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MONTHLY PROGRESS REPORT OF THE CHEMISTRY AND METALLURGY DIVISION

June 1, 1945

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MONTHLY PROGRESS REPORT OF THE CHEMISTRY AND METALLURGY DIVISION

June 1, 1945

The processing of plutonium as received from W is going smoothly. In spite of wide variations in the product as received both in regard to impurities (such as silicon, phosphorus, tin, iron, chromium, nickel, platinum) and oxidation state (present material is about 50% plutonyl nitrate), the wet purification is working well and giving an excellent product, with yields usually only a few percent below the expected 95 to 98%. The reduction of the fluoride continues good, with yields of 98 to 99% depending on the quality of the fluoride supplied. In dry chemistry, a new oxalate ignition cycle and HF procedure has greatly reduced the treatment time required and improved the fluoride produced.

Four attempts to fabricate pure plutonium into 2" diameter hemispheres (630 g) met with failure. The large volume change on transformation from gamma or beta to alpha on cooling after hot pressing invariably resulted in cracks and warping of the diametrical plane. This difficulty was not encountered in 2" diameter 600 g cylindrical discs, and could probably be overcome in hemispheres by directional transformation. Because of the greater efficiency expected from a low density Christy gadget, the decision was made to concentrate on delta plutonium -- which also promises to be free from fabrication trouble associated with volume change after pressing. The alloy of plutonium with 3% gallium after suitable homogenizing treatment is readily retained as delta phase at room temperature, is quite malleable either at room temperature or at temperatures up to 400°C and has proven to be quite stable under any reasonable conditions of treatment.

Our losses of plutonium as determined by inventory are now running about 1% of the amount processed. While this is a considerable improvement over earlier

work, we still hope for a reduction in losses by an order of magnitude. The study of losses is greatly complicated by the fact that our assay methods have uncertainties of 0.2 to 2%, so that actually the 1% loss may very well not be real. We now believe almost 0.5% (or half the apparent loss) may be attributed to changes in concentration of samples prior to analysis due to the decomposition of water by the 49 alpha-particles. This error will be kept to a minimum in the future.

Group CM-11 completed the fabrication of 38 kg of 25 into the form of cubes for experiments at Omega. The processes for casting and machining gun target and projectile rings and for the bolt have been completely developed and as soon as the cube material has been reconverted, fabrication of final projectile rings will start.

DO
b(3)

This work will be found in the report of CM-6, along with studies on electroplated protective coatings, which are by no means unpromising. Many advances are being made in our knowledge of polonium, an element in some

respects newer than plutonium. In this regard the report of group CM-15, particularly jobs 5 and 12, will be found very interesting.

From the report of group CM-14 it will be noted that RaLa separation difficulties mentioned last month have been solved by a modification of the chemical process and by mechanical improvements. Yields of 85% are now consistently achieved at 500 curie level.

J. W. Kennedy

C. S. Smith

R. W. Dodson

[redacted]

