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A-00409

Human Studies Project

October 2, 1951

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Parker, G. W.
Peacock, W. C.
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Sandidge, P
Weinberg, A. M.
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From: A. F. Rupp
J. A. Cox

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REPORT OF A SURVEY ON THE USE OF ISOTOPES IN MEDICAL AND BIOLOGICAL

Madison, Wisconsin, December 10-13, 1947

A. C. Knipp and J. A. Cox

A large number of our isotope customers were present at Madison and it was thus possible to conduct a broad survey of their experiences with Clinton Laboratories' material, their future needs and their suggestions for improvement.

In general most of our customers were satisfied with our material and service. Many of them did not have any suggestions at all - they were pleased with the whole program. The majority of comments could be classed as minor.

The most serious comments were in regard to analyses which we furnish with separated isotopes. More effort is now being devoted to that problem by the new analytical section. Since many of our customers do not analyse our material before use, we must be especially careful lest trouble result when it is administered on the basis of our analyses. In spite of the fact that we do not guarantee the quality of our material any trouble resulting from its use would have an adverse effect on the isotope program. The wider our distribution becomes the smaller will be the proportion of physicians who will actually check our measurements. The University of Oregon, one of the institutions which does make analyses, found that a shipment of P^{32}, CL-106-36A, had only one-half of the activity we claimed. In view of the fact that this institution normally checks our measurements by a constant difference (which may be attributed to the method and standards used) it seems likely that the complaint may be valid.

Dr. Manfield of Dallas, Texas, reported that one of the iodine shipments made to him on August 25 (either CL-107-442 or CL-107-443) had a precipitate, apparently silica. This might be due to irregularities in the bottles used, in which case we should probably go to a higher grade bottle. Dr. Manfield will return the residue to us for analysis. Also, he recently noted gamma radiation in our P^{32}, however, he believed that this probably came from their contaminating the P^{32} with radioiodine.

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Dr. Taborn of Abbott Laboratories explained the elaborate precautions they use to insure that their medicinal products contain no pyrogenic materials. Specially distilled water is used and biological tests are made on rabbits. Even though we do not guarantee our material to be sterile, Dr. Taborn thought that the Federal Food and Drug Administration would eventually require us to use the above precautions.

There were a number of inquiries about our containers. The comment most frequently heard was that beta emitters should be shipped in lighter containers (we now have light containers for P^{32}). Several people mentioned that our containers were hot when they arrived. It seems that we ought to re-examine our method of checking containers before they are packed to make sure that the empty container is free of contamination and to see that its mechanical parts work freely, and after packing to be positive that the necessary tools and instructions are included and that there is no contamination on the wooden box. Our instructions should apparently be rewritten, since several customers asked what the "plumber's friend" (the bottle cap unscrewing tool) was for. A customer mentioned that the bottle cap had leaked in one of his shipments, thus contaminating the container. (We had heard of this happening once previously and have remedied this by putting extra packing on top of the bottle thus reducing tendency of the bottle cap to unscrew when the top of the stainless steel container is removed.) Some of our customers have complained that the metal parts (especially cutter) in our containers have oxide coats which prevent their easy removal and also absorbs activity. This may be due to the fact that the cutter must be heat-treated thus oftentimes destroying the corrosion-resistant properties of the stainless steel. As soon as the new bottle-opener type of tool can be substituted, the cutter can be eliminated and a stainless steel insert used in its place.

A great deal of interest was evident in laboratory apparatus and techniques suitable for work on the millicurie level. Several articles have been written on this sort of thing but evidently they are generally concerned with a somewhat higher activity level. in any case there is still a considerable demand for this information. Dr. Nickson, now of Memorial Hospital in New York, spoke on Health Hazards and whether intentionally or otherwise considerably impedes [illegible]

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to begin using isotopes. Some of the people remarked that perhaps the risks were too great to make it worthwhile.

Several people mentioned that a good article on laboratory technique at the millicurie level would be very helpful. Also a short movie or a set of lantern slides demonstrating such technique would be very popular especially for showing at scientific meetings. The counter situation seems to have been well cared for by the manufacturers but it appears that there still is no good survey instrument such as the "cutie pie". It is understood, however, that this will be put on the market early next year by Sylvania at a price of about $300.

The major portion of the research in biology appears to be centered about C^{14} and a large part of the meeting was concerned with discussions of carbon labeled compounds used as tracers in biological research. While there was no generally thought out list of compounds which would be of interest, Professor Ray of the University of Cincinnati suggested benzene and acetoacetic and malonic esters in addition to the intermediates already planned. In response to the general demand for information about C^{14} technique and health precautions, Dr. Calvin spoke for about ten minutes about the laboratory procedure used at California. He emphasized the use of a hood, careful accounting for all C^{14} in each batch and safe storage of all C^{14} containing by-products. Incidentally, Dr. Calvin says that he has twenty people in his C^{14} laboratory.

