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MOUND LABORATORY-MONSANTO
Central File No. 50-1-15

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MOUND DECLASSIFICATION REVIEW	
1ST REVIEW-DATE 9/18/97	DETERMINATION (CIRCLE NUMBER(S)
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Dr. M. M. Haring

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Personnel Justification,
Operations Division

GROUP 1
Excluded from automatic downgrading and declassification

Summary

	Present Justification	Present No. On Hand	New Justification	Number Jan. 1, 1950
Management	5	5	5 5	5
Process Section				
Group 15	15	12	~~11~~ 12	11
Group 16	11	11	~~11~~ 10	11
Group 17	15	13	11 11	12
Group 18	3	3	3 3	3
Group 19	9	10	~~12~~ 11	12
	53	49	48 45	49
Control Section				
Groups 20 & 21	14	12	~~12~~ 11	12
Group 22	10	9	9 9	9
Group 24	10	8	8 8	8
Group 25	11	8	~~8~~ 7	8
Group 33	9	9	10 10	10
	54	46	47	47
Clerk Typist			1 / 46	
"Y" Section				
Group 29	7	6	5	5
Group 30	6	5	5	5
Group 31	8	6	6	6
Group 32	2	3	3	3
	23	20	19	19
N.S. Group	5	5	5	5
Totals	140	125	124 120	125

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As of February 1, 1949, 155 persons were justified for the division and 142 persons were on hand. As of January 1, 1950, the division will have lost 17 persons since February 1, 1949, and increased its work output.

Also, during the past year one section chief's job and two group leader's jobs have been eliminated.

If any personnel should leave we do not intend to hire any replacements but will either just operate at the reduced personnel in the group or make a transfer if necessary. It is expected that we could attempt to lose 4 or 5 persons more in this manner. Of course, if a person with specialized training should leave for whom no replacement is available by transfer we would hire a new person.

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Foreword

In this justification of the personnel of the Operations Division, cognisance must be accorded to the fact that a large number of the chemists are doing work that could be done by personnel of a lower rating.

This condition is readily explained by considering the history of the project. Since its inception and to the present time this work has needed qualified chemists and engineers with a minor demand for technicians or operators. This was due to several factors: the chemistry was new, scientific data had to be accummulated, a process had to be developed, the work expanded to take care of increasing requirements, design and operation running concurrently, and two new large plants to be designed, built, and one at the present time put into operation. Other points such as value of the product, hazard, and proper understanding of the nature of the material, could be mentioned including some past experience with personnel of inferior technical knowledge that were tried as operators in an earlier period without too much success.

However, the solution to the situation is not simple. For one point, the situation possibly involves up to about forty people. The replacement of such a large group unless worked out with care and over a period of time could have a devestating effect upon the morale of the personnel and, of course, the work of the division.

Then too the situation has not been without benefit from the labor viewpoint. The fact that our personnel consists principally of technical people has been a factor in limiting the scope of the union activity. It is, also, so far from desirable to have operators and probably a consequent union group in the division that the present course should be pursued to maintain our present freedom of action which has enabled us to progress so far.

Another factor could be stated in question form. If required to operate Scioto Laboratory, particularly without being allowed much time to acquire personnel, from whence could we readily obtain technically trained personnel, especially with knowledge of our work?

If the Scioto Laboratory question is resolved - say by its being put into at least partial operation, and personnel in the category of operating technician freed from danger of unionization, then probably some solution could be obtained. However, as the situation stands, there seems to be no recourse but to maintain our present scheme of utilizing the higher calibre technical personnel as long as possible.

MANAGEMENT:

Division Director	1
Section Chief*	3
Secretary	1

*Includes Assistant Division Director

PROCESS SECTION

Group 15 - Concentration Cells

Operating Supervisor	1
Operating Chemist	1
Asst. Operating Chemists	9

In addition to the operating supervisor one man is required to assist in supervision, to maintain records, to plan and oversee maintenance work. He also checks apparatus for the purpose of preventive maintenance.

Six men are required for the operation of the two concentration cells. The operation of one cell required the constant attention of three men. During shutdown of one cell the men thus relieved help to carry on those necessary auxiliary duties such as assaying of slugs, grinding of powder, checking stocks of critical items, etc.