GROUP CM-1 MONTHLY REPORT -- R. F. Dunlap, Group Leader -- June 1, 1945

JOB AND PERSONNEL	PROGRESS
2. General safety Chemistry and Metallurgy Division Safety Committee (Hammel, Hempelmann (A-6), Hinch, Kershaw (A-12), Dunlap)	The regular monthly meeting of the committee was postponed until Mr. F. F. Pittman, newly appointed safety coordinator of the CM division, can be present. Group CM-12 has reported satisfactory operation of the glass wool hood filters. In view of the satisfactory operation of the filters, and the necessary delay in obtaining electrostatic units, no change will be made in the filter set-up of D-152 purification. The outside pit and electric hoist for the safe deposit of special solutions from D-302 has been completed. All technical work in D building was suspended for 24 hours on May 28, 1945 to enable a thorough cleaning of the building and surrounding areas. Much equipment (not in active use) was moved to the warehouse recently assigned to the CM division. Similar cleanup programs are planned for all other areas occupied by the CM division. A special meeting of the committee was held May 7, 1945 to discuss safety measures at DP Site. Messrs. Pittman, Van Winkle, and Veltman represented DP Site. The committee agreed: 1. That geophone installations should be made in D building and DP Site to check the shock from HE explosions. This matter is being followed by Mr. Kershaw who will report his findings to the committee. Mr. Kershaw suggested this matter be followed with all diligence due to the high amount of fragile glass ether-containing apparatus. 2. That the contemplated amount of CO_2 to be used in conjunction with the ether hoods at DP be increased by a substantial factor. Van Winkle and Pittman to follow this item. 3. That Pittman further investigate the ether disposal problem as outlined in the memorandum from Rogers. 4. That a letter be written to Burke from the committee to the effect that the committee recommends the emergency wiring layout as described by Veltman, i.e.; a system including lighting and an arrangement whereby all hoods will be maintained at about half normal air velocity output, and that a good and reliable auxiliary power supply be made available to the emergency circuits, preferably a steam operated generator at the Site, and that the committee recognizes a great hazard in even brief power shut downs. The capacity of such an emergency outfit would probably not exceed 15% of the total peak power requirement of the Site. (This letter was written and delivered on May 8.)
3. Light contamination control Hill	This work has been discontinued as a special problem, although the procedures developed will, in the main, continue to be followed

[redacted]

Library records	This service was resumed late in the month. A report have been completed and a are in progress. The current periodical report service will soon be resumed.
Division	
J. Technician's pool	Due to a curtailment in the functions of this service, no report hereafter will be submitted.
Chearns and assistants	
Uncontaminated machine shop	Services continue.
Bussdieker and assistants	
Coordination of outside services	The system of controlled priorities on outside services to assure work being done in the order of its importance to division activities continues. During the past month about 505 job orders were issued, approximately 135 of which remain uncompleted. The delay in technical area services is about as follows: plumbers current, cabinet makers three weeks, and electricians two weeks.
Powell, Goodwin, Merryman, Mills	

The conversion of D-113, D-132, D-133, and D-134 to the uses of group CM-8 is complete. New equipment is being installed in D-103 for use in the remelting program. The new addition to D building is completed and occupied. Alterations in the front air lock and the men's locker room in D building have resulted in extra facilities and a general improvement in the building entrance. D-104 was modified to accommodate services formerly conducted in E-3. Janitorial service for D building now operates from D-313; only minor modifications were required in existing facilities. A large metal hood and 8 muffle furnaces are being installed in D-103. A closet was constructed opposite D-311 to accommodate tradesmen's gear. Dry box and hood installations were made in D-101, D-107, and D-320.

In Sigma permanent wiring of the graphite machine shop is in progress. Equipment in rooms 44, 45, and 46 was moved to D building and the rooms re-equipped for group CM-8. A leanto was constructed adjoining room 46 to house vacuum pumps. A small area on the balcony of Sigma-33 was partitioned to provide office space for operators of the hot press units. The investment casting equipment of group CM-11 was moved from room 39B to rooms 21 and 22, and a new vacuum casting unit was installed in room 39D. A new foundation for the power hammer in Sigma-1 building has been completed and appears to be satisfactory.

In H a new hood with separate can[redacted] installed.

GEP GM-1 MONTHLY REPORT -- P. W. Kuhl, Group Leader -- June 1, 1945 (cont...)

JOB AND NOTICE	PROGRESS
7. (cont.)	The usual volume of routine repair and maintenance jobs throughout the division properties was performed. Close co-operation by group GM-1 in the physical aspects of the division safety program continues. General drafting assistance is still being given to the TR Site planning committee.
9. Miscellaneous	A regular monthly report covering the status and classification of division personnel and housing statistics, has been submitted.

