of these products, all drawings, documentation, and records were transferred to ICN. Therefore, drawings, conditions of use, labels, radiation levels, prototype testing, and other information is not available at LFE. LFE will not accept the return of sources in this group. LFE has received no report of leaking sources pertaining to Group 3. Please see the individual registrations for further comments.

Very truly yours,

William R. Prendergast
Radiation Safety Officer
LFE Industrial Systems Corporation

WRP/ddl
Enclosure

55 Green Street
Clinton,
Massachusetts
01510
Telephone
(508) 365-3400

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

NO.: NR-420-S-806-S

DATE:

PAGE 1 OF 4

SEALED SOURCE TYPE: Sealed Source

MODEL: RXA, RXB, RXC, RXL, RXM, RXN

MANUFACTURER/DISTRIBUTOR:

LFE Industrial Systems Corporation
55 Green Street
Clinton, MA 01510

ISOTOPE:

Cadmium-109
Iron-55
Americium-241

MAXIMUM ACTIVITY:

10 millicuries (370 MBq)
15 millicuries (555 MBq)
30 millicuries (1110 MBq)
* see description for activity
for each source

LEAK TEST FREQUENCY: 6 Months

PRINCIPAL USE: (U) X-Ray Fluorescence

CUSTOM SOURCE: _____ YES _____ X _____ NO

NID DRAWINGS AVAILABLE

WRP

7-11-95

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

NO.: NR-420-S-806-S

DATE:

PAGE 2 OF 4

SEALED SOURCE TYPE: Sealed Source

DESCRIPTION:

The cadmium and iron sources are electroplated on copper foil and annealed in a hydrogen atmosphere. The americium is deposited as the nitrate onto an Al_2O_3 or beryllium window to a monel body using eccobond 276 epoxide binder. The radioactive source is placed against the window in the capsule and a rear plug is heliarc welded to the body.

Capsule	Dimensions					
	Length		Diameter		Wall Thickness	
	inches	mm	inches	mm	inches	mm
RXA, RXL	0.2	5.1	0.32	8.1	0.06	1.5
RXB, RXM	0.2	5.1	0.43	10.9	0.1	2.5
RXC, RXN	0.2	5.1	0.6	15.2	0.1	2.5

Note: RXA, RXB and RXC capsules have 0.004" (0.1 mm) Be windows.
RXL, RXM and RXN capsules have 0.040" (1.0 mm) Al windows.

<u>Isotope</u>	<u>Maximum Activity</u> mCi/MBq	<u>Capsule Designations</u>
Cd-109	10/370	RXA, RXB, RXC
Fe-55	15/555	RXA, RXB, RXC
Am-241	10/370	RXA, RXB, RXC
Am-241	30/1110	RXL, RXM, RXN

For their own administrative purposes, the manufacturer will identify sources using a designation which identifies the source capsule type, isotope and activity. For example, an RXA-Am-10 source would contain 10 millicuries of americium-241.

LABELING:

Each source is engraved with its serial number, isotope, and activity.

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

NO.: NR-420-S-806-S

DATE:

PAGE 3 OF 4

SEALED SOURCE TYPE: Sealed Source

CONDITIONS OF NORMAL USE:

The sealed sources are designed for use in x-ray fluorescence analyzers and other laboratory equipment.

PROTOTYPE TESTING: NO INFORMATION AVAILABLE

A prototype of the source designs were tested to the specifications of ANSI N5.10 1968 and achieved a classification of C32231.

EXTERNAL RADIATION LEVELS:

NO INFORMATION AVAILABLE

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- The sealed source may be used by specific licensees of NRC or Agreement States.
- Handling, storage, use, transfer, and disposal: To be determined by the licensing authority.
- Each source shall not be subjected to conditions which exceed its ANSI classification.
- The sealed source shall be leak tested at intervals not to exceed 6 months using techniques capable of detecting 0.005 microcurie (185 Bq) of removable contamination.
- This registration sheet and the information contained within the references shall not be changed without the written consent of the NRC.

SAFETY ANALYSIS SUMMARY:

LFE distributed this device prior to 1969. However, in 1969 the product line was sold and all the information that LFE has concerning the device is contained in this certificate.

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

NO.: NR-420-S-806-S

DATE:

PAGE 4 OF 4

SEALED SOURCE TYPE: Sealed Source

REFERENCES:

The following supporting documents for the Models RXA, RXB, RXC, RXL, RXM and RXN sealed source are hereby incorporated by reference and are made a part of this registry document.

- LFE's letters dated September 16, 1991, and August 6, 1991.

