Model 2-6195

DML:MB:JMB

DEC 10 1970

Newlett-Packard
Avondale Division
ATTN: Mr. M. E. Whittier
Radiation Safety Officer
Avondale, Pennsylvania 19311

Gentlemen:

The information submitted with your May 4, October 1, and November 25, 1970 letters concerning the use of the Nuclear Radiation Development's Model N-1002 foil in place of the previously utilized U.S. Radium Corporation Model LAB-784 foil has been evaluated. We find the use of the Nuclear Radiation Development's Model N-1002 foil in your Model 2-6195 detector cell acceptable for licensing purposes.

As indicated by the enclosure to this letter "Comments Concerning Request for Leak Test Exemption", we feel that insufficient data is available to justify a leak testing exemption for nickel 63-bearing foils. At such time as definitive data concerning the performance of such foils in the field for a period of time commensurate with the effective useful lifetime of such foils becomes available, we will be prepared to reevaluate your request. Such data may be available in the form of leak test result reports furnished your customers by those persons performing leak test sample analyses.

Sincerely,

Original Signed by
Jack M. Bell

Jack M. Bell
Materials Branch
Division of Materials Licensing

DISTRIBUTION:
St. Br. Dist.
CO:I
DML

Enclosure:
As indicated

cc: John Miele
State of New York Department
of Labor
Division of Industrial Hygiene
80 Centre Street
New York, New York 10013

CRESS
T79, R01

DML:MB

JMBell:blv
12/3/70

COMMENTS CONCERNING REQUEST FOR LEAK TEST EXEMPTION

The request by Hewlett-Packard for exemption of their customers from the standard leak test requirement applicable to the use of nickel 63-bearing foils in Hewlett-Packard gas chromatography detector cells is based on two items:

1. A report prepared by their current supplier of nickel 63-bearing foils, Nuclear Radiation Developments, Incorporated, of Grand Island, New York entitled the "Effect of High Temperature on A Typical NRD Ni-63 Gas Chromatography Source" (Report NC-400-11T).

2. The applicant's contention that "In the entire history of these products, neither Mr. Taylor of NRD nor myself have knowledge of any wipe test producing a positive result".

With respect to Item 1, the report cannot be considered conclusive in that:

1. The tests were performed on a Model N-1001 foil instead of the Model N-1002 foil which Hewlett-Packard indicates they will use in their detector cells.

2. The report was based on the testing of only one foil.

3. The test did not include exposure of the foil to chemicals which are contained in samples which are routinely injected into a gas chromatography unit when in use.

4. The single test foil was "pretreated", a practice which may not be followed in routine production.

5. There is no indication of the basis for the selection of carrier or purge gas type and flow rate. Depending upon cell volume, the type of gas and gas flow rate may be important with respect to local cooling of the foil surface.

6. No basis is given for the selection of a 500-hour test period nor is any discussion included with respect to the extrapolation of foil performance over a 500-hour period to foil performance over a much longer period which may be expected for some conditions of use.

7. No basis is given for the selection of the particular temperatures to which the foil was exposed during the test period. It is not known whether these test temperatures being higher than the "maximum use temperature of 350°C" will tend to strengthen the bond between the nickel deposit and the foil substrate or have some adverse effect on the bond between the two.

8. No indication is given that cell surfaces were tested prior to loading with the nickel 63-bearing foil to determine background levels. Therefore, we do not have a basis for the judgment stated on page 4 of the report that the cell internal contamination is "the result of mechanical transfer of removable activity from the source surface during assembly and disassembly operations".

9. No indication is given of the basis for the apparent assumption that the filter system is approximately 100% effective in trapping activity that may have been released from the nickel 63-bearing foil.

10. The radioactivity measurement results given in Tables I, II and III are not meaningful since nothing is said concerning the sensitivity of the detection and measurement system, the accuracy and precision of the measurement system, or the system efficiency (necessary to convert the results given in Table III in "cpm" to units of activity).

    In addition, the second line of Table III seems to report a figure of 11,300 cpm which, even with an efficiency of 100% would represent more than 0.005 microcuries of nickel 63 activity.