In summary:

Members of Division - 383
Apartments occupied - 87

Breakdown of personnel by status:

Married men	- 67
Wives	- 25
Single men	- 36
Single women	- 19
WACs	- 11
SED	- 207

10. Quantity control

Roth, Stark, Sackheim and staff

Services continue. At the suggestion of the security office the cardex system and telephone board have been moved to the first floor of D building.

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II. [illegible]	III. [illegible]
9. Service [illegible] testing Duffy, Summers, Hansen, Nisenoff, Muehlenkamp	[redacted] DOE b(3) 7 Data is being secured on the martempering of K-42 [illegible] steel. The Ms temperature level has been established between 472°-480°F., and further work will establish a relationship between size of piece being quenched and the time required to quench successfully to just above the Ms point.
10. Mechanical testing Muehlenkamp	[redacted] DOE b(3) Miscellaneous testing of [illegible], rubber pads, felt, etc., also continues.
11. Beryllium metallography Chafey, Barkin, Wood, Welton, Nothaft	A method of metallographic preparation of beryllium has been worked out that appears to give excellent results. The procedure consists of grinding on diamond-charged laps, with diamond dust Nos. 2, 4, 7 and 3 successively, and finally polishing lightly on a cloth covered lap with alumina. A 2-3% aqueous sulphuric acid solution has been found to be a satisfactory etching reagent. All shipments of extruded beryllium rod received from outside sources have been examined macroscopically for extrusion defects. This examination consists of cutting the bars -- usually 1 1/8" diameter -- into 2 1/2" lengths, grinding the transverse faces, and macroetching in 5% sulphuric acid. Following the findings of M.I.T., it has been found that beryllium is quite sensitive to shallow cracking when improperly cut, and that before macroetching, it is essential to remove the disturbed metal on the cut faces by machining. Experimental work is being carried out on the machinability of beryllium, with particular attention to establishing a correlation between the microstructure and machinability. If the extrusion temperature of beryllium is sufficiently low, recrystallization can be effected by appropriate annealing, and this in turn will probably effect the machining characteristics of the metal. DOE b(
12. Metallographic study of initiators Chafey, Barkin, Wood, Welton, Nothaft	[redacted]

[redacted]

[illegible] MONTHLY REPORT -- [illegible] -- June 1, 1944

JOB AND PERSONNEL	PROGRESS
3. BF_3 and counter preparation Hoiges, Lloyd	Forty-eight neutron detection chambers have been filled with enriched BF_3 for initiator testing equipment. Only three of the number showed any change of operating characteristics with time and had to be refilled. Attempts have been made to find the most satisfactory method and gas mixture for filling fission chambers for initiator testing.
4. Foil preparation Miller, Potter	During the past month fifty-four uranium foils prepared by the vapor technique have been supplied to other groups, as well as fourteen 49 foils prepared by electrolysis. A number of boron foils have been made by the vapor technique using B_2O_3, and by sedimentation using amorphous boron. In addition, research has been carried out on the following lines of investigation: (a) Search for a carrier suitable for collecting and purifying Pa. (b) Tracer studies on methods for electroplating "37". As a result of this work it appears probable that "37" can be electrodeposited from LiF solution using the method used for uranium.
6. Water boiler Helmholz, Miller, Novenzel, Watkins	Further experiments have been made using the remote control ether extraction column at Omega with the following results: (a) The use of $Ca(NO_3)_2$ in place of NH_4NO_3 as salting out agent has made possible a rate of pumping of U solution five times that expected (but not realized) with NH_4NO_3. (b) At this pumping rate it has been found necessary to cool the extraction column to prevent boiling of the ether (See point (a) below). (c) Tracer experiments using a f.p. solution obtained by decontamination of small amounts of boiler soup have shown a γ-decontamination factor of 20 - 30. (d) Solution of $Ca(NO_3)_2$ in "mock" soup has been tested under anticipated conditions and temperature control of reservoir tanks has been installed. Considerable time has been spent in investigating the ether extraction process. The following points may be mentioned: (a) When 1 mol of $UO_2(NO_3)_2$ is extracted from a solution 7M in $UO_2(NO_3)_2$, and 3.4M in $Ca(NO_3)_2$ (composition of hot soup solution expected in column) approximately 10 Kcal are evolved. (b) There is an overall volume decrease on extraction. For the case when equal volumes of ether and solution are used there is a 10% decrease in volume of the H_2O phase and only a 5% increase in the ether phase.