April 13, 1995

William R. Prendergast
LFE Industrial Systems Corporation
55 Green Street
Clinton, MA 01510

Dear Mr. Prendergast:

This letter is in reference to your letter dated August 6, 1991, which requested that we transfer the registration certificates listed in column 1 of Enclosure 1 to inactive status. Columns 2 and 3 of Enclosure 1 include the new registration numbers that will be assigned to the certificates and the model numbers of the sources or devices that will be included on each new certificate. Please note that in several cases existing registration certificates have been combined into one inactive certificate.

In order to continue our evaluation your request, we need the additional information that is indicated in Enclosure 2. The table in Enclosure 2 provides a matrix which includes the new registration certificate numbers and a listing of the information necessary to complete our evaluation.

In addition to the information in Enclosure 2, please verify that the information included in the copies of draft registration certificates (Enclosure 3) is correct. Please mark any changes directly on the certificates and return them with your response. Please note that we did not include certain registration certificates (see column 9 of the table in Enclosure 2) due to not having enough information to generate a certificate.

Please note that transfer of the registration certificates to inactive status means the sources or devices included on the certificates may no longer be commercially distributed.

Once we have completed our evaluation of these certificates, we will re-evaluate the sources and devices which you are actively distributing and will re-issue the registration certificates for the products.

If you have any questions, please call me at (301) 415-7868 or Mr. Steven Baggett at (301) 415-7273.

Sincerely,

Original Signed by

John W. Lubinski, Mechanical Engineer
Sealed Source Safety Section
Source Containment and
Devices Branch
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
And Safeguards

Distribution:

SSSS Staff

SCDB r/f

SSD-91-86

NE01

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NAME	JLubinski/jl							
DATE	04/13/95							

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ENCLOSURE 1

Old Reg. Number	New Reg. Number	Model Number(s)
NR-420-D-101-U	NR-420-D-801-S	Keleket-Barnes Rotary
NR-420-D-102-U	NR-420-D-802-S	Keleket-Barnes Shperay
NR-420-D-103-U	NR-420-D-803-S	Keleket-Barnes Ceiling Mounted Unit
NR-420-S-104-S	NR-420-S-804-S	Sealed Source
NR-420-D-106-U	NR-420-D-805-S	Keleket-Barnes Flexaray
NR-420-S-107-U	NR-420-S-806-S	RXA, RXB, RXC, RXL, RXM, RXN
NR-420-D-108-U	NR-420-D-807-B	SCL-1D
NR-420-D-109-B	NR-420-D-808-B certificates were combined	BGL-7C
NR-420-D-110-G		BGL-7
NR-420-D-111-B		BGL-1C
NR-420-D-112-B	NR-420-D-809-B	BGL-1
NR-420-D-113-B	NR-420-D-810-B certificates were combined	SO-7D, SO-7E
NR-420-D-114-B		SO-7A, SO-7B, SO-7C
NR-420-D-115-B	NR-420-D-811-B	SO-1A, SO-1B, SO-1C
NR-420-D-116-B	NR-420-D-812-B certificates were combined	SN-7D, SN-7E
NR-420-D-117-B		SN-7A, SN-7B, SN-7C
NR-420-D-118-B	NR-420-D-813-B	SN-1A, SN-1B, SN-1C, SN-1D, SN-1E, SN-1F
NR-420-D-119-B	NR-420-D-814-B	SC-7D, SC-7E
NR-420-D-120-B	NR-420-D-815-B	SC-7A, SC-7B, SC-7C
NR-420-D-121-B	NR-420-D-816-B	SC-1A, SC-1B, SC-1C, SC-1D, SC-1E, SC-1F
NR-420-D-122-B	NR-420-D-817-B	SNP-UB
NR-420-D-124-B	NR-420-D-818-B	SCL-1A and SCL-1B
NR-420-D-125-G	NR-420-D-819-G	SN-P7A4
NR-420-D-126-U	NR-420-D-820-S	HSB-76 and HSB-77
NR-420-D-127-G	NR-420-D-821-G	HSB-76A and HSB-77A