The remaining men are required for records and material accounting, to maintain stocks of reagents, load slugs, supply relief to the men operating the cells, maintain records for standby stocks, to allow for periodical inspection trips to Scioto Laboratory, maintain an up to date operating manual, prepare an operating manual for Scioto Laboratory, assist in housekeeping and other similar jobs required for the performance of this group.

Group 16 - Process Laboratory

Operating Supervisor	1
Operating Chemist	1
Asst. Operating Chemists	6
Technical Trainees	3

In addition to the operating supervisor one man is required to help with the supervison. This includes daily assignment of chemists, constant supervision of maintenance and clean up work, and cognisance of all operating and health conditions.

Six men are required for operational and maintenance work in three lines of special hoods. The procedures in these hoods are such as to require almost constant attention, even during normal operations. This includes the preparation of reagents and other materials used in the hoods.

The other men are required to handle material accounting and records. This includes checking of daily work sheets, preparation of daily and weekly reports, monthly activity and critical equipment inventories. They also serve in an operational capacity when needed. They are also required for the handling of the completion of the numerous reports and manuals for Scioto Laboratory and to allow for the regular inspection trips to this Laboratory.

This group has more trouble with men becoming contaminated than any other group in the section. The number of personnel in the group with high urine count has averaged 16% during the past six months. This is the equivalent to 1.6 men unavailable for operations work during this period. Men who are prohibited from working with activity are used, when possible, for some of the non-operating work outlined above.

Group 17 - Electrolysis Laboratory

Operating Supervisor	1
Operating Chemists	2
Asst. Operating Chemists	5
Technical Trainee	1

In addition to the operating supervisor one man is required to assist in supervision. This includes daily assignment of chemists, constant supervision of maintenance and clean up work. He insures the observance of all operating procedures, health and safety rules.

Five men are required to operate and maintain the four plating lines. This includes the preparation of reagents, fabrication of platinum and other related duties of an auxiliary nature.

One man is required to handle records and material accounting. This includes checking of daily work sheets, preparation of daily and weekly reports as well as monthly activity and critical equipment inventories. He is available in emergencies to help in processing work.

The remaining men are responsible for the completion and maintenance of an up to date operating procedure, and to help out in an operational capacity as needed.

They also are being used for the completion of the reports and manuals for Scioto Laboratory and to be available for the frequent inspection of the Laboratory.

As shown in the summary of personnel this group has one man in excess.

Group 18 - Hydrolysis House

Asst. Operating Supervisor	1
Asst. Operating Chemist	1
Chemical Operator	1

In addition to the operating supervisor one technical man is serving as an aide and alternate for this man as well as helping with the regular operational work. He is also responsible for familiarity with the technical details of the Waste Disposal process so he will be available to that group in emergencies.

The non-technical man handles routine operational duties. He also is familiar with some of the operational duties in the Waste Disposal Process. Relief of this man is provided by a non-technical man from the Waste Disposal Group.

Group 19 - Waste Disposal

Operating Supervisor	1
Operating Chemists	2
Asst. Operating Chemists	3
Operating Technician	1
Chemical Operators	5

One group leader.

Two technical men are required on a full time basis for operational duties. They are responsible for the successful performance of the process. Each has two non-technical men assigned to help him.

One technical man is required to handle maintenance details on processing equipment. This includes decisions on best way to solve these maintenance problems, responsibility for completion of maintenance work, as well as the responsibility for the accomplishment of changes and additions being made to the process equipment from time to time. He also assists in operational work when needed.

One technical man is required to maintain adequate stocks of operating supplies, replacement parts, etc. This man assembles data and helps in preparation of reports. A detailed record is being kept of all operating data since the process is still in an experimental state. This man is also capable of assisting with operations if necessary.

One technical man is needed for analytical work. This includes taking samples, slide mounting (for both operations and research), analysis of water as received as well as at several points in the process. This man is also responsible for selection and delivery of low activity samples for outside analysis.

Five chemical operators are needed as follows: Four for regular operational work, and one to help on special operational work and to help with work in the HH Building.