SUBJECT	PROGRESS
8. (cont.)	(c) A mechanism for the extraction has been proposed which, with the necessary activity coefficients of the salting out solution, will give the "practical" distribution coefficients to a factor of two or three.
9. Instrumentation Sands, Sturgess	In addition to routine maintenance and counting, the assembly and testing of BF_3 counter have been carried on this month.
14. Radio-phosphorus Holmhols, Nevenzel, Watkins	Work is in progress on the separation of radio-phosphorus from sulfur and the preparation of samples for counting for Group R-2.

SECTION M-8 MONTHLY REPORT -- [redacted]

JOB AND PERSONNEL	PROGRESS
1. Radioassay of Pu samples Bradford, A. Browning, M. Hahn, C. Hirt, Hudgins, Roberts, Wood	The hundred milligram-weight standard radioassays for 49 were completed during May. The technic of a more precise radioassay has been worked out by Roberts and is now in current use by him. The internal precision of this method appears to be about 0.3%. The time required for the assay is such that it is used only on special samples and does not displace the standard radioassay technic applied to all samples submitted.
2. Purification of Pu Atherton, Friesmeisser, H. Brown, D. Carlson, F. Carlson, Carritt, Clark, Englar, Gergen, Giffen, Hagen, Holtrock, Huselton, Keller, Leber, Lowe, Ludwig, Lynch, Mechem, Pagan, Pearson, Schell, Setzer, Sheinberg, Taylor, Upchurch, Wahl	A total of 4.89 kg Pu was purified during May in the [redacted] equipment. Thirty-four runs were made with an average yield of 91.7% based on 24 of the runs. The yield was calculated from the dioxide weight and the radioassays on the purification residues (oxalate slurry not transferred to boats by the dry chemistry staff is considered as a purification residue). The average time from receipt of shipments to the start of the purification process has been 3.3 days; the time includes that required for dissolving the syrup, transferring and diluting, cutting and radioassay. In general, a given shipment is processed completely within a few days of the receipt of the next shipment, so the backlog is kept very low or zero. Some trouble was experienced with the first oxalate precipitation on a number of occasions. The source of the difficulty was traced to the presence of considerable (40-60%) Pu in the +6 state in the solutions obtained by dissolving recent W lots received; this required the addition of extra H^+ and I^- (obtained by a shift from HI to HI) to cause reduction to the +3 state prior to the oxalate precipitation. This is but one example of the variations in product received from W, all of which make any simplification of present processing an uncertain proposition. As of June 1 three apparatus are in operating condition (Nos. 5, 3, 7) and No. 8 is scheduled for activation June 17. Sufficient operators are available for simultaneous operation of two apparatus. To date no new men have been obtained, so the scheduled date (June17) for operating three apparatus at once will not be met. Part of the personnel are still engaged in planning for Operation 4 at DP site. Process research on the 5-8 g. scale is reported under job 7.

GROUP CM-5 MONTHLY REPORT -- J. G. Garner, Group Leader -- June 1, 1945 (cont).