ENCLOSURE 1

Old Reg. Number	New Reg. Number	Model Number(s)
NR-420-D-128-G	NR-420-D-822-G	BGL-7A
NR-420-D-132-G	NR-420-D-823-G	SNF-18
NR-420-D-133-G	NR-420-D-824-G	SSL-3
NR-420-D-136-G	NR-420-D-825-G	SU-S7
NR-420-S-137-U	NR-420-S-826-S	R-30, R-31
NR-420-S-138-U	NR-420-S-827-S	CD-1
NR-420-D-139-U	NR-420-D-828-S	SC-11
NR-420-D-140-U	NR-420-D-829-S	DH-75
NR-420-S-141-U	NR-420-S-830-S	S-75
NR-420-D-142-U	NR-420-D-831-S	AX-4
NR-420-D-143-U	NR-420-D-832-S	BG-107
NR-420-D-144-U	NR-420-D-833-S	BG-105
NR-420-D-145-U	NR-420-D-834-S	BG-7
NR-420-D-146-U	NR-420-D-835-S	BG-5
NR-420-D-147-U	NR-420-D-836-S	BG-2/5
NR-420-S-148-U	NR-420-S-837-S	S-3
NR-420-S-149-U	NR-420-S-838-S	S-4
NR-420-S-150-U	NR-420-S-839-S	S-6
NR-420-D-151-B	same as old 117	
NR-420-D-152-U	NR-420-D-840-S	SC-9C
NR-420-S-153-U	NR-420-S-841-S	S-70
NR-420-S-154-U	NR-420-S-842-S	S-9
NR-420-S-155-U	NR-420-S-843-S	R-58, R-59
NR-420-S-156-U	NR-420-S-844-S	CS-15
NR-420-S-157-U	NR-420-S-845-S	CD-15
NR-420-S-158-U	same as old 156	
NR-420-D-159-U	NR-420-D-846-S	SC-11A
NR-420-D-160-U	NR-420-D-847-S	Clathrate Gas Detector

ENCLOSURE 1

Old Reg. Number	New Reg. Number	Model Number(s)
NR-420-S-162-U	NR-420-S-848-S	S-6
NR-420-S-163-U	NR-420-S-849-S	CD-11
NR-420-D-164-B	NR-420-D-850-B	SNP-1B

ENCLOSURE 2

Group	New Reg. Number	1	2	3	4	5	6	7	8	9
1	NR-420-D-801-S	X								
1	NR-420-D-802-S	X								
1	NR-420-D-803-S	X								
4	NR-420-S-804-S								X	
1	NR-420-D-805-S	X								
3	NR-420-S-806-S		X			X				
4	NR-420-D-807-B		X		X		X	X		
4	NR-420-D-808-B		X		X			X		
2	NR-420-D-809-B								X	
4	NR-420-D-810-B		X	X	X		X	X		
2	NR-420-D-811-B								X	
4	NR-420-D-812-B		X	X	X		X	X		
4	NR-420-D-813-B		X		X		X	X		
2	NR-420-D-814-B								X	
4	NR-420-D-815-B		X	X	X		X	X		
4	NR-420-D-816-B		X		X		X	X		
4	NR-420-D-817-B		X	X	X		X	X		
4	NR-420-D-818-B		X		X		X	X		
4	NR-420-D-819-G		X	X	X		X	X		
4	NR-420-D-820-S		X		X			X		
2	NR-420-D-821-G								X	
2	NR-420-D-822-G								X	
2	NR-420-D-823-G								X	
4	NR-420-D-824-G		X	X	X	X				
4	NR-420-D-825-G		X	X	X	X	X			X
3	NR-420-S-826-S						X			
3	NR-420-S-827-S					X	X			
2	NR-420-D-828-S								X	

ENCLOSURE 2

Group	New Reg. Number	1	2	3	4	5	6	7	8	9
4	NR-420-D-829-S		X	X	X			X		
4	NR-420-S-830-S		X		X					
3	NR-420-D-831-S						X			
2	NR-420-D-832-S								X	
2	NR-420-D-833-S								X	
2	NR-420-D-834-S								X	
2	NR-420-D-835-S								X	
2	NR-420-D-836-S								X	
4	NR-420-S-837-S		X	X	X	X	X			X
4	NR-420-S-838-S		X	X	X	X	X			X
4	NR-420-S-839-S		X	X	X	X	X			X
4	NR-420-D-840-S		X		X		X	X		
4	NR-420-S-841-S		X	X	X	X	X			X
2	NR-420-S-842-S								X	
3	NR-420-S-843-S		X				X	X		
3	NR-420-S-844-S			X			X	X		
3	NR-420-S-845-S			X			X	X		
2	NR-420-D-846-S								X	
3	NR-420-D-847-S				X			X		
4	NR-420-S-848-S		X	X	X	X	X			X
3	NR-420-S-849-S			X		X				
4	NR-420-D-850-B		X		X			X	X	

ENCLOSURE 2

LEGEND:

Groups:

- 1 Keleket-Barnes Units.
- 2 Products which were never distributed.
- 3 Product lines which were sold in 1969.
- 4 Products for which you provided number of units distributed.

