

## MATERIALS LICENSE

Amendment No. 56

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438 and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee		In accordance with letter dated February 5, 1992,
1. LFE Industrial Systems Corporation		3. License number 20-01382-02 is amended in its entirety to read as follows:
2. 55 Green Street Clinton, Massachusetts 01510		4. Expiration date January 31, 1994
		5. Docket or Reference No 030-04598
6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Strontium 90	A. Sealed sources	A. Not to exceed 150 millicuries per source
B. Krypton 85	B. Sealed sources	B. Not to exceed 1.5 curies per source
C. Americium 241	C. Sealed sources	C. Not to exceed 1 curie per source
D. Cobalt 60	D. Sealed sources	D. Not to exceed 1 curie per source
E. Cesium 137	E. Sealed sources	E. Not to exceed 1 curie per source
F. Promethium 147	F. Sealed sources	F. Not to exceed 150 millicuries per source
9. Authorized use		
A. through F. For use and/or possession incident to:		
(1) Research, development, manufacture, and testing of gauging devices.		
(2) Installation into or removal from gauging devices.		
(3) Installation, relocation, repair, and servicing of LFE Corporation devices and the other devices described in the licensee's application dated May 26, 1978 including the leak testing of sealed sources and radiation surveys of devices.		
(4) Calibration of radiation survey and measuring instruments.		
(5) Picking-up, storing, and transferring sealed sources and devices manufactured by LFE Corporation and other devices described in application dated May 26, 1978 received from customers for disposal.		
(6) Distribution in the gauging devices specified in Condition 10 of this license or other gauging devices (e.g., custom devices to persons authorized to receive the licensed material pursuant to terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or any Agreement State.		
(7) Instruction and training of individuals in the use of gauging devices.		

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MATERIALS LICENSE  
SUPPLEMENTARY SHEET

License number

20-01382-02

Docket or Reference number

030-04598

Amendment No. 56

## CONDITIONS

10. Except for custom-made devices, each device distributed under this license shall be in accordance with the following table:

Device Model Number	Type	Source Model Number	Isotope	Maximum Activity per source (millicuries)
A. BGL-1	"O" Frame	S2-A2 or NER-592 or S1F.D1	Sr 90	50
B. BGL-1C	"C" Frame	S2-A2 or NER-592 or S1F.D1	Sr 90	50
C. BGL-7	"O" Frame	S-6	Kr 85	500
D. BGL-7A	"O" Frame	S-6	Kr 85	750
E. BGL-7C	"C" Frame	S-6	Kr 85	500
F. SC-1A through SC-1F	"C" Frame	S-10	Sr 90	100
G. SC-7A through SC-7C	"C" Frame	S-70	Kr 85	1200
H. SC-7D through SC-7E	"C" Frame	S-6	Kr 85	750
I. SCL-1A and SCL-1B	"O", "MO", or "C" Frame	S2-A2 or NER-592 or S1F.D1	Sr 90	50
J. SCL-7A or SCL-7B or SCL-7C or SCL-77A	"O", "MO", or "C" Frame	LFE S-6A or LFE S-70A or Amersham KAC.D1 or Amersham KAC.D3	Kr 85 Kr 85 Kr 85 Kr 85	500 (S-6A) 1200 (S-70A) 1000 (KAC.D1) 750 (KAC.D3)
K. SN-1A through SN-1F	"N" Frame	S-10	Sr 90	100
L. SN-1A through SN-1F	"N" Frame	S2-A2 or NER-592 or S1F.D1	Sr 90	50
M. SN-7A through SN-7C	"N" Frame	S-70A	Kr 85	1200
N. SN-7D and SN-7E	"N" Frame	S-6A	Kr 85	750
O. SNP-7B	"N" Frame	S-70A	Kr 85	1200
P. SO-1A through SO-1C	"O" Frame	S-10	Sr 90	100
Q. SO-7A and SO-7C	"O" Frame	S-70	Kr 85	1200
R. SO-7D and SO-7E	"O" Frame	S-6A	Kr 85	750
S. SN-P7A4	"N" Frame	S-4	Kr 85	450
T. FSB-76	FAB	S-76	Kr 85	500
U. HUB-76A	FAB	S-76A	Kr 85	500
V. HUB-77A	FAB	S-77A	Kr 85	1200
W. HUB-SS-1	FAB	SS-1	Sr 90	20
X. HUB-SS-3	FAB	SS-3	Am 241	1000
Y. SCL-1C	"O", "MO", or "C" Frame	S2-A2 or NER-592 or S1F.D1	Sr 90	150 (S2-A2) 100 (NER-592 or S1F.D1)
Z. SNP-1B	"N" Frame	S2-A2 or NER-592 or S1F.D1	Sr 90	100

MATERIALS LICENSE  
SUPPLEMENTARY SHEET

License number

20-01382-02

Docket or Reference number

030-04598

Amendment No. 56

(10. continued)

## CONDITIONS

Device Model Number	Type	Source Model Number	Isotope	Maximum Activity per source (millicuries)
AA. SSL-3	"C" Frame	SS-3	Am 241	1000
BB. SSU-S3	"O", "MO", or "C" Frame	SS-3A	Am 241	1000
CC. SU-P77A and SU-77A	"O", "MO", "C" Frame	LFE S-70A or	Kr 85	1200 (S-70A)
		Amersham KAC.D1 or	Kr 85	1000 (KAC.D1)
		Amersham KAC.D3 or	Kr 85	750 (KAC.D3)
		LFE S2-A2 or	Sr 90	100 (S2-A2)
		New England Nuclear NER-592 or	Sr 90	100 (NER-592)
DD. SU-S7	"O", "MO", or "C" Frame	Amersham S1F.D1	Sr 90	100 (S1F.D1)
		SS-7A	Kr 85	1200
EE. SCL-1D	"O", "MO", or "C" Frame	S2-A2; NER-592 or S1F.D1	Sr 90	100

USER LEAK TEST INTERVAL: 6 months for all sealed sources except Krypton 85 sources.

11. Licensed material may be used at 55 Green Street, Clinton, Massachusetts, and at temporary job sites of the licensee anywhere in the United States where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material.
12. A. Licensed material shall be used by, or under the supervision of, S. Eakman, A. Dias, R. Bedard, W. R. Prendergast, or individuals who have completed the training described in licensee letters dated January 25, 1979, March 19, 1979, July 2, 1979, December 17, 1979, June 25, 1980, November 30, 1981, and January 25, 1982.  
B. The Radiation Safety Officer for this license is William R. Prendergast.
13. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed 3 years.  
B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.  
C. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.  
D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.

MATERIALS LICENSE  
SUPPLEMENTARY SHEET

License number

Docket or Reference number 20-01382-02

030-04598

Amendment No. 56

(13. continued)

CONDITIONS

E. Sealed sources and detector cells need not be leak tested if:

- (i) they contain only hydrogen 3; or
- (ii) they contain only a gas; or
- (iii) the half-life of the isotope is 30 days or less; or
- (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
- (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

F. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source shall be removed from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source involved, the test results, and corrective action taken.

G. The licensee is authorized to collect leak test samples for analysis by the licensee. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.

14. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material".



MATERIALS LICENSE  
SUPPLEMENTARY SHEET

License number

20-01382-02

Docket or Reference number

030-04598

Amendment No. 56

(Continued)

CONDITIONS

15. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Application dated May 26, 1978
- B. Letter dated January 25, 1979
- C. Letter dated February 26, 1979
- D. Letter dated March 19, 1979
- E. Letter dated July 2, 1979
- F. Letter dated December 17, 1979
- G. Letter dated January 9, 1980
- H. Letter dated June 25, 1980
- I. Letter dated May 21, 1981
- J. Letter dated September 11, 1981
- K. Letter dated November 2, 1981
- L. Letter dated November 3, 1981
- M. Letter dated November 30, 1981
- N. Letter dated December 4, 1981
- O. Letter dated December 18, 1981
- P. Letter dated January 25, 1982
- Q. Letter dated March 1, 1982
- R. Letter dated August 20, 1982
- S. Letter dated June 20, 1985
- T. Letter dated November 16, 1987

For the U.S. Nuclear Regulatory Commission

Original Signed By:

Francis M. Coster

By

Nuclear Materials Safety Branch  
Region I

King of Prussia, Pennsylvania 19406

Date

JUN 02 1992

JUN 02 1992

License No. 20-01382-02  
Docket No. 030-04598  
Control No. 116168

LFE Industrial Systems Corporation  
ATTN: William R. Prendergast  
Radiation Safety Officer  
55 Green Street  
Clinton, Massachusetts 01510

Dear Mr. Prendergast:

Please find enclosed an amendment to your NRC Material License.

Please review the enclosed document carefully and be sure that you understand all conditions. If there are any errors or questions, please notify the Region I Material Licensing Section, (215) 337-5093, so that we can provide appropriate corrections and answers.