JOB AND PERSONNEL	PROGRESS
3. Recovery of Pu W. Brown, Coley, Duffy, Fleming, Gibson, Pittman, Thomson, Wolfe	According to receipts received a total of 0.81 kg Pu was returned for recovery during May, of which 0.81 kg was recovered and converted by the peroxide procedure into 44 nitrate for use in job 2. Handling of the supernatants from job 2 continues on a satisfactory basis. At present, reduction liners can be handled at a rate of two per day which enables keeping up with the reduction residues. Part of the personnel continues to plan for Operation 5 at DP site.
6. Service and calibration of detection instruments Chadwick	Counting equipment for the radioassay of 43 (job 1) and for contamination control (CM-13) has been repaired and kept in operating condition.
7. Production of PuF_4 Anderson, Bakes, Bernstein, Crom, Disney, Dumrose, Garner, H. Hahn, Kaufman	A total of 4.01 kg Pu was converted to PuF_4 in the 150-g equipment during May. Twenty-nine runs were made using various drying and HF programs. Two runs were ruined by accidental misconnection of controlling thermocouples; the material was returned to recovery. Until the very recent use of a new drying program (D-2, ignition to 600°C) and HF program (HF-2) the conversion was averaging about 90% in 24 hours, the range running from 88% in 69 hours to 93% in 3 hours HF time. The A, D-2, HF-2 program on the basis of five runs is giving 92-98% conversion in 3-9 hours HF time. Reduction yields on these last fluorides have all been over 99%. This program will be continued to see if the better conversions are maintained. It may be remarked that the oxide weight obtained by ignition to 600°, rather than to 900° as on former drying programs, is too large, relative to the 900° material, by about 0.75%; calculations for receipting and other purposes are corrected by the use of an extrapolated weight accordingly. Two dryer-igniter units and one slurry transfer device are in operation; one more igniter unit and two more slurry transfer devices are being set up. Use of a preheater in the drying unit has been shown to be unnecessary. Six hydrofluorinator units are in operating condition and are operated in pairs from three potentiotrol controllers. Two other units are operable under poor conditions. In general, present staff is inadequate to handle the processing and maintain the equipment; there are many poorly working parts of the units which cannot be changed by the crew which is already overloaded by the normal processing of material. Bakes and Crom have been transferred completely to the design and planning of the Operation 5 installation at DP site.

JOB AND PERSONNEL	PROGRESS
7. (cont.)	Additional results of the process research partially reported in LADC-249, p. 12, are presented in tabular form below. All runs were on a 5-8 g scale with material from Lot 10-W. Correction of the neutron count for 410 spontaneous fission contribution cannot be made at this time, but the values given for the total emission have relative meaning. As can be seen from the table, the peroxide process looks inferior to the single oxalate process; the latter appears promising. However, no metallurgical fabrication tests were made on metal from any of these runs. It may be remarked that adoption of the single oxalate process or any other simple process as our only purification method is not advisable until it has been tested on full scale with adequate fabrication tests on the metal, and until definite specifications for purity of incoming material are agreed to by the Hanford Engineering Works, and until more definite specifications can be set as to the purity necessary for successful fabrication in the form desired.

(See table on next page)

JOB AND PERSONNEL — PROGRESS

7. (cont.)

Schedule #	Purification	Dry Chem. Conversion to PuF_4	Std. 6-g Reduction % Yield***	Total m/g. sec., Remelted Metal****
7d	None	Evap. nitrate, ign. to PuO_2, HF by A for 7 hrs., 88.3% PuF_4; 2 days for evap. & ign. Splattering.	96.30	9.6
7f	Single oxalate pptn.*	., HF for 2.5 hrs., 88.7%	97.46	8.6
7f[1]	Duplicate*	Ditto, 97.6%	96.21	9.4
7g	"Silica" removed; single oxalate pptn.*	Ditto, 96.2%	97.67	9.0
7g[1]	Duplicate*	Ditto, 96.9%	96.62	9.1
7h	Single peroxide pptn.**	Evap., ign. to PuO_2 (12 hrs.)., splattered; HF by A for 9 hrs., 76.2%. Requires 2 x as many boats due to peroxide bulkiness.	95.8	10.0
7h[1]	Duplicate**	Ditto, 91.6%	99.17	10.4
8h	"Silica" removed; single peroxide pptn.**	Ditto, except 7 hrs. for drying, 6 hrs. for HF, 91.5%.	96.65	9.9
8h[1]	Duplicate**	Ditto, 91.8%	94.86	10.0

* By job 2 staff. ** By job 3 staff. *** By CM-3. **** By R-4.