It is often necessary to operate more than fourty hours per week in order to handle the volumes of water received. This extra work has been accomplished without outside assistance by the expenditure of extra effort on the part of the men in the group.

CONTROL SECTION

Groups 20 and 21 - Micro Assay Group

Operating Supervisor	1
Operating Chemist	1
Asst. Operating Chemists	9
Technical Trainee	1

The primary functions of these groups are to carry out the mass purity determinations for the Operations Division, the research and development necessary for improvements in the present method, and to work on allied problems.

The major operations of the group consists of plating, weighing, and counting. The plating operation requires a minimum of three men. These are concerned with mounting and removing runs, keeping the hoods in operation, mounting cold micro foils, preparing bridges, half cells, etc.

Two men are required for the balance room, one man on each of two balances to handle the taring of cold foils and the weighing of plated foils, and maintaining the proper records.

One man is required for Logne-L counting and the calculation of results.

In addition, the full time of one man is now necessary to maintain the records and inventory of the group. This man assembles and files all group data, keeps graphs of production runs, makes all activity transfers, and compiles the monthly inventory.

Further, the use of the present foil holders in operations requires the regular decontamination of these holders by electrolytic plating and stripping. This plus other repair and maintenance on these holders is almost a full time job for one man.

From the nature of the operations, it is necessary to have a man to coordinate the activities in the various rooms, and to serve as an assistant supervisor.

Recently the group has assumed responsibility for the routine colorimetric analyses required by the Operations Division, in addition to which some development studies are being carried on in more completely analysing the problem of contaminating ions in this work. This, plus other minor short term problems continually arising, requires the services of one man.

As to Group 21, one man is spending full time on the problem of developing a method for a practical macro purity determination.

It is to be noted that general points of laboratory maintenance, preparations, etc., were not included, which are performed by the personnel at odd times as the regular work permits. In addition considerable time is being spent on Scioto Laboratory reports and manuals, and will be in the future for required inspection trips and laboratory changes and additions.

Group 22 - Inventory Group

Operating Supervisor	1
Asst. Operating Chemists	2
Laboratory Assistant B	4
Clerk - Typist B	2

The prime functions of this group include the preparation of slides for solution assay at all stages of the process for the Operations Division. In addition, the group is responsible for the inventories of activity, precious metals, critical metals, etc., and for the preparation of periodic reports on the above.

The personnel employed in this group may be classified under three general headings: technical, clerk, and laboratory aids. The specific duties of each and the number of personnel required are discussed below:

Technical

A group leader to carryout the normal supervisory and administrative duties.

A group leader assistant to handle the development of methods and equipment for Mound and Scioto Laboratories; maintenance and inspection of Scioto Laboratory; and to assume group leader's duties when necessary.

A supervisor of laboratory operations to schedule operations, which may include discussion with the group leader; supervise all routine operations of laboratory; calculate results from data furnished by Counting Room; and organize and distribute results.

Clerk

A clerk is needed to maintain the precious and critical metals inventory, make up the required monthly reports and quarterly audit; maintain the activity log; and do miscellaneous typing.

One clerk is required to maintain the activity inventory and issue the required weekly and monthly reports. The duties entail much detailed bookkeeping and accuracy is a paramount consideration. The monthly

averages 50 type written pages, and accurate data must be available early in the month.

Laboratory Aides

The laboratory aides collect samples for assay and glass ampules for decontamination from other groups via the "hot" corridors; mount BH slides, either research, calibration, or routine; mount alpha slides; prepare slides for mounting; prepare solutions and fill "line" bottles; decontaminate ampules; answer calls for activity stored in safe; clean up - such as discard solutions, collect samples into common container, wash glassware, etc; and assist in the counting room when necessary.

Two men are required to mount the BH slides. One man makes the slides while the other removes them from the hood, boxes, numbers, and sends the slides to the counting room. These jobs are exchanged at intervals of about an hour to relieve fatigue.

It is not unusual to mount 200 slides over an eight hour period, this is at the rate of a slide every 2.5 minutes.