With respect to Item 2 we do not have data concerning the experience of users of nickel 63-bearing foils in the field. The applicant's statement given in Item 2 above indicates a lack of data rather than the possession of positive data supporting the contention that nickel 63-bearing foils do not exhibit a loss of activity resulting in contamination of the detector cell and its surroundings. A lack of information concerning the spread of contamination from detector cells containing nickel 63-bearing foils is not necessarily indicative of a lack of such contamination, especially in the absence of any active effort to determine whether such contamination has in fact occurred.

Although laboratory tests are valuable, a knowledge of the performance of products under conditions of use for which they were designed seems highly desirable in this case.

STATE OF NEW YORK
ATOMIC ENERGY COORDINATING COUNCIL
COMMITTEE ON LICENSING
ALBANY, N. Y.

P. O. Box 7036

October 14, 1966

MEMORANDUM

TO: Dr. Morris Kleinfeld, Chairman
Mr. Hanson Blatz
Dr. James H. Lade

FROM: Mr. Robert D. Vessels
Secretary

The F & M Scientific Division of Hewlett-Packard in the State of Pennsylvania provided me with some detailed information on their high temperature electron capture detector which they are processing through licensing channels with the U. S. Atomic Energy Commission in Washington.

I am attaching this information for your files since it would appear that some time in the furture this equipment might be obtained by customers in the State of New York and, therefore, you might like to have detailed data. Of course, when this is approved, I assume this item will become a part of the Sealed Source and Device Catalog.

RDV:ams
Attachment
cc: Mr. Sherwood Davies
Mr. Bennett L. Harless

Mr. Harless:

My quick evaluation of the data that F & M indicates they provided to the Commission reveals a matter which I would like you to be certain the licensing people catch. The blue-prints on the proposed name plates show the radiation symbol upside down. Since the American Standards Association and the International Standards Organization have approved a uniform symbol, I would like to urge the licensing people ~~that the~~ to require that the universal symbol be utilized in this case.

F & M SCIENTIFIC
DIVISION OF HEWLETT-PACKARD
Route 41 and Starr Road, Avondale, Pennsylvania 19311 / Phone 215-268-2281 · TWX: 510-663-8268

September 28, 1966

New York State Coordinating Council on Atomic Energy
Alfred E. Smith State Office Building
P. O. Box 7036
Albany 1, New York

Att: Committee on Licensing

Gentlemen:

We have recently submitted details of our high temperature electron capture detector to the AEC in Washington.

They are now prepared to accept license applications from customers for this cell. I therefore would like to request that you consider this same detector (Model 2-6195) for use in the area under your jurisdiction. I have enclosed information detailing this detector for your evaluation, and would be pleased to supply any additional information required. Further we would wish to install our tritium detectors presently on record with you (electron capture Model 2-2837; micro cross-section Model 2-2830) in a number of the new heat sinks (as used for the nickel 63 detailed in enclosure).

If you could contact me when customer license applications can be received, it would be most helpful. We ask that you hold all the information enclosed as confidential, and not make it available for public inspection.

Thank you.

Very truly yours,

J. Peters
Radiation Safety Officer

JP/mlp
Encl.

9-28-66

F & M Ni63 Electron Capture Detector

1. Cell Dimension

Approximate dimensions of the nickel cell are: 1 inch diameter and 1-3/8 inch length (excluding gas connection tubes). These dimensions are very similar to our present cells 2-2830 and 2-2837.

2. Heat Sink

The aluminum heat sink to enclose the cell is very similar to that used in our tritium detector. However it is reduced in size (to 2-3/8 x 2-3/8 x 1-1/4"). Insulation is wrapped around this heat sink which is then covered by a thin metal outer container. The label is fixed to the outer surface of this container.

3. Labels

It is possible that some fading may occur to the caution label at the temperatures reached, although information at this time indicates fade will be at a minimum.

4. Leak Tests

This is performed with F & M Leak Test Kit No. P 6761 which includes the following parts:

a. twelve pieces of paper for performing wipe tests - only three will be used at any one test.

b. twelve envelopes - three used for one test.

c. four postal envelopes addressed to U. S. Radium for the customer to return the wipes to U. S. Radium.

d. a form detailing: cell serial number, model number, date loaded, date wipe tests are due (six months after loading date), and wipe test count.

e. Service Note 5663A-2 - details how wipe test is performed - detailed in letter from J. Peters to J. Bell on July 20. Wipe test results will be reported to the customer as microcuries for his record keeping. We are suggesting that U. S. Radium perform these wipe tests (rather than F & M as previously stated).