Please be advised that you must conduct your program involving licensed radioactive materials in accordance with the conditions of your NRC license, representations made in your license application, and NRC regulations. In particular, please note the items in the enclosed, "Requirements for Materials Licensees."

Since serious consequences to employees and the public can result from failure to comply with NRC requirements, the NRC expects licensees to pay meticulous attention to detail and to achieve the high standard of compliance which the NRC expects of its licensees.

You will be periodically inspected by NRC. A fee may be charged for inspections in accordance with 10 CFR Part 170. Failure to conduct your program safely and in accordance with NRC regulations, license conditions, and representations made in your license application and supplemental correspondence with NRC will result in prompt and vigorous enforcement action against you. This could include issuance of a notice of violation, or in case of serious violations, an imposition of a civil penalty or an order suspending, modifying or revoking your license as specified in the General Policy and Procedures for NRC Enforcement Actions, 10 CFR Part 2, Appendix C.

We wish you success in operating a safe and effective licensed program.

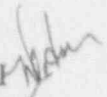
Sincerely,

Original Signed By:  
Francis M. Costello

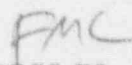
Francis M. Costello, Chief  
Research, Development &  
Decommissioning Section  
Division of Radiation Safety  
and Safeguards

Enclosures:

1. Amendment No. 56
2. Requirements for Materials Licensees

DRSS:RI   
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MEMORANDUM FOR: Francis Costello  
Region I

FROM: John W. Lubinski, Mechanical Engineer  
Sealed Source Safety Section  
Source Containment and  
Devices Branch  
Division of Industrial and  
Medical Nuclear Safety

SUBJECT: SSD TECHNICAL ASSISTANCE REQUEST:  
LFE INDUSTRIAL SYSTEMS CORPORATION  
CONTROL NO. - 115900  
LICENSE NO. - 20-01382-16G

In response to your TAR dated February 19, 1992, for the need of a SSD amendment associated with LFE's license amendment request, we have completed the amendment. Please find enclosed a copy of the amended certificate NR-420-D-135-B.

If you have any questions, please contact me at (301) 504-2689 or Mr. Steven Baggett at (301) 504-2542.

131  
John W. Lubinski, Mechanical Engineer  
Sealed Source Safety Section  
Source Containment and  
Devices Branch  
Division of Industrial and  
Medical Nuclear Safety

Enclosure: As stated

cc: GJackson, LFDCB

Distribution:

SSSS Staff	NMSS r/f	SCDB r/f	IMNS Central Files
FBrown	JGlenn	NR-420-D-135-B	

OFC: SCDB

NAME: J. Lubinski

DATE: 05/06/92

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NR420135.TAR

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MAY 08 1992

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

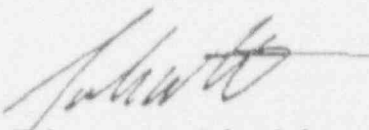
Dear Mr. Prendergast:

Based on the information and test data submitted in your letter dated February 5, 1992, with enclosures thereto, we have amended the registration for the Models SU-P77A and SU-77A to include the Model S2-A2 sealed source. We continue to conclude the devices are acceptable for licensing purposes in accordance with the conditions of the enclosed registration certificate (NR-420-D-135-B). A copy of the certificate has been forward to the appropriate reviewer for licensing action.

Please read over the registration certificate in its entirety and notify us immediately of any errors or omissions.

If you have any questions, please contact me at (301) 504-3442 or Mr. Steven Baggett at (301) 504-2542.

Sincerely,

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

Enclosure: As stated

cc: Jackson, LfDCB (w/encl.)

Distribution:

SSSS Staff	NMSS r/f	SCDB r/f	IMNS Central Files
FBrown	JGlenn	NR-420-D-135-B	

OFC: SCDB

NAME: J. Lubinski

DATE: 05/06/92

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NR420135.CMP

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(AMENDED)

NO.: NR-420-D-135-B

DATE: MAY 03 1992

PAGE 1 OF 8

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauges

MODEL: SU-P77A and SU-77A

MANUFACTURER/DISTRIBUTOR

LFE Industrial Systems Corporation  
55 Green Street  
Clinton, MA 01510

SEALED SOURCE MODEL DESIGNATION:

LFE Models: S-70A  
S2-A2  
Amersham Models: KAC.D1  
KAC.D3

ISOTOPE:

Krypton-85

Strontium-90

MAXIMUM ACTIVITY:

1200 millicuries (S-70A)  
1000 millicuries (KAC.D1)  
750 millicuries (KAC.D3)  
100 millicuries (S2-A2)

LEAK TEST FREQUENCY: 6 months for Sr-90  
Not required for Kr-85

PRINCIPAL USE: (E) Beta Gauge

CUSTOM DEVICE: \_\_\_\_\_ YES \_\_\_\_\_ X \_\_\_\_\_ NO

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(AMENDED)

NO.: NR-420-D-135-B

DATE: MAY 08 1992

PAGE 2 OF 8

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauges

DESCRIPTION:

LFE Models SU-P77A and SU-77A are used to measure product weight per unit area. Both models use encapsulated krypton-85 gas or solid strontium-90. The devices consist of three main parts: the source head, the detector, and the frame. The detector measures the change in beta radiation due to the absorption by the product material. The source head and detector are attached to a mechanical frame that allows the source head and detector to transverse back and forth across the product. The source head and detector can be attached to three different frame configurations designated as "O", "MO", or "C" type frame (see attachment 1). In all cases the detector is attached to the top arm of the frame and the source head is attached to the bottom arm of the frame.

Sealed sources are placed in a cast iron box 6 inches square by 3.625 inches high. The box houses the source, shutter, cylinder, and shutter mechanism. Model SU-P77A contains a pneumatic cylinder whereas Model SU-77A contains an electric cylinder. Both systems have a fail-safe shutter design in that if the air supply or current supply fails, or shuts off, a spring attached to the end of the cylinder shaft returns the shutter to the closed position. Another safety feature equipped on both models is a visible check of the shutter's position. The edge of the shutter has a green and red painted section on it which is visible through an acrylic window located in the side of the box. If the green surface is seen through the window it indicates the shutter is closed, "safe" position, if a red surface is seen then the shutter is in the "open" position.

The shutter mechanism consists of a clevis, compression spring, two levers, roll pin, pivot block, and shutter. When the cylinder engages a shaft is pulled back against the safety spring and rotates the levers which move the shutter to the open position. Disengaging the power supply causes the shutter to return to the closed position.

A gasket is bonded to the cast iron box perimeter and then a 10 inch diameter lid is attached with screws. The lid houses a collimator and aluminum or stainless steel window. The collimator is placed in the lid and then an O-ring gasket is

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(AMENDED)

NO.: NR-420-D-135-B

DATE: 1 1 1972

PAGE 3 OF 8

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauges

DESCRIPTION (Cont.):

fitted in place. An aluminum or stainless steel window is stretched over the collimator and held in place with a clamp ring.

One of five collimators can be used with each device and are notated as collimator "A" (D251553 or B241560), collimator "B" (D251554 or B241561), collimator "C" (D251555 or B241562), collimator "H" (A953542) or collimator "F" (D241558). The collimator has an outside diameter of 1.125 inches and is 0.250 inches thick (see attachment 4). The radiation beam produced by collimator "A", "B", "C", and "H" is oval in shape and is 1 inch by 0.5 inches if collimator "A" is used, 1 inch by 0.375 inches if collimator "B" is used, 1 inch by 0.250 inches if collimator "C" is used, and 1 inch by 0.125 inch if collimator "H" is used. The radiation beam produced by collimator "F" is circular in shape with a diameter of 0.350 inches. Collimators "A", "B", and "C" are used with Kr-85 sources only. Collimator "F" is used with Sr-90 sources. Collimator "H" is used with both Kr-85 and Sr-90 sources.

A stainless steel holder will be used to adapt Amersham's KAC.D1 and KAC.D3 and LFE's S2-A2 sources in order to secure them to LFE's devices.

The sources are attached by two machine screws and lock washers to the source support plate which is attached to the box by use of spacers and three machine screws and lock washers.

DIAGRAM:

See attachments 1-3.

LABELING:

The devices are labeled in accordance with Section 20.203, 10 CFR Part 20. Devices distributed to persons generally licensed are labeled in accordance with Section 32.51, 10 CFR Part 32. The labels are made of stainless steel and are permanently attached by drive screws to the devices. Also included on the label is a warning that removal of the labels is prohibited.



REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(AMENDED)

NO.: NR-420-D-1.5-B

DATE: MAY 6 1992

PAGE 4 OF 8

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauges

CONDITIONS OF NORMAL USE:

The devices are used in process lines to measure the product weight per unit area of plastics, paper, rubber, and similar materials.

The devices are used in factories having environments that are fit for human occupancy. The surface temperature of the device is not expected to reach temperatures in excess of 100°F.