One man is assigned to diluting solutions and preparing alpha mounts. Time is of the essence as results are wanted as soon as possible, and one man must be free for this duty as required.

One man is assigned the remaining duties as outlined above. During his absence in collecting samples from behind the lines, the man assigned to alpha mounting answer the calls for material from the safe.

Group 24 - Assay Group

Operating Supervisor	1
Asst. Operating Physicists	2
Instrument Operators A	4
Instrument Operator B	1

Complete staffing of this group requires three technical men and five instrument operators.

Of the three technical men one serves as group leader and the other two are individually in charge of counting and calorimetry.

The group leader, in addition to administrative and supervisory duties, planning and overall responsibility, also performs considerable detailed work on quality control and preparation and transfers of shipments, working against deadlines in each case. In the event of the absence of either of the other two technical men, the group leader is required to serve in two capacities, a condition which could not be satisfactorily maintained for any considerable time ie. not longer than the usual vacation period.

The technical men in charge of counting and calorimetry are responsible for the calibration, operation and maintenance of equipment in their respective sub-groups. They select and order samples, check samples for contamination, assign work to operators, supervise operators, check calculations, and transcriptions, keep records of results, report results promptly, and one of them must serve in the place of the group leader when the latter is absent. From an administrative point of view a total of three professional men represents the practical minimum for the group.

The five instrument operators are assigned two (2) to calorimetry and three (3) to counting.

Each calorimetry operator has four instruments to calibrate, at least weekly, and to operate on a daily basis. This is more exacting work than most instrument operation. It requires a considerable understanding of the instrument and more than average attention to detail. The work is performed according to a fairly elaborate procedure and involves calculations of considerable complexity.

The three operators in the counting room have seven counters available for operation, five of which are usually kept in daily service. One operator is assigned, full time, to the counting of "Y" samples (two counters used) due to the fact that these samples must be counted as soon as received and results reported promptly. In general, the full time of one operator is required to secure satisfactory performance. The other two counting operators do all the counting work on guns and gauzes, including gamma counting and a series of neutron counts on each item in the stockpile which is maintained at a size to meet future commitments for at least one month in advance. The counting instrument operators run the samples assigned, calculate and record results, and run calibrations as assigned. From past experience it has been found that two operators can handle this part of the counting work ("Y" counting excepted) comfortably while one operator would have difficulty in getting the work out promptly when final counting for the shipment was being done. Final counts are run, on the average, for six days, or about one-fourth of the working days per month.

Group 25 - Counting Group

In Charge		1
Instrument Operators	A	5
Instrument Operator	B	1
Laboratory Assistant	C	1

A summary of the personnel requirements for this group were submitted in a memorandum to Mr. E. C. McCarthy from Dr. E. A. Rembold on November 30, 1949. The total of eight persons as stated in that memorandum still applies. The following is an abstract of that memorandum.

Manhour Analysis

Routine Instrument Checking

Instrument	Number	Manhours/day per Instrument	Total Manhours/day
Logac-S	4	2	8
Alpha	4	1.5	6
Logac-L	2	0.5	1
Simpson	2	3.0	6
		Total	21

Sample Counting - (Based on Sample Counts for May through October)

Instrument	Average Counts on Samples/day	Average Working rate, Samples/hr.	Manhours/day
Logac-S	95	11	8.5
Alpha	37	10	3.7
Logac-L	72	12	6.0
Simpson	10	6	1.7
		Total	19.9

Instrument Maintenance

Type	No. of Instruments	Manhours/day
Determination of plateaus, geometry coincidence, etc.	12	3.5
Background cleaning, etc.	10	5
Mica changing	6	0.5
	Total	9.0

Receiving and Checking Samples

Type	Average Samples/day	Manhours/day
Logac-S	60	1.5
Alpha	30	.5
	Total	2.0

Overall total, manhours/day = 51.9

On the basis of the total above, using eight hours per day per girl, a calculated total of 6.5 or actually six instrument operators is indicated. Added to this should be one person more or less exclusively concerned with supervisory and administrative duties. Further, in the analysis above certain vital operations involving general materials preparation and maintenance were not included, such as slide preparation, mica splitting and weighing, paper cutting, slide box preparation, small article decontamination, etc. This requires almost the full time of one person, not necessarily of instrument operator calibre or technical training. By doing this, the instrument operators are free to efficiently perform the functions for which they have been trained.

