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

NO: NR-616-D-101-E DATE: SEP 7 1982 PAGE 1 OF 4

DEVICE TYPE: Ionization Smoke Detector

MODEL: EGD-4S, EGD-4B, EGD-4I, EGD-4IR, EGD-5S, EGD-5B

MANUFACTURER/DISTRIBUTOR:

Square D Company
Electrical Equipment
P.O. Box 4000
Pinelas Park, FL 33565

MANUFACTURER/DISTRIBUTOR:

SEALED SOURCE MODEL DESIGNATION: Foil sources, NRD Model A-001 or Amersham Model AMM-1001H

ISOTOPE: Americium-241

MAXIMUM ACTIVITY: 1 microcurie

LEAK TEST FREQUENCY: Not required

PRINCIPAL USE: (P) Ion Generators, Smoke Detectors

CUSTOM DEVICE: ____YES __X__NO

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

NO: NR-616-D-101-E DATE: SEP 7 1982

DEVICE TYPE: Ionization Smoke Detector

DESCRIPTION:

The Square D Company Models EGD-4S, EGD-4I, EGD-4IR, EGD-4B, EGD-5S and EGD-5B smoke detector devices are single chamber ionization type detectors that are designed to detect incipient fires by responding to the products of combustion produced by thermal decomposition of materials. The construction and design of the Models EGD-4S, EGD-4I, EGD-4IR and EGD-4B smoke detectors are identical with respect to foil source design and source housing (see Enclosure 1 for more details). The Model EGD-5S and EGD-5B designs are upgrading of the Models EGD-4S and EGD-4B. The revised designs use the same foil source but the method of securing the foil source to the source holder and the source holder to the source plate is by star staking rather than use of a compression washer. Additionally, the new design uses a stainless steel source holder and either a steel, aluminum or tin plated steel ion chamber cover.

LABELING:

Ion chamber cover is stamped "Caution-Radioactive Material" and radiation caution symbol. In addition, the base of the detector is labeled in accordance with the requirements of Section 32.29, 10 CFR Part 32.

DIAGRAM:

See attachment.

CONDITIONS OF NORMAL USE:

These detectors are for home use and will normally be ceiling or wall mounted. The expected useful life of these detectors is about 30 years.

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

NO: NR-616-D-101-E DATE: SEP 7 1982

DEVICE TYPE: Ionization Smoke Detector

PROTOTYPE TESTING:

Smoke detector devices listed have been prototype tested in accordance with NRC criteria and are deemed acceptable for licensing purposes.

EXTERNAL RADIATION LEVELS:

An unpackaged unit exhibits a maximum radiation level of about 2 micro roentgen per hour at 5 cms from the surface. This is reduced to about 0.2 micro roentgen per hour at 25 centimeters.

QUALITY ASSURANCE AND CONTROL:

The manufacturer/distributor has established an acceptable quality control program which is incorporated as a part of his NPC distribution license

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

Products manufactured by the Square D Company and listed on this document are deemed acceptable for licensing purposes and may be distributed to persons exempt from licensing as specified in Section 30.20, 10 CFR Part 30 and as authorized by a specific license issued by NRC.

SAFETY ANALYSIS SUMMARY:

The safety analysis summary for Square D Models EGD-4S, EGD-4B, EGD-4I and EGD-4IR is contained in Enclosure 1. The Models EGD-4S and EGD-5B are improved versions of the Model EGD-4S and EGD-4B respectively. The new design features include: improved methods of securing the foil source within the ion chamber, a stainless steel source holder, a more durable ion chamber cover and an improved method for securing the foil source against access.