Access to the radiation beam is restricted due to both the location of the device in the process line and the measuring gap between the source and detector. The usual gap for Kr-85 is 5/8 inches with a maximum gap of two inches. The usual gap for Sr-90 is approximately 1-1/8 inches with a maximum of four inches.

PROTOTYPE TESTING:

LFE Corporation has performed prototype tests on the above models. A bench test was performed in which the device was actuated to open and close the shutter for 8,000 cycles. The prototypes were then placed in each of four possible mount orientations for 35,000 additional cycles.

The prototypes were then placed in an oven with an environmental temperature of 250°F, and subjected to 30,000 more cycles. At the end of each test, the prototypes were examined. After the completion of over 70,000 cycles (estimated 90 year life expectancy for normal industrial use of these devices) the prototypes operated with no mechanical failures.

Sealed source Model S-70A was approved and has been in use since 1965.

The manufacturer of sealed source Models KAC.D1, KAC.D3, and S2-A2 have tested prototype models in accordance with ANSI N542-1977 and the prototype sealed sources achieved ANSI classifications 77C33232, 77C43232, and 77C54343 respectively.

The devices have been used in an industrial environment since 1973 with no reported incidents.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(AMENDED)

NO.: NR-420-D-135-B

DATE: MAY 6 1992

PAGE 5 OF 8

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauges

EXTERNAL RADIATION LEVELS:

The manufacturer reports the following external radiation levels from the device when loaded with a 500 mCi, krypton-85 sealed source:

<u>Distance (cm)</u>	<u>Max. Radiation Level (mR/hr)</u>	
	<u>Shutter open</u>	<u>Shutter closed</u>
30	2.4	1.7
100	0.4	.3

The manufacturer reports the following external radiation levels from the device when loaded with a 50 mCi, strontium-90 sealed source:

<u>Distance (cm)</u>	<u>Max. Radiation Level (mR/hr)</u>	
	<u>Shutter open</u>	<u>Shutter closed</u>
30	2.4	2.2
100	0.4	0.4

QUALITY ASSURANCE AND CONTROL:

LFE has supplied an adequate Quality Control Policy which is on file with the Source Containment and Devices Branch. LFE's Quality Control Policy includes the following:

- Design Control
- Procurement Document Control
- Instructions, Procedures, and Drawings
- Document Control
- Inspection
- Non-Conforming Material Parts, or Components
- Quality Assurance Records

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- The devices may be distributed to specific or general licensees of NRC or an Agreement State.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(AMENDED)

NO. 1 NR-420-D-135-B

DATE: MAY 28 1992

PAGE 6 OF 8

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauges

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE (Cont.):

- Handling, storage, use, transfer, and disposal: To be determined by the licensing authority.
- When distributed to general licensees, the devices shall be installed and initially tested for proper operation of the source exposure mechanism, safety warning components, labels, and external radiation levels by LFE or other persons specifically licensed by NRC or an Agreement State to do so.
- The devices shall be leak tested at intervals not to exceed 6 months using techniques capable of detecting 0.005 microcurie 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:

The sealed sources Models KAC.D1, KAC.D3 and S2-A2 have achieved ANSI N542 classifications of 77C33232, 77C43232 and 77C64343 respectively. Sealed source Model S-70A has been in use since 1965 with no reported incidents. This indicates that temperature, pressure, impact, vibration, and puncture stresses imposed during use are highly unlikely to cause breach of containment integrity of the capsule. During use the source is sealed within the housing such that the source is protected against possible airborne corrosive and other types of contaminants. Protection provided by the source housing further assures radiation material containment in the event of an accident.

It is not expected that personnel will have access to the radiation beam due to the location of the device in the process line and the preset maximum two inch gap for Kr-85 and four inch gap for Sr-90 devices between the source housing and the detector.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(AMENDED)

NO. 1 NR-420-D-130-B

DATE: MAY 28 1992

PAGE 7 OF 8

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauges

SAFETY ANALYSIS SUMMARY SECTION (Cont.):

The devices will be used in an industrial environment; however, these environments are not expected to be severe because of the need to protect the detection system.

A number of these units have been in operation since 1973 throughout the country. LFE's experience shows that these devices provide adequate radiation protection.

The LFE Corporation has submitted sufficient information to provide reasonable assurance that:

- The device can be safely operated by persons not having training in radiological protection.
- Under ordinary conditions of handling, storage, and use of the device, the byproduct material contained in the device will not be released or inadvertently removed from the source housing, and it is unlikely that any person will receive in any period of one calendar quarter a dose in excess of 10 percent of the limits specified in the table in Section 20.101(a), 10 CFR Part 20.
- Under accident conditions associated with handling, storage, and use of the source housing, it is unlikely that any person would receive an external radiation dose or dose commitment in excess of the dose to the appropriate organ as specified in the following chart:

PART OF BODY

REM

Whole body; head and trunk; active blood-forming organs; gonads; or lens of eye	15
---------------------------------------------------------------------------------------	----

Hands and forearms; feet and ankles; localized areas of skin averaged over areas no larger than 1 square centimeter	200
------------------------------------------------------------------------------------------------------------------------------	-----

Other organs	50
--------------	----



REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(AMENDED)

NO.: NR-420-D-135-B

DATE: MAY 08 1992

PAGE 8 OF 8

DEV: EXPE: "O", "MO", or "C" Frame Beta Gauges

SAFETY ANALYSIS SUMMARY SECTION (Cont.):

Based on review of the Models SU-P77A and SU-77A, and the information and test data cited below, we continue to conclude that these devices are acceptable for licensing purposes.

Furthermore, we continue to conclude that these devices 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 for the Model SU-P77A and SU-77A are hereby incorporated by reference and are made a part of this registry document.

- LFE's letters dated February 5, 1992, October 25, 1988, November 16, 1987, November 16, 1983, August 18, 1978, December 29, 1977, December 15, 1977, November 14, 1974, January 2, 1973, December 19, 1972, October 13, 1972, and May 25, 1972, with enclosures thereon.

ISSUING AGENCY:

U.S. Nuclear Regulatory Commission

Date: MAY 08 1992

Reviewer:

Date: MAY 08 1992

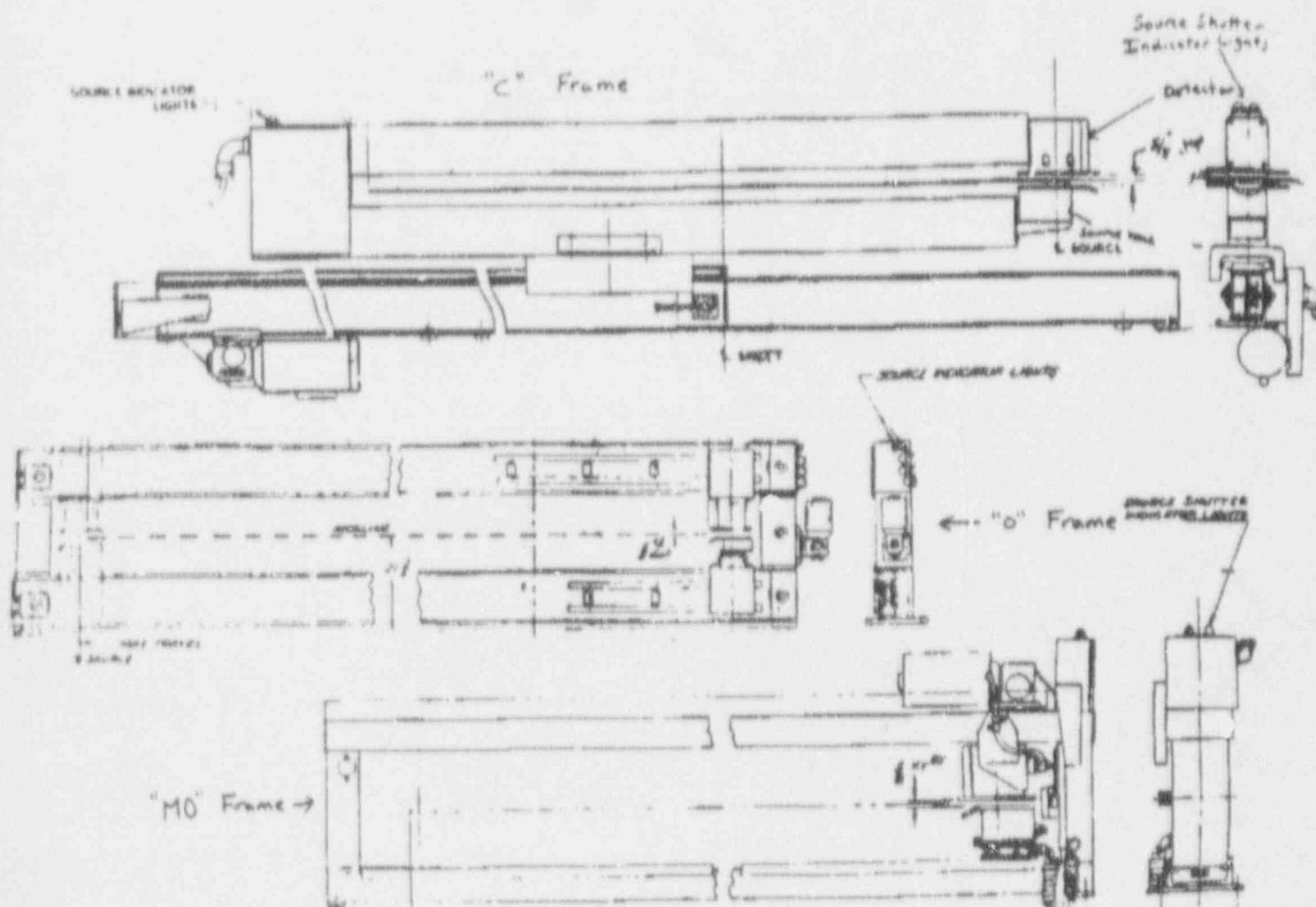
Concurrence:

