

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

NO: NR-441-D-101-S

DATE: OCT 1 1982

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DEVICE TYPE: X-Ray Fluorescence Spectrometer

MODEL: PXRFS

MANUFACTURED/DISTRIBUTOR:

Martin Marietta Corporation
Denver Division
Denver, CO 80225

MANUFACTURER/DISTRIBUTOR:

SEALED SOURCE MODEL DESIGNATION:

Isotope Products Laboratories Model XFB-5

ISOTOPE: Iron-55
Cadmium-109

MAXIMUM ACTIVITY: 100 millicuries
15 millicuries

LEAK TEST FREQUENCY: 6 months

PRINCIPAL USE: (U) X-Ray Fluorescence

CUSTOM DEVICE: X YES NO

CUSTOM USER:

Bureau of Mines
Denver Mining Research Center
Building 20
Denver Federal Center
Denver, CO 80225

8403020172 840209
PDR FOIA
HAMMITT84-74 PDR

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DESCRIPTION:

The sensor head is, essentially, an aluminum box, 10 1/2 in x 2 1/2 in x 1 1/2 in, closed on all sides, except for a circular opening (port) in the bottom. It is attached to the analysis unit (microprocessor, controls, and display), by a flexible cable. The sensor head has a knob on the top which is attached to a U-shaped slide inside the head. The slide contains the two sources and detectors. The Cadmium-109 source is mounted inside the slide in a tungsten cup and the Iron-55 source is mounted in a brass cup. The slide is held in the neutral (closed) position by springs. The slide has two circular holes in the bottom, one under each source (and its detector). One of these holes lines up with the hole in the bottom of the case when the knob is pushed by hand to the high or low (forward or backward) position. When the hand pressure is released from the knob, the slide returns to the neutral (closed) position and no radiation escapes. See attached sketch of the device.

LABELING:

The sensor head bears a permanent label identifying the manufacturer: Martin Marietta Aerospace; the isotopes: FE-55 = 100 mCi and Cd-109 = 15 mCi; the date of measurement of the radioactive material; the radiation symbol and the words, "CAUTION-RADIOACTIVE MATERIAL." In addition, a label is placed on the bottom of the sensor head. This label has the radiation symbol and the words, "RADIOACTIVE MATERIAL Caution: Radiation exit port."

DIAGRAM:

See attachment

CONDITIONS OF NORMAL USE:

The portable X-ray fluorescence spectrometer device is designed for environmental conditions encountered in laboratory and field use. The sources used in the spectrometer head have an ANSI Classification of ANSI 32232.

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EXTERNAL RADIATION LEVELS:

There is no external radiation level above background when the shutter is in the closed position. With the shutter in the open position the radiation pattern and levels are as seen in the following sketch and Table:

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LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- A. The device shall be distributed only to the specific licensee specified in this custom review.
- B. Leak Testing: The sources shall be leak tested at six-month intervals.
- C. Source removal and repairs involving the sensor head should be performed only by the device manufacturer.

SAFETY ANALYSIS SUMMARY:

Based on the information contained in the references cited below, we conclude that this custom portable X-ray fluorescence analyzer manufactured by Martin Marietta Corporation is acceptable for licensing purposes under Material License No. 05-06468-02, and the device is likely to retain containment of the radioactive contents under foreseeable conditions of storage and use by the specified licensee.

REFERENCES:

- ° Letters with attachments dated March 11, 1981, May 4, 1981, and May 20, 1981.

ISSUING AGENCY:

U.S. Nuclear Regulatory Commission

Date: OCT 1 1982

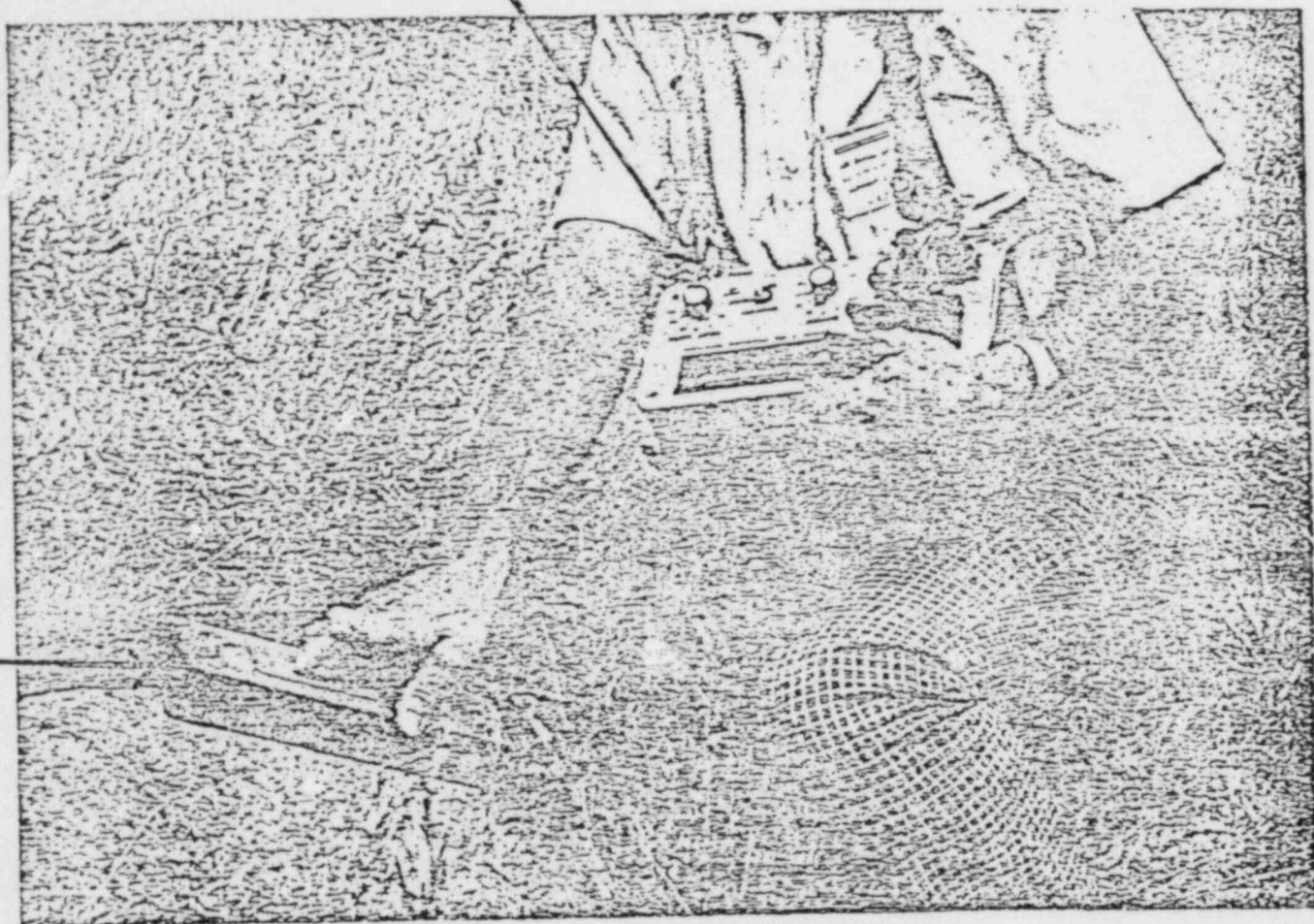
Date: OCT 1 1982

Reviewer:

Concurrence:

Joseph M. Brown
James J. Singer

ANALYSIS UNIT



SENSOR
HEAD