REFERENCES:

- Applications dated July 15, 1977 and November 10, 1981
- Letters dated December 6, 1977, January 19, 1982 and February 23, 1982
- NRC License No. 09-17650-01E
- NRC Safety Evaluation dated December 27, 1977 (enclosed).
- Formally NRC Safety Evaluation dated March 10, 1982

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

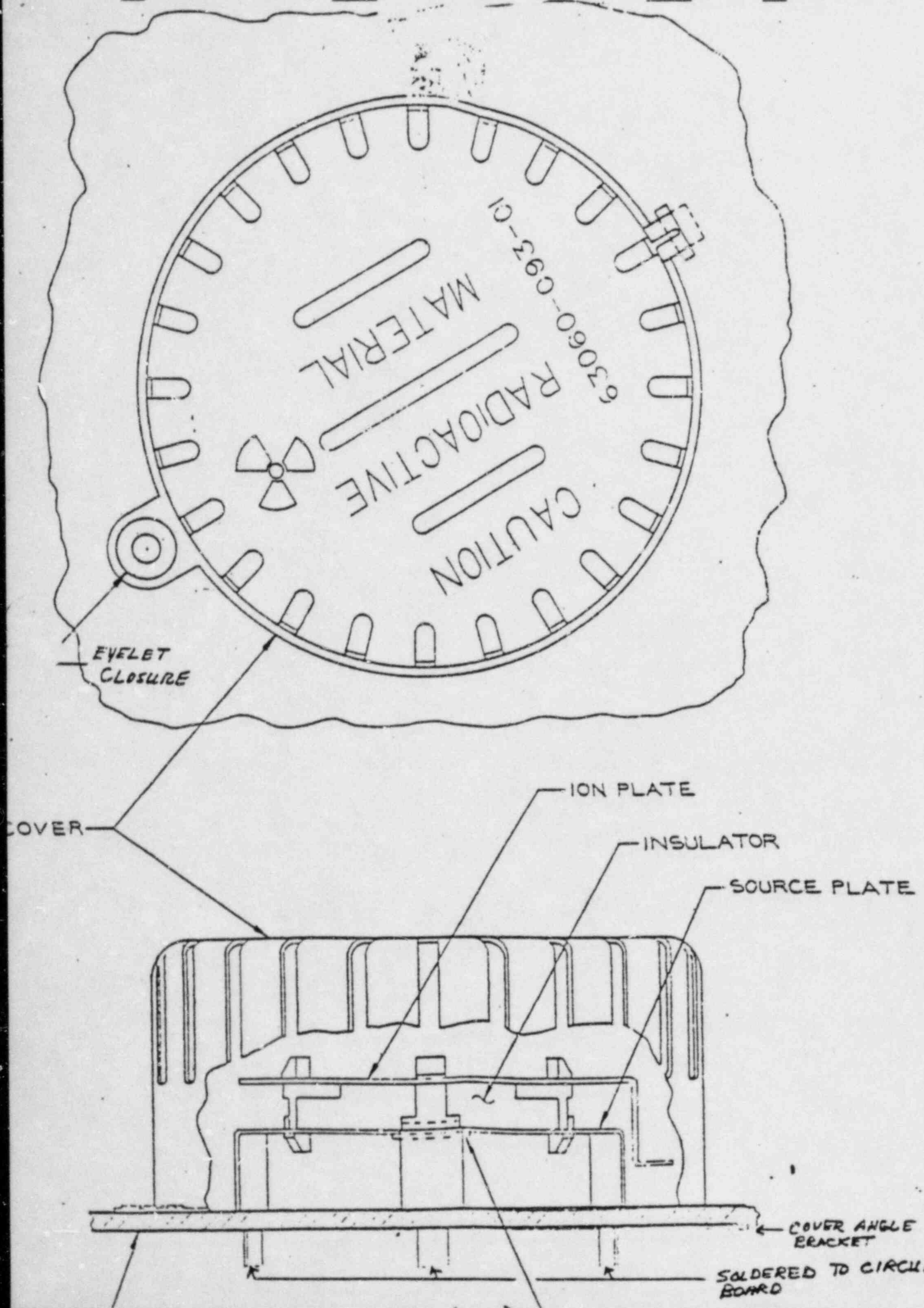