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(AMENDED)

NO. 1 NR-420-D-135-B

DATE: MAY 08 1992

ATTACHMENT 1



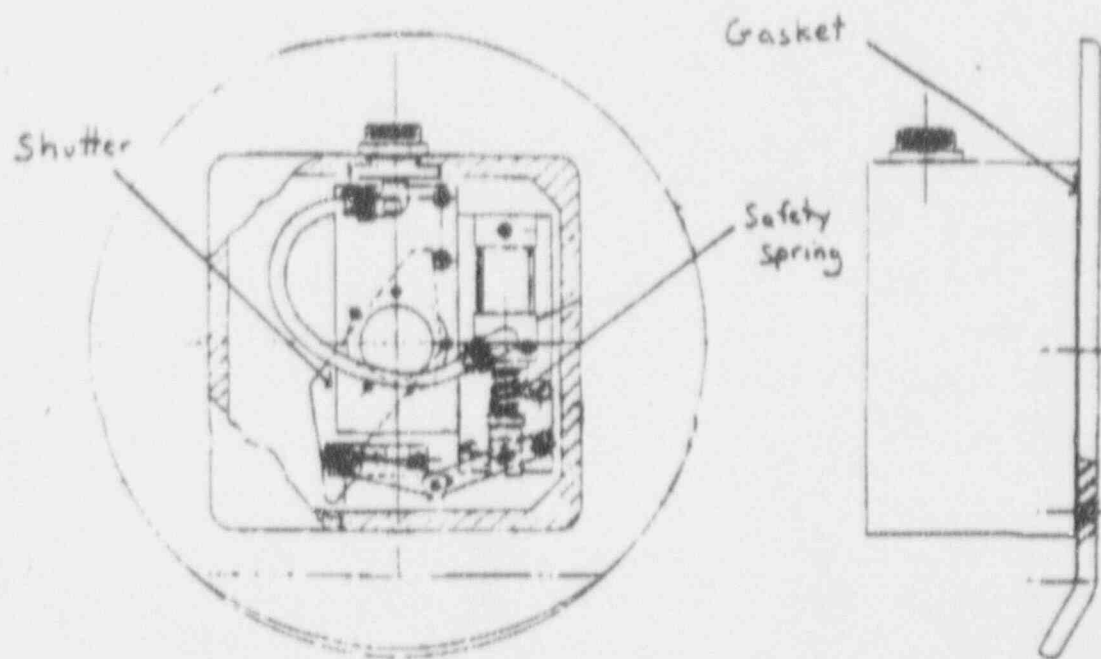
REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(AMENDED)

NO. 1 NR-420-D-135-B

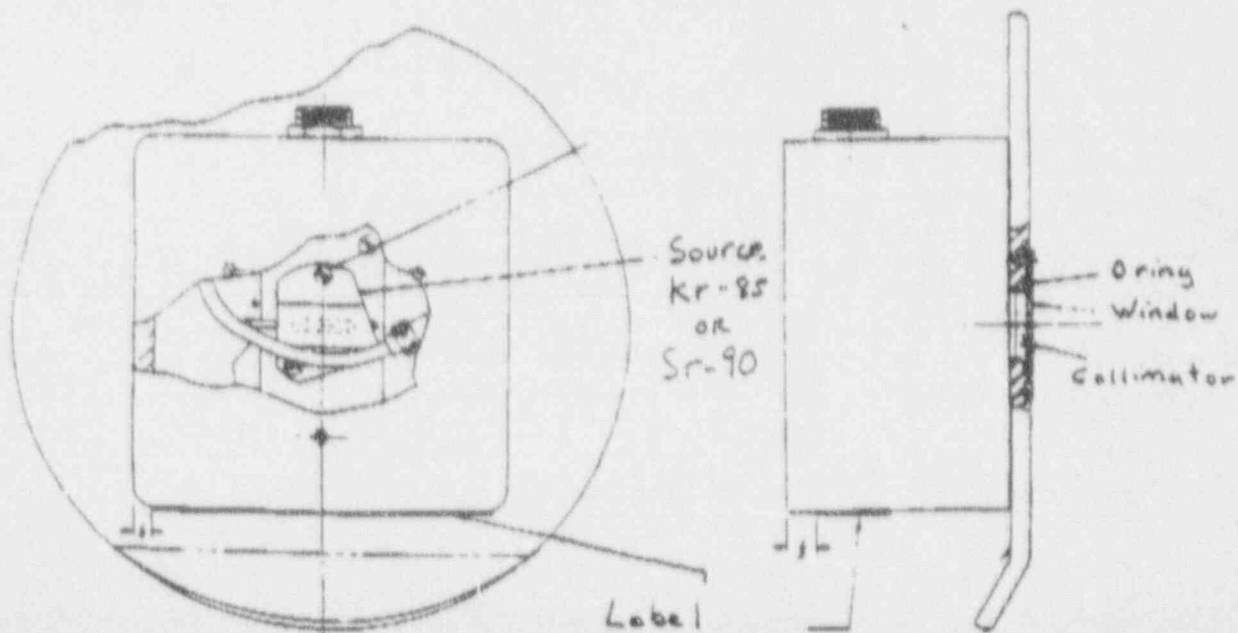
DATE: . . . . .

ATTACHMENT 2

Source Head Top and Side View



Source Head Bottom and Side View





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555



FAX NO'S 301 - FTS - 492-0259, 492-0260, 492-1137

VERIFICATION NO. 301 - FTS - 492-0262

LOCAL ( ) OR FTS (✓)  
PLEASE CHECK ONE

PLEASE TYPE OR USE BOLD FELT TIP PIN. TELECOPIES WILL NOT BE RETURNED.

	TO	LOCATION
1.	<u>Frank Costello</u>	<u>RI</u>
	FAX # _____	VERIFICATION _____
2.	_____	_____
	FAX # _____	VERIFICATION _____
3.	_____	_____
	FAX # _____	VERIFICATION _____
4.	_____	_____
	FAX # _____	VERIFICATION _____
5.	_____	_____
	FAX # _____	VERIFICATION _____
6.	_____	_____
	FAX # _____	VERIFICATION _____

# OF PAGES 10 AND COVER SHEET

FROM SW Bell PHONE EXT. 504-2617



SOURCE AND DEVICE EVALUATION TECHNICAL ASSISTANCE REQUEST

*Copy to  
Steve Buzza  
also.*

TO: STEVEN BAGGETT, NMSS/IMNS, Mail Stop OWFN-6H3

FROM: LEDCB REGION: (1) II III IV V HQ (Circle One)

FTS PHONE NO. \_\_\_\_\_ DATE: \_\_\_\_\_

APPLICANT LFE Industrial Sys. LETTER/APPLICATION DATE 2/20/92

MAIL CONTROL NO.(S) 116168 LICENSE NO.(S) 20-01382-02

REQUEST ACTION (CHECK APPROPRIATE BOX)

( ) SOURCE REVIEW ( ) DEVICE REVIEW ( ) CUSTOM

( ) AMENDMENT OF REGISTRATION SHEET NO. \_\_\_\_\_

( ) OTHER: \_\_\_\_\_

\*\*\*\*\*  
FOR NMSS/IMAB USE ONLY CONTROL NO. \_\_\_\_\_ MODELS: \_\_\_\_\_

DATE RECEIVED \_\_\_\_\_ REVIEWER \_\_\_\_\_

TYPE OF ACTION (INDICATE NO. OF EACH ON THE LINES)

( ) SOURCE REVIEW \_\_\_\_\_ ( ) DEVICE REVIEW \_\_\_\_\_

( ) FORMAL ( ) AMENDMENT ( ) CUSTOM

( ) NO LICENSING ACTION REQUIRED

TOTAL REVIEWER HOURS SPENT ON EVALUATION \_\_\_\_\_ DATE COMPLETED \_\_\_\_\_

NOTES: \_\_\_\_\_ DEFICIENCY LETTER \_\_\_\_\_ DATE COMPLETED \_\_\_\_\_

\_\_\_\_\_ DEFICIENCY PHONE CALL \_\_\_\_\_ DATE MADE \_\_\_\_\_

\_\_\_\_\_ RESPONSE TO DEFICIENCY \_\_\_\_\_

\_\_\_\_\_ TYPING DRAFT \_\_\_\_\_ IN \_\_\_\_\_ OUT \_\_\_\_\_ FINAL \_\_\_\_\_ IN \_\_\_\_\_ OUT \_\_\_\_\_

\*\*\*\*\*  
FOR ARM/LFMB USE ONLY

FEEs THAT HAVE BEEN PAID FOR : (INDICATE NO. OF EACH ACTION ON THE LINES)

( ) SOURCE REVIEW \_\_\_\_\_ ( ) DEVICE REVIEW 1 ( ) FORMAL \_\_\_\_\_  
(X) AMENDMENT \_\_\_\_\_ ( ) ARM/LFMB \_\_\_\_\_ ( ) CUSTOM \_\_\_\_\_

NOTES: \_\_\_\_\_ DATE TO ARM/LFMB: 2/20/92

DATE RETURNED: 2/27/92

SIGNED: S.K.

