HR-14- JMB

F&M SCIENTIFIC F-M
DIVISION OF HEWLETT-PACKARD
Route 41 and Starr Road, Avondale, Pennsylvania 19311 / Phone 215-268-2281 · Telex 083-4927

July 20, 1966

1819

Mr. J. Bell
Isotopes Branch
Division of Materials Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Bell:

We have discussed by phone on July 18 our hopes to shortly be able to offer a nickel 63 electron capture detector. We have listed in the enclosure our proposed handling techniques for this new source. It is requested that Dwg. 2-6195 be withheld from inspection by the public, as we feel it may endanger our competitive position. I hope you will be able to consider this proposal for early manufacture.

If there is any further information required, please feel free to call me collect.

Very truly yours,

J. Peters
Radiation Safety Officer

JP/mlp
Encl.

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FOR DIV. OF COMPLIANCE

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U.S. ATOMIC ENERGY COMMISSION
Regulatory Mail Section

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Drawings Not Duplicated for Compliance.
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Assembly Procedure

1. All sources will be assembled in the electron capture detector by U. S. Radium, Morristown, N. J. Thus F & M personnel will not handle the bare source at any time. A radiation profile of the loaded cell is listed in Appendix I. Wipe tests will be performed on the outside surfaces of all cells before further use. Cells will be riveted inside heat sinks at F & M, and customers will not be permitted to remove the foil or cell from the heat sink. 1819

All checkout work on the cell will be done in the hot lab, with units removed only for shipment.

2. The source (LAB 784) contains 2 millicuries of Ni 63 and is manufactured by U. S. Radium Corporation. It consists of an electroplated coating of nickel 63 on pure gold foil, and is enclosed within a cell made of stainless steel, alumina, boron nitride, and uses metal O-rings for sealing purposes. After tests performed on this cell under simulated operating conditions, no gas leakage occurred up to 400°C.

Leak Testing

It is proposed that the customer will perform the wipe tests, using a 1" square of filter paper at the cell entrance and exit. These wipes are sent to F & M for analysis on our counting equipment. If any contamination is found, a cell exchange plus some decontamination procedure performed by an outside company would be performed. Wording in the manual will consist of:

"Leak tests on the cell

Leak tests should be performed on the cell at intervals of six months. These are performed as follows:

(1) Cut three filter paper squares approximately 1" x 1".

(2) With one square wipe the inlet fitting (¼"Swagelok) inside and out.

(3) With a second square, wipe the outside surface of the cell container.

(4) Using the last square, wipe around the cell exit both inside and outside the Teflon connector.

These wipe test papers should be sent into F & M for counting. You will be informed of the results whether positive or negative."

The manual for the nickel 63 detector is not yet completed, but the safety section will consist of:

(a) The detector should always be operated with the exit tube connected to vent the exhaust gas out of the working area, either into a fume hood or outside the laboratory building. This is a precaution against any loss of radioisotope from the cell, even though no trace of this loss has yet been reported in use.

(b) This isotope is four times more energetic than tritium, and for this reason caution should be used when handling the cell, even though particles emitted from the cell package are emitted at a much reduced energy level due to the steel and aluminum shielding within the cell package itself.

Labels

Labels are identical to those presently used for the tritium cell except for (a) model number - now 2-6195, and (b) isotope: 2 millicuries of Ni 63. A drawing of this label is enclosed (1-6716). Please note the color of the label is gold anodized aluminum with magenta lettering. This plate will be riveted to the metal outer case of the electron capture detector.

A second plate (drawing also enclosed, 1-2846) is positioned on the outer panel of the unit. See marked up drawing.

Temperature limitation of the detectors will be controlled in the same manner as the tritium cell:

(a) Matching of the heaters to the load so that maximum power applied to the panel control will not allow the temperature to rise above 400°C.

(b) The oven heat protection circuit will operate if the temperature of the detector exceeds the setpoint of a thermal switch located in the detector heat sink. This switch activates a relay and removes all voltage from the detector heater. Voltage is not applied to the circuit until a manual reset button is operated.

Location of the Cell in the Unit

The cell is installed on the unit by means of four screws attached to the inner oven and cell. The cell is normally not visible, as a metal side panel covers the side of the unit, and encloses the cell area. This panel has a caution label No. 1-2846 on the side.

A photograph is enclosed which shows the unit with side panel removed. An arrow shows the location of the electron capture detector. The side panel is of perforated and sheet steel held in position by five screws. It fully covers the cell when in position.

JP/mlp
7-20-66

APPENDIX I

Radiation profile of a nickel 63 electron capture cell is listed in the enclosed sketch. All figures were taken for one minute with a g.m. tube and scaler pointed in the direction of the arrow. All counts were taken for one minute and include 43 counts background.

The g.m. tube was positioned 1/2" from the cell for all readings. Normal minimum operator distance from the cell would be 6" or 12" depending on configuration of the unit on a bench. The 12" minimum distance is the most probable (distance from front panel to EC cell).

The handling hazard would be further reduced by enclosure of the cell in an aluminum heat sink, insulation and steel outer container.

Measurements were also made with a direct meter reading MR/HR with a full scale reading of 25 MR/HR and an integration system to allow higher sensitivities to be realized - less than 0.1 MR/HR was read.