5. Manual

The manual will be sent with any system if it includes a nickel 63 detector, or a detector only when the nickel 63 detector is sent to a customer for field installation on an existing unit. This manual for the cell is generally very similar to the tritium manual, with the following exceptions:

a. Description of Source. 20 millicuries of NI63 on gold foil instead of 200 millicuries of tritium.

b. Temperature. The maximum operating temperature is now 360°C instead of 225°C.

c. Life of Foil. This will be extended over the present 1-2 years.

d. Venting of Cell Effluent. We will suggest the customer vent the cell effluent gas at all times.

e. Energy Level of Nickel 63. Changed to "Nickel is medium-low energy emitter and as such caution should be used when handling the cell even though the shielding of the source (by the cell, heat sink and outer insulation and container) is sufficient to prevent any hazard from normal handling of the cell." This removes the assumption we made in my letter of July 20, "...isotope is four times more energetic than tritium...", that the customer has knowledge of tritium activity.

6. Materials of Construction of Ni63 Cell (Electron Capture).

Details of Drawing 2-6195 (cell assembly high temperature electron capture) detector.

Call-Out Number on Print 2-6195	Material
(11) Housing assembly cell	Stainless steel
(12) Insulator anode	Alumina
(13) Anode assembly	Stainless steel
(14) Spacer - electrode	Boron nitride
(15) Spacer cathode	Alumina
(16) Nut -retaining	Stainless steel
(17) Cathode assembly	Stainless steel
(18) Insulating beads (surrounding anode wire)	Alumina
(19) Metal O-rings	Inconel x silver plate
(20) Nickel 63 foil	Gold & Ni63

7. Wipe Test Containers

The customer will be given several small envelopes of plastic to perform some shielding for any contaminated wipes when sent to U. S. Radium for counting.

8. Temperature Limit of Cell.

It is suggested that a temperature limit of 360°C be applied to this cell for the following reasons.

a. The cell has been run for over 48 hours with the temperature cycling from 100 to 400°C. During this time no gas leaks developed.

b. The cell was run for a further 24 hours while cycling from 100 to 450°C. Some leaks developed at temperatures above 400°C; however on returning to 400°C the leak resealed.

c. A cell with foil enclosed was operated for approximately 96 hours at a temperature of 360°C and with a flow of argon methane (the normal gas flowing through the cell). The gas from this cell was passed into a solution which would absorb nickel (low concentration hydrochloric acid). This solution was evaporated to dryness in a glass dish and was then counted with a gas flow tube and scaler giving essentially background level.

d. As we will suggest that the customer always connects his effluent vent to exhaust the carrier gas outside the lab, no contamination of a working area would occur even if nickel loss from the cell did occur.

9. Cleaning Procedure.

a. Do not use any acidic material, due to the danger of dissolving nickel from the foil.

b. Do not use any ester material (e.g. acetates, butyrates, etc.) as some acid may be present in these chemicals due to degeneration in storage.

c. Suitable solvents are hexane, methanol or benzene (all chemically pure). Wash with approximately 50 ml of solvent as specified above. This should be done with the cell not above 50°C. This solvent is then washed down the drain with large quantities of water.

J. Peters/um

September 23, 1966

Details of F & M High Temperature Electron Capture Detector

1. Cell Model No. 2-6195

2. Source. Maximum of 2 millicuries of Nickel 63 per cell. Foil is purchased from U. S. Radium, Morristown, New Jersey, and is type LAB 784. This consists of Nickel 63 electroplated on pure gold foil.

3. Cell. This is constructed of stainless steel, alumina, and boron nitride, with metal O-rings used for sealing. This cell is enclosed is an aluminum heat sink (size 2-3/8 x 2-3/8 x 1-1/4") insulation, and this assembly is then enclosed within a thin steel container. This outer steel container is 6 x 3 x 2" in size.