NO: NR-616-D-101-E DATE: SEP 7 1982

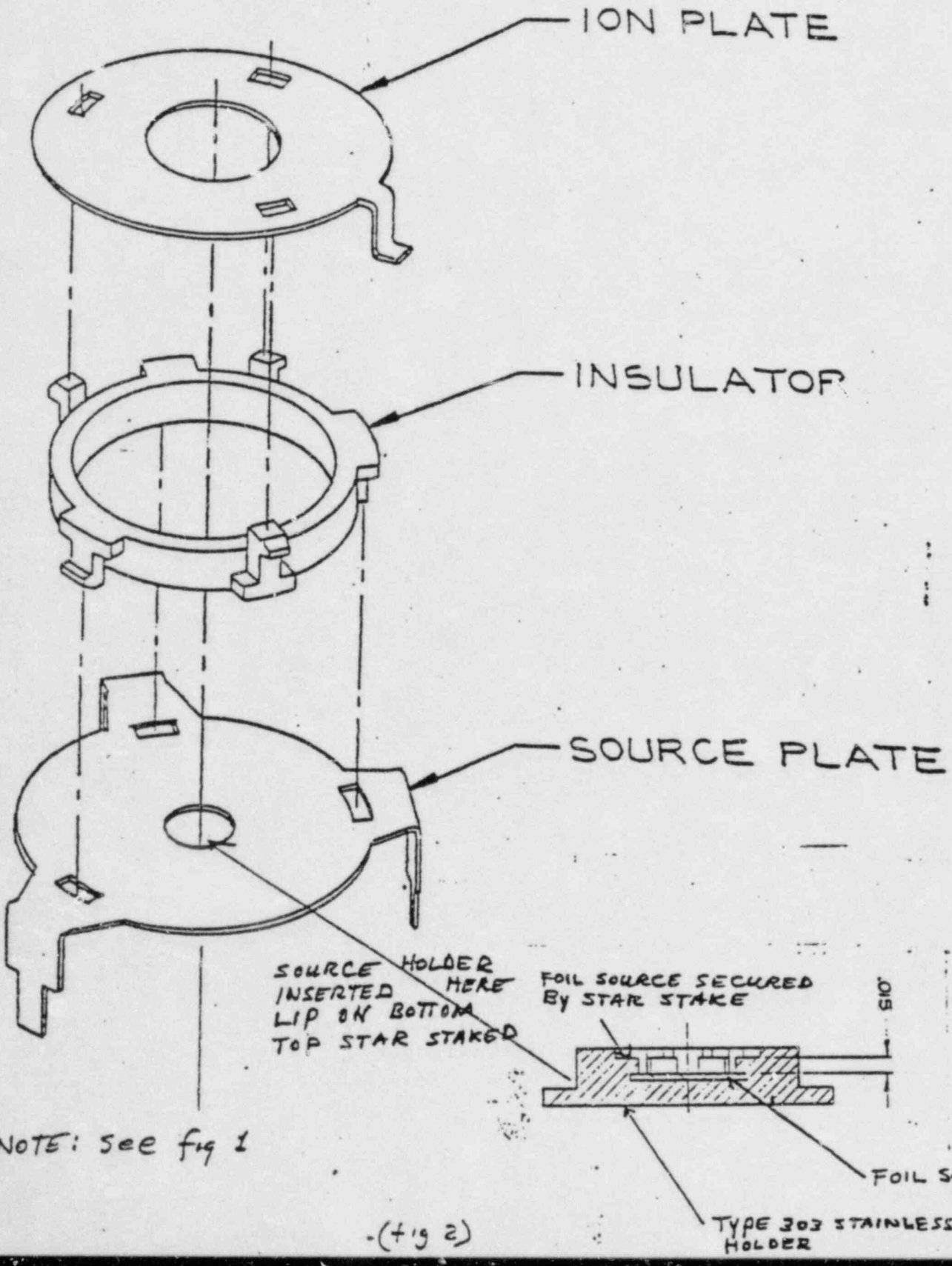
DEVICE TYPE: Ionization Smoke Detector

ISSUING AGENCY: U.S. Nuclear Regulatory Commission

Date: SEP 7 1982 Reviewer: Earl D Wright

Date: SEP 7 1982 Concurrence: Bernard Singer


CAUTION
RADIOACTIVE
MATERIAL
63060-093-01
EYELET
CLOSURE
COVER
ION PLATE
INSULATOR
SOURCE PLATE
COVER ANGLE
BRACKET
SOLDERED TO CIRCUIT
BOARD