DATE: 2/27/92



30 - 04598

LFE  
INDUSTRIAL February 5, 1992  
SYSTEMS  
CORPORATION

A Mark IV Company

Director, Region 1  
U.S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

REF: License 20-01382-02  
Registration NR0420D135B

Log	Feb. 22 / Feb. 1992
Remitter	
Check No.	54025403
Amount	\$550 / \$1200
Fee Category	3B, 3N / 9A
Type of Fee	Amo
Date Check Rec'd.	2/27/92
Date Completed	
By:	SK

Dear Sir:

The purpose of this letter is to request amendment of license 20-01382-02 and registration NR0420D135B. I am enclosing a check for \$2,150.00 in fees under 10CFR170 for processing the amendments. The amount of \$1200.00 applies to the amendment of registration NR0420D135B. The amount of \$950.00 applies to the amendment of license 20-01382-02 (fee categories 3B and 3N).

1. License 20-01382-02

Under paragraph 1 delete "LFE Corporation, Process Control Division" and add "LFE Industrial Systems Corporation". Only the name has changed. There have been no changes in facilities, personnel, or procedures.

Under paragraph 10.CC, please add Strontium-90 sources (L1 model S2-A2, New England Nuclear model NER-592, and Amersham model SlF.D1) to devices SU-P77A and SU-77A. Maximum activity per source is 100 millicuries. These sources are registered under registration NR0420S105S.

Registration NR0420D135B

Page 1

Under manufacturer/distributor, the name is changed to LFE Industrial Systems Corporation.

Under sealed source model designation, add LFE Model S2-A2, New England Nuclear Model NER.592 and Amersham Model SlF.D1. Under Isotope, add Strontium-90 100 millicuries (S2-A2, NER-592 and SlF.D1). Under leak test frequency, delete "not required" and add "Krypton-85 not required, Strontium-90 six months".

Page 2

In paragraph 1, second sentence after Krypton-85 gas, add "or solid Strontium-90". In the fifth line absorption should be absorption. In paragraph 2, in the fourth line, where as should be whereas and line 8 equiped should be equipped.

In paragraph 4, the second sentence is changed to "The lid houses a collimator and aluminum or stainless steel window".

In paragraph 4, the last sentence is changed to "An aluminum or stainless steel window is stretched over the collimator and held in place with a clamp ring".

Page 3

Paragraph 1 is revised to read "One of five collimators can be used with each device and are notated as collimator "A" (D251553 or B241560), collimator "B" (D251554 or B241561), collimator "C" (D251555 or B241562), collimator "H" (A953542) or collimator "F" (D241558). The collimator has an outside diameter of 1.125 inches and is 0.250 thick (see attachment 4). The radiation beam produced by collimator "A", "B", "C" and "H" is oval in shape and is 1 inch by 0.5 inches if collimator "A" is used, 1 inch by 0.375 inches if collimator "B" is used, 1 inch by 0.250 inches if collimator "C" is used, and 1 inch by 0.125 inches if collimator "H" is used. The radiation beam produced by collimator "G" is circular in shape with a diameter of 0.350 inches. Collimators "A", "B", and "C" are used with Krypton-85 sources only. Collimator "F" is used with Strontium-90 sources". Collimator "H" is used with both Krypton-85 and Strontium-90 sources.

Paragraph 2 is revised to read "The sealed source dimensions are shown in attachment 3. A stainless steel holder will be used to adapt Amersham's KAC.D1 and KAC.D3, LFE's S2-A2, New England Nuclear's NER-592 and Amersham's S1F.D1 sources in order to secure them to LFE's devices".

Paragraph 3 - No change

Paragraph 4 is revised to read "A stainless steel caution plate is secured by means of drive screws to the side of the source head. The plate is labeled in accordance with section 20.203, 10CFR20 and section 32.51, 10CFR32. Also included on the label is warning stating that Removal of this Label is Prohibited".

Paragraph 5 - No change

Paragraph 6 - No change

Page 4

Paragraph 1 is revised to read "Access to the radiation beam is restricted due to both the location of the device in the process line and the measuring gap between the source and the detector. The usual gap for Krypton-85 devices is approximately 5/8 inch and the maximum gap is two inches. For Strontium-90 devices the usual gap is approximately 1 1/8 inches with a maximum gap of four inches".

Paragraph 2 - No change

Paragraph 3 - No change

Paragraph 4 - No change

Paragraph 5 is revised to read "The manufacturer of sealed source Models KAC.D1 and KAC.D3 has tested prototype models in accordance with ANSI N542-1977 and the prototype sealed sources achieved ANSI classifications 77C33232 and 77C43232 respectively. Sealed source Models S2-A2, NER-592 and SlF.D1 are registered under registration NRO420S105S.

Paragraph 6 - No change

Page 5

Under External Radiation Levels, add a table for Strontium-90 sources as follows:

The maximum external radiation levels as reported for Model SU-P77A loaded with a 50 millicurie SR-90 sealed source (Model S2-A2) were as follows:

<u>Distance from</u> <u>Source (CM)</u>	<u>Measured Radiation</u> <u>Levels (mR/hr)</u>
Shutter Open	
30	2.4
100	0.4
Shutter Closed	
30	2.2
100	0.4

Page 6

Limitations and/or other considerations of use - no change.

Safety Analysis Summary - After the second sentence add the following sentence "Sealed source Models S2-A2, NER-592, and SlF.D1 are registered under registration NRO420S105S".

Page 7

Revise paragraph 1 to read "It is not expected that personnel will have access to the radiation beam due to the location of the device in the process line and the preset

maximum two inch gap for Krypton-85 devices and four inch gap for Strontium-90 devices between the source housing and the detector".

Remainder of Page 7 - no change

Page 8 - No change

Page 9 - No change

Attachment 1 - No change


Attachment 2 - Add after KR-85 "or SR-90".

Attachment 3 - Add Page 2 to show Strontium-90 sources.

Attachment 4 - Revised to include collimators "F" and "H".

I am enclosing a copy of registration NR0420D135B which I have marked to indicate the changes. In addition, I have done some updating and I have made some corrections. If you have any questions or if you require additional information, please contact me. My direct line telephone number is (508) 365-3438 and my fax number is (508) 365-3468.

Very truly yours,  
LFE Industrial Systems Corporation

  
William R. Prendergast  
Radiation Safety Officer

WRP/sm

cc: Steven Baggett  
Mail Stop 6H3  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555



REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(Amended in its Entirety)

NO.: NR-420-D-135-B DATE: DEC 08 1988

PAGE 1 OF 9

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauges

MODEL: SU-P77A and SU-77A

MANUFACTURER/DISTRIBUTOR: LFE Corporation  
55 Green Street  
Clinton, MA 01510  
INDUSTRIAL SYSTEMS CORPORATION

SEALED SOURCE MODEL DESIGNATION:

LFE Model S-70A  
Amersham Model KAC.D1  
Amersham Model KAC.D3  
LFE Model S2-A2  
NEW ENGLAND NUCLEAR MODEL  
AMERSHAM MODEL SIF.D1  
NR-592

ISOTOPE:

MAXIMUM ACTIVITY:

Krypton-85

1200 millicuries (S-70A)  
1000 millicuries (KAC.D1)  
750 millicuries (KAC.D3)

STRONTIUM-90

LEAK TEST FREQUENCY: Not Required

KRYPTON-85 NOT REQUIRED

STRONTIUM-90 SIX MONTHS

PRINCIPAL USE: (E) Beta Gauge

CUSTOM DEVICE: \_\_\_\_\_ YES \_\_\_\_\_ X \_\_\_\_\_ NO

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REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(Amended in its Entirety)

NO.: NR-420-D-135-B

DATE:

DEC 08 1986

PAGE 2 OF 2

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauges

DESCRIPTION:

OR SOLID STRONTIUM-90

LFE Models SU-P77A and SU-77A are used to measure product weight per unit area. Both models use encapsulated Krypton-85 gas. The devices consist of three main parts: the source head, the detector, and the frame. The detector measures the change in beta radiation due to the absorption by the product material. The source head and detector are attached to a mechanical frame that allows the source head and detector to transverse back and forth across the product. The source head and detector can be attached to three different frame configurations designated as "O", "MO", or "C" type frame (see attachment 1). In all cases the detector is attached to the top arm of the frame and the source head is attached to the bottom arm of the frame.

