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MOUND DECLASSIFICATION
DATE: 11/15/97 INIT. O

MOUND LABORATORY-MONSANTO
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MOUND LABORATORY
OPERATED BY
MONSANTO CHEMICAL COMPANY
MIAMISBURG, OHIO

BZ ✓

PROGRESS MEMORANDUM

October 16, 1952 - November 15, 1952

CONTROL SECTION

Abstract

MOUND DECLASSIFICATION REVIEW	
1ST REVIEW DATE: <u>9/24/97</u>	DETERMINATION (CIRCLE NUMBER(S)) <input type="checkbox"/> 1. CLASSIFICATION RETAINED <input type="checkbox"/> 2. CLASSIFICATION CHANGED TO: _____ <input type="checkbox"/> 3. CONTAINS NO DOE CLASSIFIED INFO <input type="checkbox"/> 4. COORDINATE WITH: _____ <input type="checkbox"/> 5. CLASSIFICATION CANCELLED <input type="checkbox"/> 6. CLASSIFIED INFO BRACKETED <input type="checkbox"/> 7. OTHER (SPECIFY): _____
AUTHORITY: <input type="checkbox"/> AOC <input type="checkbox"/> DAC <input type="checkbox"/> DADP	
NAME: <u>T.M. FLANNAGAN</u>	
2ND REVIEW DATE: <u>11/15/97</u>	
AUTHORITY: <u>DR Ratay</u>	
NAME: _____	

Group 20

One hundred eighty-eight purity determinations were made.

The macro purity investigation was terminated. A final report will be written.

Group 22

Approximately \$20,000 worth of scrap precious metals will be made available for surplus metal sales.

The alpha counting procedures and results are being compared to the calorimeter by means of a calorimetered solution.

Group 33

Forms and instructions for the cost estimate for activating Scioto were issued to the groups in the Operations Division.

DETAILED REPORT

Group 20 - Electrolytic Purity Assay

During this period 188 products were assayed; eight required resampling. To date 1467 solutions have been run; 82 or 5.6 per cent required resampling. This makes a total of 1549 purity runs for the year.

GROUP 20
Excluded from automatic
downgrading and
declassification

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Unauthorized persons are prohibited from
accessing this information in any
manner to
the extent that it is
classified in accordance with
the provisions of Executive Order
11652, as amended, and
Departmental Regulation
1.1, as amended.

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Ten bismuth analyses were made for R. W. Endebrock.

EQUIPMENT AND MAINTENANCE

Four foils were lost and recovered this period. One of these foils was lost on the floor of T-260 and created a high level of contamination. However, the lab was decontaminated in one day and without difficulty.

Thirty-two foil holders were cleaned and adjusted since the last report. One set of new tweezers was installed and three tips were straightened.

M.I.B. #1 was thoroughly cleaned, lubricated and adjusted this period.

DEVELOPMENT

A comparison of Data on Normal and High Curie Products

A comparison of micro-assay data of 11 high curie products averaging 123 curies per solution and 11 normal products, selected randomly, averaging 67 curies per solution was made and the following information obtained:

The normal solutions had an average recovery of 84 per cent and an average purity of 96.5 per cent. The high curie solutions had an average recovery of 67 per cent and average purity of 94.5 per cent.

It is believed all the processes of micro-assay will be applicable to high curie value product solutions except that perhaps the plating period should be extended to give maximum recovery of the plateable product. If through an extended plating period the percentage recovery obtained is comparable to that of normal curie value solutions, a problem in counting may result. This should be easily eliminated by changing from the present four hole plate position in the logic to the one hole plate position.

Macro-Assay Method Development

This project has been discontinued. A final report will be written.

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Group 22 - Inventory

Operations

Work is continuing on the revision of the Standard Operating Procedures involving the accountability of Polonium, Actinium, and Radium as outlined in last month's Progress Report. The procedure for Radium has been issued and is technically in effect, although actual activation is being delayed pending further discussions with Group #2. The procedure will be closely associated with Actinium accountability problems; the latter are scheduled for discussion with Group #2, and it is expected that formal initiation of the Radium procedure will ensue during the course of these discussions. The Polonium accountability procedure is being rewritten and revised from the standpoint of simplification wherever possible; particular attention is being given to the consolidation and elimination of standard paper forms used in the procedure. The idea of the reduction of paper forms in use has been carried over to the procedure for the control of Precious Metals, and this procedure will also be revised along these lines as soon as time permits.