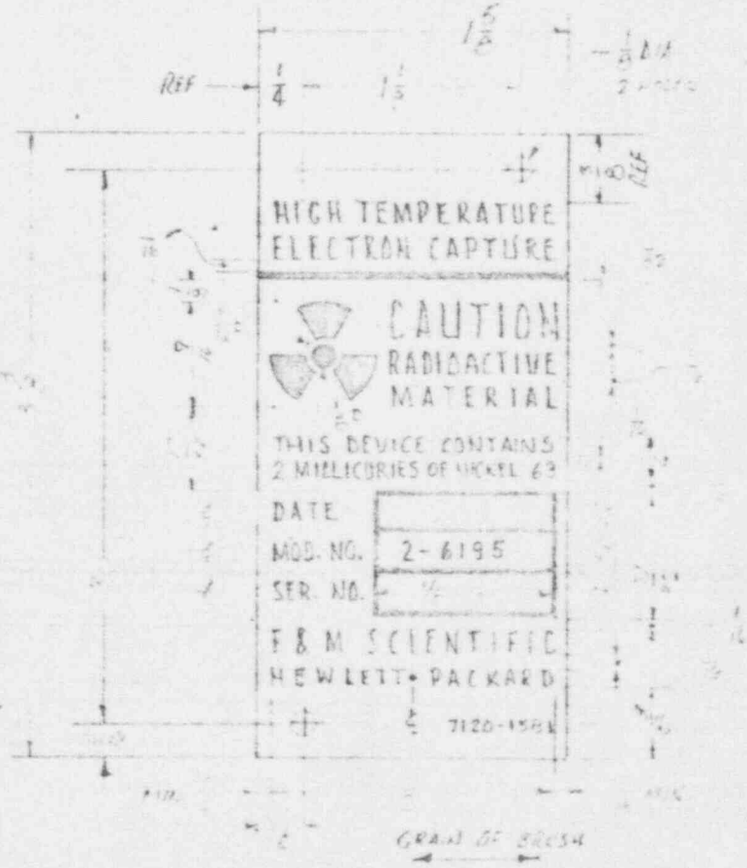
4. Labels. A label will be attached to the outside of each instrument containing a nickel 63 detector. (Dwg. 1-2866) Each cell will also have a detailed label (Dwg. 1-6716) riveted to the metal outer container of the cell assembly. Both labels will be magenta on gold anodized aluminum. However it is possible that some fading will occur with label (1-6716) due to temperature. This fade will be at a minimum.

5. Chromatographic Equipment. This nickel 63 detector can be used on our present model 700, 400, and 810 series units as well as our relatively new Model 5750.

6. Leak Tests. Wipe tests are required every six months. The customer will perform the wipes himself with F & M's P6761 Leak Test Kit and our instructions.

JP:mm

REVISIONS				
SYM	ECN	DATE	BY	CHK
B				
C				
D				
E				
F				
G				
H				
J				
K				



NOTES 1. "CAUTION" 18 PT. ALT GOTHIC NO 2.
"RADIOACTIVE MATERIAL", "F&M SCIENTIFIC" & HIGH TEMPERATURE ELECTRON CAPTURE" 12 PT. ALT GOTHIC NO. 2.
PART NO. "7120-1551" 9 PT ALT GOTHIC NO. 2
ALL OTHERS 10 PT ALT GOTHIC NO 2.

2 NO. BOX LINES TO BE .020 APPROX WD.

3 MATL .032 GOLD ANODIZED ALUM PLATE WITH LEGEND IN MAGENTA. HORIZONTAL BRUSH FINISH

4. VENDOR TO FURNISH WITH STD PEELABLE FILM PROTECTIVE COVERING.

A
1-6716

3-6606	5750
NEXT ASSY	MODEL
APPLICATION	

TOLERANCES UNLESS NOTED		
DIMENSION	LINEAR AND TURNED	HOLE C TO C
FRACTION	± 1/32	± 1/64
2 PLACE DEC	± .01	± .01
3 PLACE DEC	± .005	± .005
ANGLES ± 0° 30'	HOLES PER ES 2.9	
THREADS UNIFIED CL-2A-2B		CHAM ± 5°
BREAK CORNERS OR CHAM 1/64 MAX		

TITLE: NAMEPLATE HI TEMP E.C. DET

DWN: E.C. NICHOLS

CHK: 7-29-66

ENG:

MFG: J. Wegener 7-20-66

MAT'L: SEE NOTE 3

F&M SCIENTIFIC CORP.
AVONDALE, PA.