In addition the supervisor of this group is concerned with the preparation of the manual for Scioto Laboratory, periodical inspection of the Scioto Laboratory, as well as the preparation of purchase lists which are not normally associated with the duties of Counting Room supervision.

Group 33 - Process Development Group

Operating Supervisor	1
Chemical Engineer	1
Research Chemists	4
Asst. Chemical Engineers	2
Draftsman A	1
Operating Technician B	1

The Operations Development Group was only recently formed as such upon the reorganization of other groups. It has as its prime purpose the responsibility for applied research and development for the Operations Division. Included in this are design work, drafting with attendant file, maintenance, consulting work on engineering and chemical problems for the division, and overall development work on improvement of present methods or the incorporation of new procedures.

The group must of necessity be quite flexible and it is difficult to propose an exact number for the required staff. There are sufficient problems, both long and short range, which should be worked on that small variations in personnel could be accommodated with changes in schedule and priority assignments.

At present the group consists of 10 technical men, one of whom is currently assigned to the Engineering Division on a temporary loan. The current problems being worked on include: concentration cell development; preparation of complete, up to date drawings of the present concentration cells; mechanical stripping of slugs; stannous chloride process; decontamination of platinum; and micro balance studies.

These are the major problems, with many smaller short term studies also being investigated concurrently. Other problems are available contingent upon the availability of personnel. A more complete resume will be available in the near future.

It is definitely felt that the group should continue to expand as needed and to serve as the nucleus for all development and research work for the division for overall increased efficiency, serving also as a pool for engineering and chemical talent where required for the whole project.

"I" SECTION

Group 29 - Parts Preparation

Operating Supervisor	1
Asst. Operating Chemists	4

The general functions of this group are to carry out the distillation of activity into prepared parts; the deposition of a thin nickel "holddown" coat; the recovery of activity from materials and equipment; and to assist Group 31 in making autoradiographs of the parts. It is also required to carry out, in conjunction with the development group, programs designed to improve the operations in regard to efficiency, quality, and safety, and to prepare special items requiring the use of distillation techniques.

Under present operating quotas the four assistant operating chemists are assigned to do all of the above general functions on a routine rotating basis. The preparation of special items is assigned in a similar manner to be done as the general functions schedule permits. These men are also employed in the development work directed towards the improvement of techniques and equipment used by this group and in development work on new or modified products.

Group 30 - Assembly

Operating Supervisor	1
Operating Chemist	1
Asst. Operating Chemists	3

The general functions of this group are to carry out the assembly, "canning" and finishing operations for the "I" Section. It is also required to carry out, in conjunction with the development group, programs designed to improve the operations in regard to efficiency, quality and safety.

Under present operating quotas three men are needed to do the routine assembly and "canning" steps. These operations require the handling of large quantities of activity in a concentrated form given off a strong gamma ray flux and a neutron flux. If any smaller number of men were available to do this work for any extended period of time due to illness, low white corpuscle count, etc., it is felt that the increased radiation that will be absorbed by the remaining men due to the extra load they will be carrying will be over the allowable limit.

One man is assigned the task of performing the finishing operations. These consist of the application of the cold finishing coat; measuring for size to come within specified tolerances; expediting for assay counting; the identification marking and the compiling of all the necessary data required before shipment can take place. These operations also entail considerable radiation absorption by the worker.

These men are also gainfully employed in development work directed towards the improvement of techniques and equipment used by this group; the preparation of polonium compounds for research X-ray diffraction analysis; and development work on new or modified products.

Group 31 - Surveillance

Operating Supervisor	1
Asst. Operating Chemists	5

The general functions of this group are to carry out the operation of applying a metallic envelope to metal parts; the making of autoradiographs; the analysis of the autoradiographs; the accounting of "Y" Section materials; and the preparation of the numerous reports necessary for the "Y" Section.

Under present operating quotas two assistant operating chemists (female) are needed to do the coating of metal parts with a metallic envelope.