Sealed sources are placed in a cast iron box 5 inches square by 3.625 inches high. The box houses the source, shutter, cylinder, and shutter mechanism. Model SU-P77A contains a pneumatic cylinder where as Model SU-77A contains an electric cylinder. Both systems have a fail-safe shutter design in that if the air supply or current supply fails, or shuts off, a spring attached to the end of the cylinder shaft returns the shutter to the closed position. Another safety feature equipped on both models is a visible check of the shutter's position. The edge of the shutter has a green and red painted section on it which is visible through an acrylic window located in the side of the box. If the green surface is seen through the window it indicates the shutter is closed "safe" position, if a red surface is seen then the shutter is in the "open" position.

The shutter mechanism consists of a clevis, compression spring, two levers, roll pin, pivot block, and shutter. When the cylinder engages a shaft is pulled back against the safety spring and rotates the levers which move the shutter to the open position. Disengaging the power supply causes the shutter to return to the closed position.

A gasket is bonded to the cast iron box perimeter and then a 10 inch diameter lid is attached with screws. The lid houses a collimator and aluminium window. The collimator is placed in the lid and then an O-ring gasket is fitted in place. An aluminium window is stretched over the collimator and held in place with a clamp ring.

OR STAINLESS

12

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(Amended in its Entirety)

NO.: NR-420-D-135-B      DATE: DEC 08 1988

PAGE 3 OF 9

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauges

DESCRIPTION (CONT.)

One of three collimators can be used with each device and are notated as collimator "A" (D241553), collimator "B" (D241554), or collimator "C" (D241555). The collimator has an outside diameter of 1.125 inches and is 0.250 inches thick (see attachment 4). The radiation beam produced is oval in shape and is 1 inch by 0.5 inches if collimator "A" is used, 1 inch by 0.375 inches if collimator "B" is used, and 1 inch by 0.250 inches if collimator "C" is used.

The sealed source dimensions are shown in attachment 3. A stainless steel holder will be used to adapt Amersham's KAC.D1 and KAC.D3 sealed sources in order to secure them in LFE's devices.

The sources are attached by (2) machine screws and lock washers to the source support plate which is attached to the box by use of spacers and (3) machine screws and lock washers.

LABELING:

An aluminium caution plate is cemented to the side of the source head. The plate is labeled in accordance section 20.203, 10 CFR20 and section 32.51, 10 CFR 32. Also a warning is engraved in the label stating "REMOVAL OF THIS LABEL IS PROHIBITED BY REGULATIONS OF THE NUCLEAR REGULATORY COMMISSION".

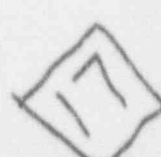
DIAGRAM:

See attachments 1 through 4.

CONDITIONS OF NORMAL USE:

The devices are used in process lines to measure the product weight per unit area of plastics, paper, rubber, and similar materials.

The devices are used in factories having environments that are fit for human occupancy. The surface temperature of the device is not expected to reach temperatures in excess of 100° F.



REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(Amended in its Entirety)

NO.: NR-420-D-135-B      DATE: DEC 08 1988

PAGE 4 OF 9

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauge

CONDITIONS OF NORMAL USE (CONT.)

Access to the radiation beam is restricted due to both the location of the device in the process line and the pre-set gap of 5/8 inch between the source and detector.

PROTOTYPE TESTING:

LFE Corporation has performed prototype tests on the above models. A bench test was performed in which the device was actuated to open and close the shutter for 8,000 cycles. The prototypes were then placed in each of four possible mount orientations for 35,000 additional cycles.

The prototypes were then placed in an oven with an environmental temperature of 250° F, and subjected to 30,000 more cycles. At the end of each test, the prototypes were examined. After the completion of over 70,000 cycles (estimated 80 year life expectancy for normal industrial use of these devices) the prototypes operated with no mechanical failures.

Sealed source Model S-70A was approved and has been in use since 1965.

The manufacture of sealed source Models KAC.D1 and KAJ.D3 have tested prototype models in accordance with ANSI N542-1977 and the prototype sealed sources achieved ANSI classifications 77C33232, 77C43232 respectively.

The devices has been used in an industrial environment since 1973 with no reported incidents.

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REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(Amended in its Entirety)

NO.: NR-420-D-135-B      DATE: DEC 08 1988

PAGE 5 OF 9

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauge

EXTERNAL RADIATION LEVELS:

The maximum external radiation levels as reported by the manufacturer for Model SU-P77A loaded with a 500 millicurie Kr-85 sealed source (Model S-70A) were as follows:

<u>Distance from</u> <u>the source (cm.)</u>	<u>Measured radiation</u> <u>levels (mR/hr)</u>
Shutter Open	
30	2.4
100	0.4
Shutter Closed	
30	1.7
100	.3

ADD >  
SR-90  
QUALITY ASSURANCE AND CONTROL:

LFE Corporation has supplied an adequate Quality Control Policy and is on file with the Medical, Academic and Commercial Use Safety Branch. LFE Corporation's Quality Control Policy includes the following:

- o Design Control
- o Procurement Document Control
- o Instructions, Procedures, and Drawings
- o Document Control
- o Inspection
- o Non-Conforming Material Parts, or Components
- o Quality Assurance Records

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REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(Amended in its Entirety)

NO. 1 NR-420-D-135-B DATE: DEC 08 1988

PAGE 6 OF 9

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauge

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- o Devices intended for distribution to persons specifically licensed by the NRC or an Agreement State shall be labeled in accordance with Section 20.203(f).
- o Devices intended for distribution to persons under the general license pursuant to Section 31.5 shall be labeled in accordance with Section 32.51 (a)(3).
- o Devices intended for use under a general license shall be installed and initially tested for proper operation of the source exposure mechanism, safety warning components, labels, and external radiation levels by LFE Corporation, or other persons specifically licensed by the NRC or an Agreement State.
- o The device shall be subjected to a safety performance test each year. The test will check for proper shutter and warning light/indicator operation.
- o Handling, Storage, Use, Transfer, and Disposal: For devices used under a specific license to be determined by the licensing authority.
- o This registration sheet and the information contained with the references shall not be changed without the written consent of the NRC.

SAFETY ANALYSIS SUMMARY:

The sealed source Models KAC.D1 and KAC.D3 have an ISO ANSI N542 classification of 77C33232, and 77C43232 respectively. Sealed source Model S-70A has been in use since 1965 with no reported incidents. This indicates that temperature, pressure, impact, vibration, and puncture stresses imposed during use are highly unlikely to cause breach of containment integrity of the capsule. During use the source is sealed within the housing such that the source is protected against possible airborne corrosive and other types of contaminants. Protection provided by the source housing further assures radiation material containment in the event of an accident.

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REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(Amended in its Entirety)

NO.: NR-420-D-135-B      DATE: DEC 08 1988      PAGE 7 OF 9

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauge

SAFETY ANALYSIS SUMMARY (CONT.):

It is not expected that personnel will have access to the radiation beam due to the location of the device in the process line and the pre-set 5/8 inch gap between the source housing and the detector.

The devices will be used in an industrial environment; however, these environments are not expected to be severe because of the need to protect the detection system.

A number of these units have been in operation since 1973 throughout the country. LFE Corporation's experience shows that these devices provide adequate radiation protection.

LFE Corporation has submitted sufficient information to provide reasonable assurance that:

- o The device can be safely operated by persons not having training in radiological protection.
- o Under ordinary conditions of handling, storage, and use of the device, the byproduct material contained in the device will not be released or inadvertently removed from the device, and it is unlikely that any person will receive in any period of one calendar quarter a dose in excess of 10 percent of the limits specified in the table in Section 20.101(a), 10 CFR 20.
- o Under accident conditions (such as fire and explosion) associated with handling, storage, and use of the device, it is unlikely that any person would receive an external radiation dose or dose commitment in excess of the dose to the appropriate organ as specified in the following chart:

21

NO CHANGE

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(Amended in its Entirety)

NO.: NR-420-D-135-B

DATE:

3 1988

PAGE 8 OF 9

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauge

SAFETY ANALYSIS SUMMARY (CONT.):

<u>PART OF BODY</u>	<u>REM</u>
Whole body; head and trunk; active blood-forming organs; gonads; or lens of eye	15
Hands and forearms; feet and ankles; localized areas of skin averaged over areas no larger than 1 square centimeter	200
Other Organs	50

NO CHANGE

Based on the above and the information referenced below, we continue to conclude that LFE Corporation's Models SU-P77A and SU-77A are acceptable for distribution to persons under a general license. Further, we conclude that the source housings can be expected to maintain its containment integrity adequately for normal conditions of use and for accidental conditions that might occur during use.