Information which is necessary to complete our evaluation:

Column

- 1 Source model designation and the name and address of the manufacturer of the device.
- 2 Drawings showing the complete construction of the product.
- 3 Conditions under which the product is designed to be used.
- 4 Information which is included on the labeling of the product and the construction of the labeling (e.g., steel labels with engraved information, engraved directly on the source)
- 5 The maximum radiation levels, during use, in the beam of the product, on its surface, and at 30 and 100 cm from the product.
- 6 Tests performed on prototypes of the products and the results of such tests.
- 7 The maximum radiation levels, during use, in the beam of the product and on its surface.
- 8 Verification that the registration certificate is complete and accurate. No additional information is necessary.
- 9 A draft of the registration is not included.

Additional Information:

- For all products in groups 1, 3, and 4, please provide a listing of the types of services you will provide for the products. Please include whether LFE will receive the product for disposal, provide source exchanges, or will service or repair devices.
- A letter dated June 20, 1986, has been referenced in documents pertaining to many of the registration certificates. However, our files do not include a copy of the letter. If LFE has a copy of the letter, please include it with your response to this letter.

ENCLOSURE 3

COPIES OF DRAFT REGISTRATION CERTIFICATES

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

NO.: NR-420-S-806-S

DATE:

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SEALED SOURCE TYPE: Sealed Source

MODEL: RXA, RXB, RXC, RXL, RXM, RXN

MANUFACTURER/DISTRIBUTOR:

LFE Industrial Systems Corporation
55 Green Street
Clinton, MA 01510

ISOTOPE:

Cadmium-109
Iron-55
Americium-241

MAXIMUM ACTIVITY:

10 millicuries (370 MBq)
15 millicuries (555 MBq)
30 millicuries (1110 MBq)
* see description for activity
for each source

LEAK TEST FREQUENCY: 6 Months

PRINCIPAL USE: (U) X-Ray Fluorescence

CUSTOM SOURCE: _____ YES _____ X _____ NO

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

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SEALED SOURCE TYPE: Sealed Source

DESCRIPTION:

The cadmium and iron sources are electroplated on copper foil and annealed in a hydrogen atmosphere. The americium is deposited as the nitrate onto an Al₂O₃ or beryllium window to a monel body using eccobond 276 epoxide binder. The radioactive source is placed against the window in the capsule and a rear plug is heliarc welded to the body.

Capsule	Dimensions					
	Length		Diameter		Wall Thickness	
	inches	mm	inches	mm	inches	mm
RXA, RXL	0.2	5.1	0.32	8.1	0.06	1.5
RXB, RXM	0.2	5.1	0.43	10.9	0.1	2.5
RXC, RXN	0.2	5.1	0.6	15.2	0.1	2.5

Note: RXA, RXB and RXC capsules have 0.004" (0.1 mm) Be windows.
RXL, RXM and RXN capsules have 0.040" (1.0 mm) Al windows.

<u>Isotope</u>	<u>Maximum Activity</u> mCi/MBq	<u>Capsule Designations</u>
Cd-109	10/370	RXA, RXB, RXC
Fe-55	15/555	RXA, RXB, RXC
Am-241	10/370	RXA, RXB, RXC
Am-241	30/1110	RXL, RXM, RXN

For their own administrative purposes, the manufacturer will identify sources using a designation which identifies the source capsule type, isotope and activity. For example, an RXA-Am-10 source would contain 10 millicuries of americium-241.

LABELING:

Each source is engraved with its serial number, isotope, and activity.

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SEALED SOURCE TYPE: Sealed Source

CONDITIONS OF NORMAL USE:

The sealed sources are designed for use in x-ray fluorescence analyzers and other laboratory equipment.

PROTOTYPE TESTING:

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EXTERNAL RADIATION LEVELS:

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- The sealed source may be used by specific licensees of NRC or Agreement States.
- Handling, storage, use, transfer, and disposal: To be determined by the licensing authority.
- Each source shall not be subjected to conditions which exceed its ANSI classification.
- The sealed source shall be leak tested at intervals not to exceed 6 months using techniques capable of detecting 0.005 microcurie (185 Bq) of removable contamination.
- This registration sheet and the information contained within the references shall not be changed without the written consent of the NRC.

SAFETY ANALYSIS SUMMARY:

LFE distributed this device prior to 1969. However, in 1969 the product line was sold and all the information that LFE has concerning the device is contained in this certificate.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
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NO.: NR-420-S-806-S

DATE:

PAGE 4 OF 4

SEALED SOURCE TYPE: Sealed Source

REFERENCES:

The following supporting documents for the Models RXA, RXB, RXC, RXL, RXM and RXN sealed source are hereby incorporated by reference and are made a part of this registry document.

- LFE's letters dated September 16, 1991, and August 6, 1991.