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AVONDALE DIVISION · Route 41, Avondale, Pennsylvania 19311, Telephone 215-268-2281

April 8, 1969

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

Dear Mr. Bell:

We are preparing to introduce a new gas chromatographic system (Model 7620) which will be equipped at times with radioisotope containing detectors. These detectors, previously identified to you as Models 2-2837, 2-2830 and 2-6195, will be identical to the ones currently being manufactured. However, an improved temperature control system will be employed in the new instrument which entails adding a sensor element to the heat sink surrounding the detector.

The sensor provides feedback to the controller for proportioning temperature control. In other words, the closer the detector temperature is to the set point, the less power there is applied to the heaters. Conversely, the further the temperature is below the set point, the more power applied. The new control system enables thermal stability to within a few degrees of set point despite changes in abient temperature or heat conducting in from other heated areas such as the column oven. Power to the detector heaters will go off if the feedback circuit should open or short circuit.

As you know, our current temperature controllers only supply a fixed power input which adds on to any heat supplied from other sources. In order to prevent excessive supplementary heating, these controllers were preset at the factory so that maximum power applied by the panel control could not exceed the maximum temperature allowed. This feature was described in item 1 of Appendix 1 (copy attached) in a communication to you dated prior to August, 1963 (exact date not known). Since the new

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temperature controller automatically compensates for supplementary heat from other sources, the limitation of maximum power (possible only with our current controllers) will no longer be necessary. Of course, the overheat protection circuit described in item 2 of the attached appendix will be incorporated.

We are also contemplating adding a control sensor to radioisotope containing detectors used on our Model 700 gas chromatographs. The purpose of this modification is to take advantage of proportional temperature control which is often part of the equipment on this particular line of instruments. For the same reasons stated in the previous case, limitation of maximum power would no longer be feasible, but again for the same reasons, no longer necessary since true temperature control would now be possible.

If you should need additional information regarding these proposed changes, please contact me.

Very truly yours,

M B Whittier

M. B. Whittier
Radiation Safety Officer

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Encl.

APPENDIX I

TEMPERATURE LIMITATION OF THE DETECTORS

Two independent systems are incorporated to prevent the temperature of the detector exceeding the safe maximum of 225°C. In the event of failure of one of the systems, the second will take over and prevent temperature overshoot.

These systems are:

1. Matching of the heaters to the load so that maximum power applied by the panel control will not allow the temperature to rise above 225°C.

2. The overheat protection circuit (O.P.C.) (see attached schematic) will operate if the temperature of the detector exceeds the set point of the thermal switch which is inside the detector heat sink. The closing of the switch (H) operates a relay and removes all voltage from the detector heater (I) by opening contacts 15. This relay remains energized, even though the system cools and the thermal switch opens, until a manual reset button (J) is operated. Voltage can then be applied once more to the heaters (I).

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Attachment: Schematic

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