REFERENCES:

The following supporting documents for LFE Corporation's Models SU-P77A and SU-77A are hereby incorporated by reference and are made a part of this registry document.

- o LFE Corporation's letters dated October 25, 1988, November 16, 1987 and enclosures thereto.
- o LFE Corporation's Applications dated November 23, 1983, August 18, 1978, December 29, 1977, December 15, 1977, and enclosures thereto.
- o LFE Corporation's letters dated November 14, 1974, January 2, 1973, December 19, 1972, October 13, 1972, May 25, 1972 and enclosures thereto.

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REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE  
(Amended in its Entirety)

NO.: NR-420-D-135-B      DATE: DEC 08 1988

PAGE 2 OF 2

DEVICE TYPE: "O", "MO", or "C" Frame Beta Gauge

ISSUING AGENCY:

U.S. Nuclear Regulatory Commission

Date: DEC 08 1988

Reviewer: *[Signature]*

Date: DEC 08 1988

Concurrence: *[Signature]*

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

DATE: DEC 68

ATTACHMENT 1

NR-420-D-135-B

Source Shutter  
Indicator Lights

Detector

$\frac{1}{2}$  3rd

Source Head  
SOURCE

Source Shutter  
Indicator Lights

← "0" Frame

Source Head  
SOURCE

SHUTTER

"C" Frame

SOURCE SHUTTER  
LIGHTS

"M0" Frame →

116168.

24

NO CHANGE



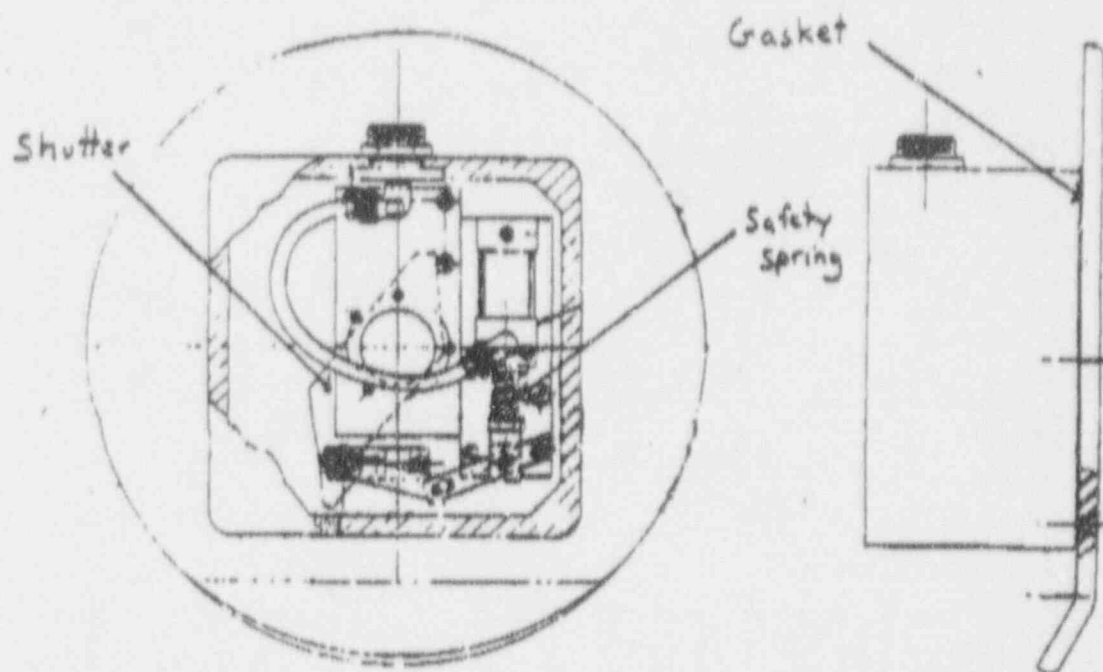
REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE

10.1

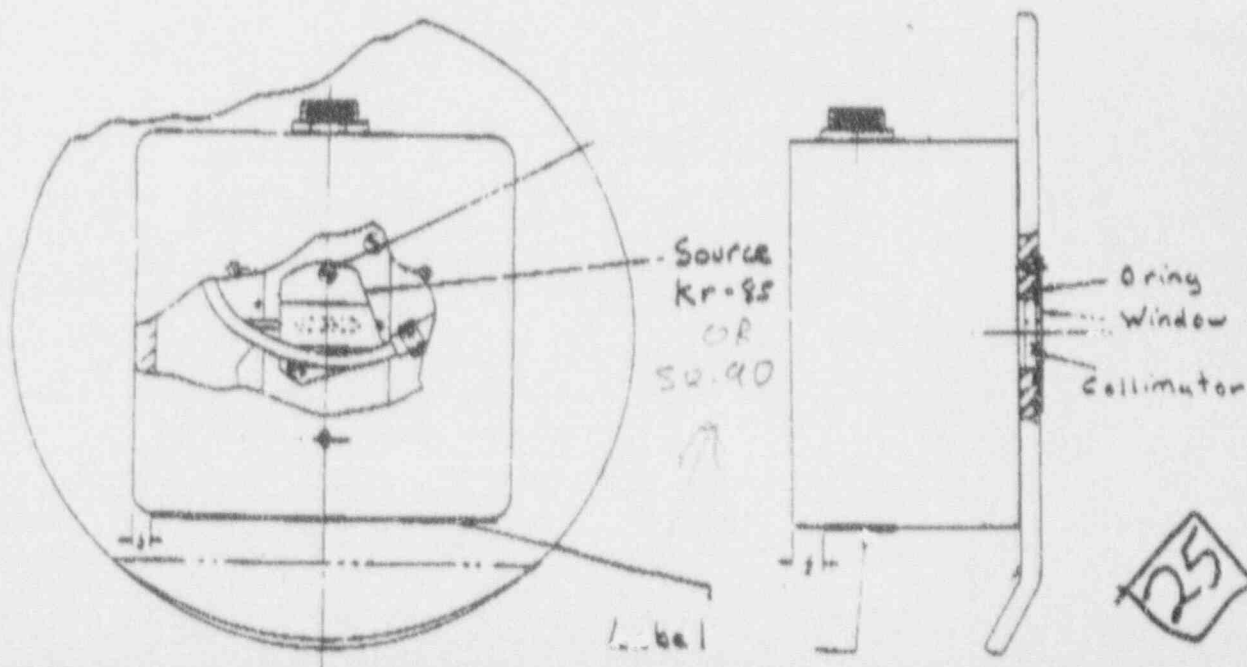
NR-420-D-135-B DATE: DEC 08 1988

ATTACHMENT 2

Source Head Top and Side View



Source Head Bottom and Side View



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

NO. 1 NR-420-D-135-B DATE: 1

DEC 08 1968

Window

ATTACHMENT 3

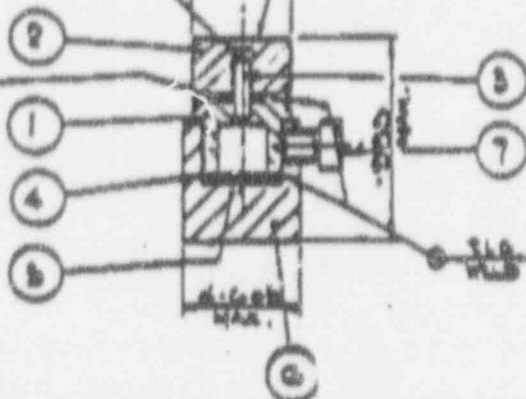
Specific for the Model

Amersham Model  
KAC.D3 Source

0.673"

MAX OFF G-40 LENGTH TO G-24  
IN. ABOVE G-1000 WINDOW  
WAS G-40 WELD SEAL AS  
AS AS CRIPPER WELD ALLOW

VACUUM BRAZED  
MAGNETIC SEAL



Material: Titanium

Overview of KAC.D3 Source

T.I.G. or Laser Weld

T.I.G. Weld

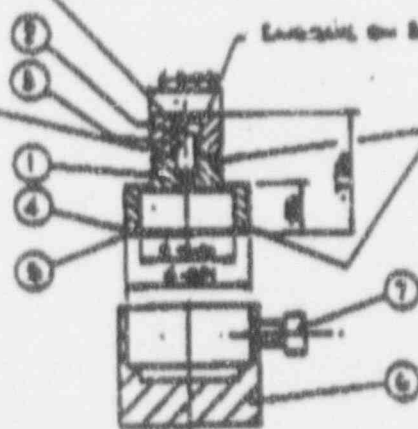
Back Cap (Engraved)