NOTE: See fig 1

(fig 2)

DEC 2 7 1977

SAFETY EVALUATION FOR LICENSE NO. 09-17650-01E ISSUED TO SQUARE D COMPANY AUTHORIZATING DISTRIBUTION OF SQUARE D MODELS EGD-4S, EGD-4I, EGD-4IR, AND EGD-4B SMOKE DETECTORS TO PERSONS EXEMPT FROM LICENSING PURSUANT TO SECTION 30.20 OF 10 CFR PART 30

General Description

The Square D Company Models EGD-4S, EGD-4I, EGD-4IR, and EGD-4B smoke detectors are single chamber ionization type detectors that are designed to detect incipient fires by responding to the products of combustion produced by thermal decomposition of building materials or contents prior to the appearance of visible smoke, flame or appreciable heat. The construction and design of the ionization chamber for the four Square D Company smoke detectors are identical. The smoke detectors differ somewhat in their source of power and in their circuit design. The detectors are intended primarily for residential use.

Amersham Corporation Model AMM-1001H or Nuclear Radiation Development Model NRD A-001 foils are used in the ionization chamber of the smoke detectors. The ionization chamber uses a single one microcurie americium-241 foil. The foil contained in a source holder is secured to the ion chamber base through the use of an arbor press and a compression fastener. A metal disc is then snapped on to the ion chamber to cover and isolate the emitting surface of the foil. To complete the assembly of the ion chamber, a twelve sided metal can is secured to the ion chamber base. The ion chamber assembly is secured to the printed circuit board by tabs which extends through the circuit board. The tabs are bent flesh against the circuit board and soldered to the board. An outer case is secured to the printed circuit board by four self tapping screws which passes through four prepunched holes in the printed circuit board. In order to gain access to the foil it would require the use of special tools and considerable force and effort.

Conditions of Normal Use and Disposal

The detector is for home use and will normally be ceiling or wall mounted. The expected useful life of the detector is 30 years. Each detector bears a label which contain the radionuclide, activity, and the name Square D Company and a statement "for repair or disposal of the detector return to Square D Company or its authorized representative."

External Radiation Levels and Dose Estimates

An unpackaged unit exhibits a maximum radiation level of 1.95 microroentgen per hour at 5 centimeters from the surface. This is reduced to .161 microroentgen per hour at 25 centimeters from the surface. Thus based on available information concerning handling, storage, installation, servicing and use of these detectors, it would appear that doses to personnel involved in these operations could only be a small fraction of the doses specified in Column I of the table in Section 32.28 of 10 CFR Part 32.

It was further determined that, based on data submitted by Square D Company, in conditions of abnormal use, no individual would be likely to receive doses in excess of the permissible doses of 0.5 rem and 15 rem specified in Columns II and III of the table in Section 32.28 of 10 CFR Part 32.

Conclusion

We have reviewed the data and information submitted by Square D Company and concluded that Square D Company has submitted sufficient information relating to the design, manufacture, prototype testing, quality control, and conditions of handling, storage, use, and disposal of their gas and aerosol detector to demonstrate that the product will meet the safety criteria set forth in Section 32.27 of 10 CFR Part 32.

It is further concluded from our review that the external radiation dose or the dose commitment resulting from the intake of radioactive material from the detector will not exceed the doses specified in Column I of the table in Section 32.28 of 10 CFR Part 32, under the conditions of normal use, handling, storage, or disposal. Finally, it is concluded that the probability is low that the containment, shielding, or other safety features of the product would fail under such circumstances that a person will receive an external radiation dose or dose commitment in excess of the dose to the appropriate organ specified in Column III of the table in Section 32.28.

Sincerely,

James A. Jones
Radioisotopes Licensing Branch
Division of Fuel Cycle and
Material Safety