There were a number of papers concerning the common stable isotopes, deuterium, C^{13}, N^{15}, and O^{18}. Several of the larger laboratories mentioned that they were getting set up for stable isotope work even though the equipment is more costly than in the case of radioactive isotopes. Dr. Keim from Y-12 was at the meeting and it is understood that sometime soon other stable isotopes will become available. When this happens, the researcher will be able to choose between radioactive and stable isotopes. The use of stable isotopes under these conditions will probably increase considerably although this depends a great deal on their price.

Most people were very pleased with our film badge service. Tracerlab has a

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similar service which they are beginning to offer. However, our service was for a time the only one available and many customers were grateful for the protection.

There was also some disappointment about the long time required to obtain fission products.

Following are some specific comments from our customers:

Tulane University
G. E. Burch, Sam Threefoot

Dr. Burch reported that he was having a great deal of difficulty in checking our radioactivity measurements on P^{32}, (CL-107-18A). He found only 5 mc in a 20 mc shipment.

University of California
J. G. Hamilton, Melvin Calvin

Dr. Hamilton was interested in getting Sm, Nd, Pr and Ce, all carrier-free fission product activities, or if carrier-free material is not available, he wants specific activities of at least 100 mc/mg.

Dr. Calvin was anxious to get C^{14} in high specific activity (50%). He was especially worried about the carbon content of the Ba_3N_2 since he felt that this might be higher than necessary.

Washington State College
Orlin Biddulph

Dr. Biddulph inquired about the possibility of getting iron with higher specific activity. He was assured that this would be available soon.

Washington University
Martin Kamen

Dr. Kamen had no complaint except that we had accused him of contaminating containers. He was sure that the contamination had been done here rather than at his location.

Massachusetts Institute of Technology
C. D. Coryell

Dr. Coryell was particularly interested in fission products he had ordered for a considerable time. He also expects to obtain some superjuice to be sent to Brookhaven.

for study of some shortlived activities. This will be done through project channels.

Columbia University
G. Failla

Dr. Failla had noted some discrepancy in our measurements of P^{32} on PR-171, the total activity did not check with the activity/cc furnished with our analysis. According to Dr. Failla's measurements, either the activity/ml or the total volume of the shipment was in error.

Tracerlab, Incorporated
F. C. Henriques

Dr. Henriques has been telling our customers that many of our prices for separated material are too high. He claims that in the case of sulfur Tracerlab could guarantee 100 mc of S^{35} from our unit for a processing cost of $60.00. This added to our price of the irradiation unit, $33 + $25 = $58.00, would be $118.00 for 100 mc. Our price on this material would be $240.00 plus a handling charge of $25.00. The reason for most of this discrepancy is that since the orders for S^{35} to date have been small, we have had to provide for a 50% decay loss.

Also, it was found that Tracerlab's representatives have been advising our customers to ship our P^{32} to them for processing. It is not known what processing the Tracerlab gives the P^{32}. In any case it appears to be unnecessary, since most of our customers use our P^{32} without any chemical processing.

Massachusetts General Hospital
B. M. Dobyns

Dr. Dobyns was interested in Ca^{45} and especially in higher specific activity. Otherwise he has found our material satisfactory.

American Cyanamid Company
D. J. Salley

Dr. Salley was interested in having phosphorus and phosphorus compounds suitable for organic synthesis irradiated. He has had red phosphorus irradiated and would like to have other compounds such as PCl_3 activated.

Ohio State University
William G. Meyers

Dr. Meyers reported that a shipment of P^{32} had a spot of contamination on the bottom of the wooden box when it arrived. He was interested in obtaining zinc of high specific activity for medical research. Also, he inquired about obtaining the P^{32} unit in some other form than KH_2PO_4. He is treating skin diseases with P^{32} by applying blotting paper impregnated with 5 μC per sq. cm. and the KH_2PO_4 is not suitable because of the presence of the potassium. Separated phosphorus 32 is satisfactory but the cost is too high in some cases where a large area of skin must be treated. It may be possible to prepare a special unit of P_2O_5 in quartz for this type of request.

Harvard Medical School
Dr. Gibson

Dr. Gibson reported that he obtained very important results in studying leukemia using radiozinc, and would like to obtain Zn of high specific activity. Since we cannot furnish carrier-free zinc, he will obtain the highest specific activity available from us and use it as carrier to recover his carrier-free zinc which he obtains from cyclotrons.

Massachusetts Institute of Technology
Robley Evans

Dr. Evans expressed interest in lighter shipping containers for phosphorus. We now have a light weight container which may be used for isotopes not having gamma radiation.

Howard University
Herman Branson

Dr. Branson asked about the purity of our P^{32} since he had been one of those advised by Tracerlab to send it there for processing.

University of Michigan
Drs. Gomberg and Lampe

Dr. Gomberg and Dr. Lampe remarked that they had trouble unscrewing the top of a stainless steel container on which the two pegs designed to keep the container from turning in the lead shield were missing. Also, they believed that the instructions furnished were not sufficiently explicit as to how the container should be opened.