SCALE: 1:1

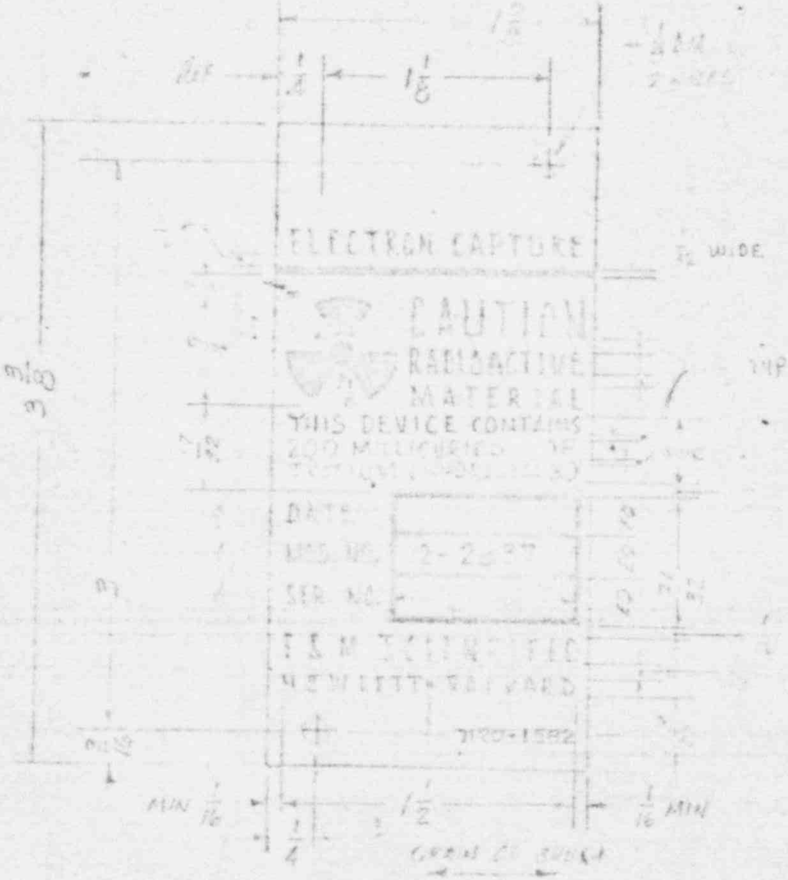
SH 1 OF 1

DWG NO. 1-6716

SYM A

1-6717 A

REVISIONS				
SYM	ECN	DATE	BY	CHK
B				
C				
D				
E				
F				
G				
H				
J				
K				



NOTES 1. "CAUTION" 18 PT. ALT GOTHIC NO 2.
"RADIOACTIVE MATERIAL", "F&M SCIENTIFIC" & "ELECTRON CAPTURE" 12 PT. ALT GOTHIC NO 2.
PART NO. "7120-1582" 8 PT ALT GOTHIC NO. 2
ALL OTHERS 10 PT ALT GOTHIC NO 2

2. NO. SOL LINES TO BE .020 APPROX WA
3. MAT'L .032 6013 ANODIZED ALUM PLATE WITH LEGEND IN MAGENTA. HORIZONTAL BRUSH FINISH
4. VENDOR TO FURNISH WITH STRIPPABLE FILM PROTECTIVE COVERING.

		TOLERANCES UNLESS NOTED		
		DIMENSION	LINEAR AND TURNED	HOLE C TO C
		FRACTION	± 1/32	± 1/64
		2 PLACE DEC	± .01	± .01
		3 PLACE DEC	± .005	± .005
		ANGLES ± 0° 30'	HOLES PER ES 2.9	
		THREADS UNIFIED CL-2A-2B	CHAM ± 5°	
6431	5750	BREAK CORNERS OR CHAM 1/64 MAX		
NEXT ASSY	MODEL			
APPLICATION				

This drawing is the property of F & M Scientific Corp. and must be returned upon request. Information and knowledge hereon may not be used nor the drawing reproduced without the written permission of F & M. All reproductions in whole or in part, including vendor's shop drawings, shall bear or refer to this stamp.