One assistant operating chemist (male), with the part-time assistance of a man from Group 29, makes the autoradiographs of parts prepared by Group 29.

One assistant operating chemist (female) is assigned the task of analyzing the autoradiographs by means of a microphotometer and from this analysis to calculate the distribution of radioactive material on the part photographed. This person is also responsible for making statistical analyses of "Y" Section data to determine where and in what direction improvements in results can be attempted.

One assistant operating chemist (female) performs the materials routing; accounting for all restricted materials-radioactive or otherwise; preparing, editing and checking all reports of final products issued from "Y" Section; compilation of data involving the problems of the section; preparing and editing of development reports from "Y" Section.

These people are also employed in the development work directed towards the improvement of techniques and equipment used by this group and in development work on new or modified products. At various times they have been called upon to work in cooperation with the Research Department on problems related to "Y" Section work.

In addition to these specified tasks the personnel of these groups must furnish manpower for routine inspection of Scioto Laboratory; assist in the compilation of operating manuals; maintain and replace operating equipment; design and supervise construction of new equipment for use at Mound or Scioto Laboratories.

As a result of the improvement of techniques and equipment these groups have been able to reduce their justified personnel from a total of 21 persons as of December 31, 1948 to a total of 16 persons as of this date while increasing their output by 76 percent with considerable improvement in the product quality.

Group 32 - Development of Technique

Research Group Leader	1
Operating Chemists	2

This group consists of one operating supervisor, and two operating chemists.

The primary function of this group is to aid in the development of "Y" Section's processes and equipment and in the solution of any special problems that may arise.

The personnel of this group fulfills these requirements by performing the following services:

Direct experimentation on full time problems where the urgency or the scope of the investigation cannot be handled by the operational groups of the "Y" Section.

Coordination of the part-time development work done by the operational groups of the "Y" Section. This includes the scheduling of the problems and the relating of the results obtained in terms of the section as a whole.

Coordination of development work done by the section with the Research Division. This entails the preparation of reports on work done by the section which is of general interest; the preparation of reports on non-production items and requests for work to be done on a non-routine basis by other sections. The work of the other sections can then be integrated into the scheme of "Y" Section operations.

The instigation of frequent surveys on operational data to locate problems and to determine methods of solution.

Since the personnel of this group have had extensive training in the "Y" Section operations and equipment design they are well qualified to take over any problem that may arise without a preliminary indoctrination into the background of the problem.

The men in this group are also available to be called upon to fill in for any of the operation groups when temporary vacancies

occur: to help out on any of the ordinary projects assigned to the section such as the design and installation of Seioto Laboratory, preparation of manuals, etc.

Group 34 - Neutron Sources

Research Group Leader	1
Operating Chemists	3
Asst. Operating Chemist	1

The work of this group is devoted to the making of neutron sources to different specifications as required by outside agencies. The requests for these come through the Atomic Energy Commission and the group acts as a supplier for the Commission on sources involving polonium. In addition, research is done on the making of sources in different ways, instrumentation, techniques and other matters pertinent to the work.

Actual production of such sources is intermittent and is dependent for the most part on outside requests. The making of a source requires a minimum of two men and it is usually advantageous to utilize three. Since these sources are "hot" the health precautions required are quite great.

An outline of the program of research work for this group is given:

A. Standardization of neutron source production.

B. Improvement of source efficiency.

C. New types of neutron sources.

I. Preparation of standard liquid neutron sources.

II. Preparation of standard solid neutron sources.

D. Engineering studies on dryboxing and shielding.

E. Comprehensive study of detection and measurement of neutron produced by polonium alphas.

I. Operating characteristics of the Hanson neutron counter.

Work is being done on this program and some of it, like the engineering studies, involves other groups.

The backgrounds of the men in this group, which includes electronic experience, gives them a fair amount of independence for working on the varied problems related to the work.

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As previously indicated the larger part of the work of this group is of a research nature and the group is just about the right size to carry out the work on a reasonable time basis.

E. C. McCarthy

ECMcC:mm

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Copy: 1 - Dr. M. M. Haring
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5 & 6 Central Files

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