Word has been received from the Process Section that their work on the investigation of the effect of the introduction of Beryllium into the processing lines has proved inconclusive; no provable correlation between the presence of Beryllium in the initial solution and resulting high-neutron products was found. We have been informed that they will again accept spent initiators for destruction although none have been processed during the month.

The organization of the scrap metal sale mentioned in the previous report has been moving slower than anticipated due to the unexpectedly large amount of platinum turned in by the operating groups. It appears now that this item will aggregate some \$20,000, and the material must be sorted and weighed prior to sale.

Development

The discrepancy between calorimetric assay and "Alpha" assay of the same solution

During the month, three aliquots of a master solution were calorimetered, and these solutions used for the study of the dilution, mounting, and counting techniques involved in an "Alpha" assay. Dilution and mounting techniques exhibited during this experiment were below the standard possible of achievement as demonstrated in previous experiments of this nature. While this will have an effect on the conclusions drawn below and should be remembered, the large amount of data collected (270 slides) will tend to randomize the effect of the variance introduced

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by dilution and mounting techniques where the entire 270 slides are considered. An examination of the data collected revealed the following:

1. The method and techniques used in assaying solutions calorimetrically provide reproducible results. Since these results are reproducible, they are also presumably accurate.
2. The average of counts from 270 slides was within 0.6 per cent of the value determined by the calorimeter assay.
3. An average of the counts from ten slides made from the dilution of a calorimetered solution provides results within 2-1/2 per cent of the calorimeter value of the solution.

Some random observations on the above conclusions follow:

1. This is the first time an investigation was made of repeated sampling for calorimetric assay from the same master solution. Three assays of this master solution agreed very well - the three values for 8.0 ml. in each case were 3.96, 4.01, and 4.07 in chronological order. One week elapsed between each assay, and it should be remembered that some evaporation of the solution would take place over such a period; this would tend to concentrate the solution and provide successively higher values for the assay.
2. The agreement of the "Alpha" assay and the calorimetric assay as indicated from the average of the 270 slides is in contradiction to previous work. However, the recent cooperative survey with the Research Division revealed the fact that the collodion cover used by the Inventory Group was too heavy and was absorbing part of the disintegrations. A change to a weaker solution of collodion was made since the last cross-checks were run, and probably the previously determined low counts by the "Alpha" assay methods were a result of the use of the heavier collodion.
3. The 2-1/2 per cent level of precision for the average of ten slides can obviously be improved by more precise dilution and mounting techniques.

Group 24 - Calorimetry and Counting

Operations

The assay work load was slightly heavier this period.

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The stock of finished guns and gauges has been maintained at a level which will assure sufficient numbers of these items to meet our immediate commitments and provide a surplus to apply toward future shipments.

Counts on the two Ra-Be neutron counting standards recently obtained from Site Y indicate that the values supplied with the standards are not in agreement. Results of a series of twenty-seven counts taken over a period of four weeks show that the second source (E-970), when compared with the first source (E-969) is approximately nine percent higher than is indicated by the value which accompanied this source. The standards do not differ widely in size their values, according to Site Y, being E-969, 2.09×10^3 and E-970, 2.37×10^3 n/s. They are similarly mounted in cases of the same kind in which they are always counted. In each set of counts the two standards were apparently counted under practically identical conditions. All 27 counts were taken on the T-29 Neutron Counting Geometry, also obtained from Site Y. Of these two standards only E-969 has been used in counting initiators for shipment.

No further internal pressure difficulties have been experienced with the T-29 Geometries during this period. The pressure gauge fitted to one of the drums has been checked daily and has shown no reading at any time. The other drum, fitted with a relief valve, expelled some air and a few milliliters of water on at least two occasions. The equipment however should be adequately protected since the valve is designed to open at about one pound pressure.

Estimates were made for the 1953 and 1954 budgets for Group #24

In addition to the regular production work, the following assays were made for other groups during this period:

<u>No.</u> <u>Assays</u>	<u>Type</u> <u>Sample</u>	<u>For</u> <u>Group</u>
1	Initiator (Po 208)	Chem. Group 3
3	Active Solution	Inventory
4	Prod. Gun	Micro-Assay
1	Alpha Source	Y Section
4	Prod. Gauge	Neutron Source
11	Prod. Gun	" "
18	Neutron Source	" "

Group 33 - Special Problems

The Scioto Laboratory Activation cost estimate instructions and forms were distributed to the operating groups. The estimating work is to begin immediately and be finished about the middle of December.

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Kenneth Busch has completed his orientation tour of the Process and Control Sections.



P. J. Lowry

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- Copy 1 - Mr. E. C. McCarthy
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