TITLE: NAMEPLATE E.C. DET

DWN	7-19-66
CHK	7-20-66
ENG	7-20-66
MFG	J Wegmann 7-19-66

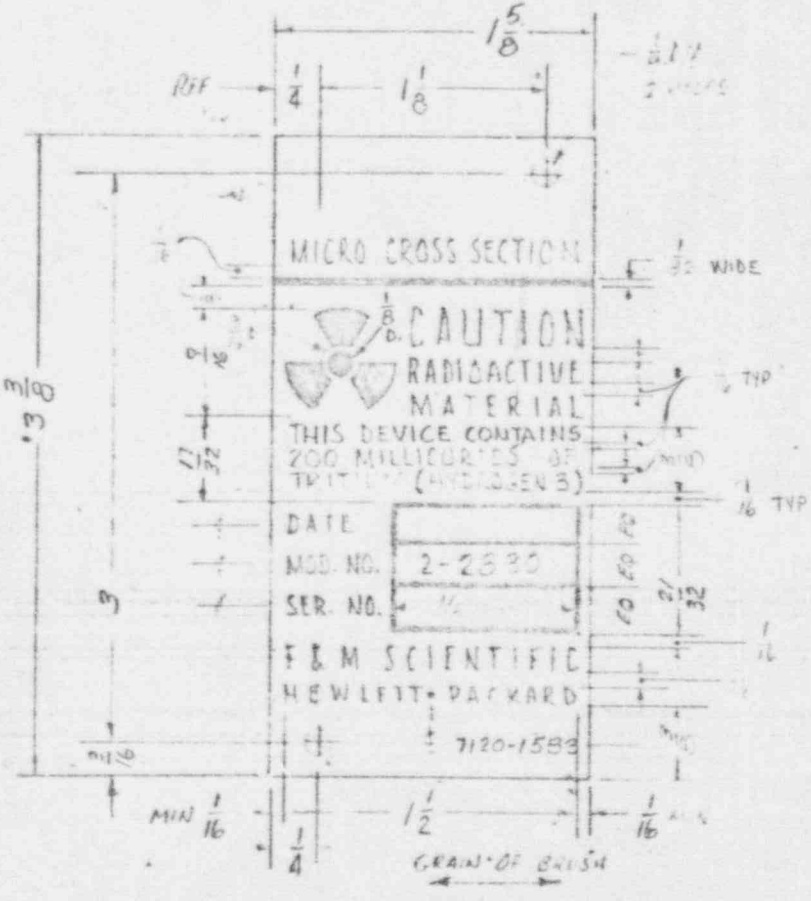
MAT'L: SEE NOTE 3

F&M SCIENTIFIC CORP.
AVONDALE, PA.

SCALE 1:1 SH 1 OF 1

DWG NO. 1-6717 SYM A

REVISIONS				
SYM	ECN	DATE	BY	CHK
B				
C				
D				
E				
F				
G				
H				
J				
K				



NOTES 1. "CAUTION" 18 PT. ALT GOTHIC NO 2.
"RADIOACTIVE MATERIAL", "F&M. SCIENTIFIC" & MICRO CROSS SECTION 12 PT ALT GOTHIC NO 2

PART NO. "7120-1583" 9 PT ALT GOTHIC NO. 2
ALL OTHERS 10 PT ALT GOTHIC NO 2.

2. NO. BOX LINES TO BE .020 APPROX WD.
3 MATL .032 GOLD ANODIZED ALUM PLATE WITH LEGEND IN MAGENTA. HORIZONTAL BRUSH FINISH
4. VENDOR TO FURNISH WITH STRIPPABLE FILM PROTECTIVE COVERING.

A
1-6718 A

		TOLERANCES UNLESS NOTED			TITLE. NAMEPLATE M.C.S. DFT		
		DIMENSION	LINEAR AND TURNED	HOLE C TO C	DWN E R NICHOLS 7-19-66	MAT'L SEE NOTE 3	F&M SCIENTIFIC CORP. AVONDALE, PA.
		FRACTION	± 1/32	± 1/64	CHK [illegible] 7-20-66		
		2 PLACE DEC	± .01	± .01	ENG [illegible] 7-21-66		
		3 PLACE DEC	± .005	± .005	MFG [illegible] 7-20-66		DWG NO. 1-6718 SYM A
		ANGLES ± 0° 30'	HOLES PER ES 2.9				
		THREADS UNIFIED CL-2A-2B		CHAM ± 5°			
3-6688	5750	BREAK CORNERS OR CHAM 1/64 MAX				SCALE 1:1	SH 1 OF 1
NEXT ASSY	MODEL						
APPLICATION							