MAX OFF G-40 LENGTH TO G-24  
IN. ABOVE G-1000 WINDOW  
WAS G-40 WELD SEAL AS  
AS AS CRIPPER WELD ALLOW

VACUUM BRAZED  
MAGNETIC SEAL

MAX

AMERSHAM Model  
KAC.D1



Engraving on B-Lined

KT 88  
ACTIVITY  
5.4

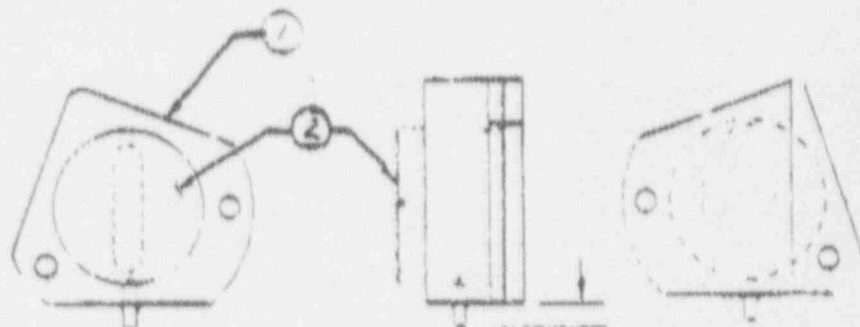
TIG or LASER WELD

ITEM NO.	DESCRIPTION
1	Window
2	Back Cap
3	Window
4	Window
5	Window
6	Window
7	Window

370A AMERSON-85  
SOURCE CAPSULE  
ASSEMBLY

## OPERATION INSTRUCTIONS

- Assemble items 1, 2, 3, and 4 by brazing with B.T. solder in hydrogen atmosphere without flux. Inside window area 3/16 in. wide x 1 in. long, window, must be entirely free of solder.
- Trim excess window material on 1/16 in. diameter.
- Handle this capsule with care, window must be free of all scratches, indentations or stresses.
- Write tags to each capsule indicating the date of test, results, remarks.
- ALL WITH HELIUM TO 100 PSI'S SEAL OF 1/16 IN. TUBE, AND TEST FOR LEAKS IN HELIUM WASH TUBE.
- Individually wrap each capsule in soft absorbent material to prevent damage in capsule.
- Send all capsules, when finished, to source department.



## PARTS LIST

QTY	PART NUMBER	DESCRIPTION	ITEM NO.
1	17814	SOURCE CAPSULE BODY	1
1	423986	WINDOW	2
1	429120	BASE	3
1	4246752	FILE 1 - 1/16	4

76

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE

NO. 1

NR-420-D-135-B

DATE:

DEC 01 1988

View:

ATTACHMENT 3

Page 2



Amersham model S1F.D1  
Diameter 0.748 inches  
Height 0.472 inches

For the LFE model S2-A2, the diameter is 0.400 and  
the height is 0.275 inches.

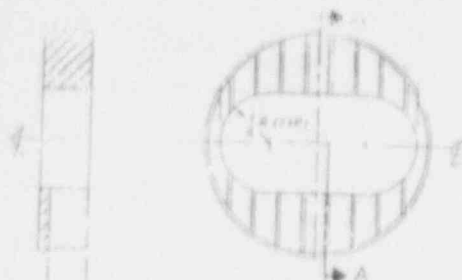
For the New England Nuclear model NER-592, the  
diameter is 0.400 inches and the height is 0.400  
inches.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE

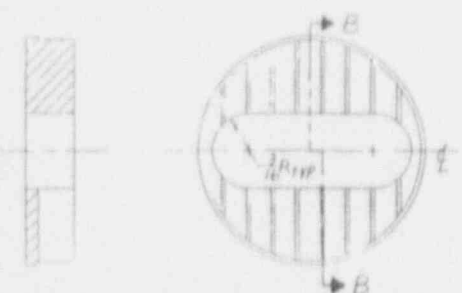
NO. 1 NR-420-D-135-B DATE 1

DEC 08 1988

ATTACHMENT 4

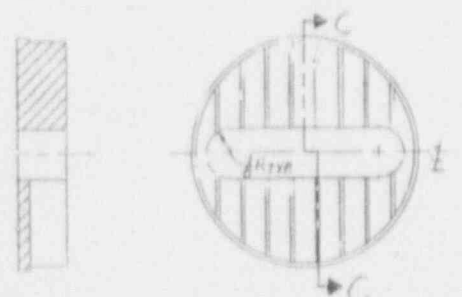


D241553  
Collimator "A"  
with strips in the slots  
Part number is B241560



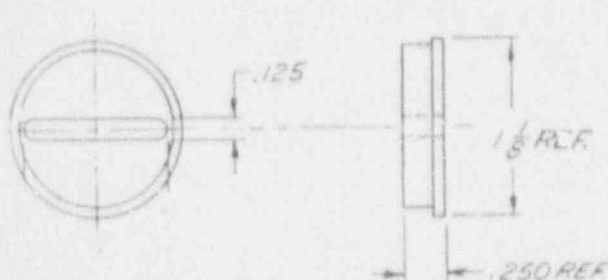
Sect "B-B"  
Otherwise same as D241553

D241554  
Collimator "B"  
with strips in the slots  
Part number is B241561

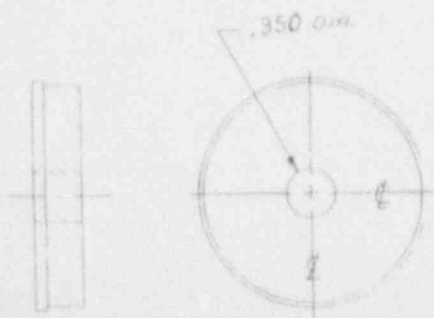


Sect "C-C"  
Otherwise same as D241553

D241555  
Collimator "C"  
with strips in the slots  
Part number is B241562



A953542  
Collimator "H"



D241558  
Collimator "F"

OFFICIAL RECORD COPY ML 10

116168

FEB 27 1992

VOUCHER COVER SHEET

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
1	L	F	E	I	n	d	u	s	t	r	i	a	l	S	y	s	t	e	m	s						
2	C	o	r	p																						
3	A	T	T	N	W	m	R	P	r	e	n	d	e	r	g	a	s	t								
4	5	5	G	r	e	e	n	S	T																	
5	C	l	i	n	t	o	n	M	A	0	1	5	1	0												
6	L	i	c	2	0	-	0	1	3	8	2	-	0	2	O	v	e	r	p	y	m	t				
7	A	M	D	R	E	Q	S	T	D	T	D	2	-	5	-	9	2									
8	C	K	N	D	3	4	0	2	5	4	0	3														

ACCOUNT NO: AA905 AMD CD NO:           

FEE CATEGORY: 3B+9A CONTROL NO: 116168

DATE RECEIVED: 2/20/92

CHECK AMOUNT: \$ 2,150

AMOUNT RETAINED: \$ 1750

AMOUNT REFUNDED: \$ 400

COMMENTS: Licensee pd also  
for 3N and which  
was not required.

SIGNED: S. Kimberley

DATE: 2/27/92

M. J. 1/92

31X6875

GOVERNMENT CODE: Y N

DOCUMENT NUMBER	
TRANSACTION CODE	AMOUNT
C&R NUMBER	
FIN	
FEE RETAINED CODE 303	FEE PAID CODE 410
DISCOUNT (CODE 000) TAKEN	DISCOUNT (CODE 415) LOST
AMOUNT PAID <u>\$ 400</u>	
FINAL Y N	



(FOR LFMS USE)  
INFORMATION FROM LTS  
\*\*\*\*\*

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM  
AND  
REGIONAL LICENSING SECTIONS

PROGRAM CODE: 03214  
STATUS CODE: 0  
FEE CATEGORY: 3B 3N  
EXP. DATE: 19940131  
FEE COMMENTS: 3B 3N 7/2/90 RULE  
DECOM FIN ASSUR REQD: N  
\*\*\*\*\*

LICENSE FEE TRANSMITTAL

A. REGION I

1. APPLICATION ATTACHED

APPLICANT/LICENSEE: LFE INDUSTRIAL SYSTEMS CORPORATION  
RECEIVED DATE: 920212  
DOCKET NO: 3004598  
CONTROL NO.: 116168  
LICENSE NO.: 20-01332-02  
ACTION TYPE: AMENDMENT

2. FEE ATTACHED

AMOUNT: \$2,150.00  
CHECK NO.: 38025403

3. COMMENTS

SIGNED  
DATE

M. A. Perkins  
2/15/92

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED 1/1)

1. FEE CATEGORY AND AMOUNT: 3B 3N

\$550 + \$1,200

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:

AMENDMENT  
RENEWAL  
LICENSE

3. OTHER

SIGNED  
DATE

AK  
2-15-92