DOE b(3)

JOB AND PERSONNEL	PROGRESS
6. Protective coatings for uranium and plutonium Bartlett, Gutman, Herman, Jones, Yuster	Uranium. [redacted] Experiments to increase the protection are showing promise on more recent pieces.
Lipkin, Perlman, Spindel, Weissman	Plutonium. Two one-centimeter discs of plutonium metal were cleaned by a dip in concentrated nitric acid following anodic treatment in trisodium phosphate solution. These discs were then coated with 10^{-5} inches of rhodium by evaporation. Corrosion tests on these pieces did not give the same favorable result which was reported last month on a piece similarly treated. Work on this problem has been suspended.
7. Initiator program Williams	Evaporated coatings. Evaporation does not seem to be a suitable method of depositing alpha stopping layers of metal upon beryllium initiator pieces. If the beryllium surface is etched by heating it in vacuum until some of the metal distils, copper evaporated coats are adherent. These coats however even of two or three range thickness have holes sufficient to give a neutron background of 0.04% to a half urchin in the most favorable case. Work is being concentrated on other methods.
Lipkin, Perlman, Spindel, Weissman	[redacted] This method shows promise and work is continuing on it.

[redacted]

GROUP CM-7 MONTHLY REPORT -- A. U. Seybolt, Group Leader -- June 1, 1945

JOB AND PERSONNEL	PROGRESS
3. Refractories Mullen, Miller, Lohman, Sargent, Walsh, Snoddy	The U and V crucibles for the 25 melting program have been completed. A few V lids are still to be made, together with stopper rods when the size of the latter is decided upon. Most of the 5 1/4" MgO mold plates are finished, and about half of the 7 3/4" plates have been made. The procedure has been standardized on all these products, and the manufacture is now routine. The X-1 crucibles and Y-1 stools for Hammel are being made on a 6 per week basis, and these products are apparently entirely satisfactory. Owing to changes in the 49 remelting program, no more Y-1 crucibles are required, and sufficient Y-3 crucibles have already been made. The Y-2 crucible will be pressed from G.E. low boron MgO. One of our men stationed at Vitrefrax is preparing some coarser grades of MgO to be mixed with the fines already on hand in order to secure a denser body.
12. Lead-boron bricks Kamm, Barnard	Fourteen lead-boron bricks 1/2" x 3" x 6" containing 1.5 g. boron per cc were turned over to Woodward in building X for neutron absorption purposes. The boron was 82% B_{10}. There was enough boron for an atomic ratio of 9 boron to 1 lead.
13. [redacted] DO 1(3 Wellborn, Harrington, Crumbly, Wine	None have been made in the last few days because of an over-supply as compared to projectiles. Plenty of 5-hole anvils are on hand also. About 19 more are required to complete present orders. In the case of projectiles, about 30 more are required. As many of these as possible will be made of chips. Some shock test specimens for Serduke were hot pressed also.
19. General foundry work Arnold, Aronow, McDonnell, Wessel, Smith, Williamson, Crumbly	Besides the usual tuballoy work, several cadmium castings for the Ra-La work were made. [redacted]
20. General powder metallurgy Hirsch, Kowalchik	Practically all of the effort in this field during the month has been put on the development of a suitable technique for making powder compacts of $AuBe_2$. [redacted] The component fine powders are intimately mixed, and pressed at 50 tons

JOB AND PERSONNEL	PROGRESS
20. (cont.)	per sq. in. at 350°C in a steel die. The resulting compact has a Rockwell B hardness of 90, a density of somewhat over 10 g/cc, and a per cent theoretical density of nearly 99. The compact is quite machinable.
21. General fabrication Taub, Stevenson	Attempts to deep draw either nickel or gold 1 mil foil to a 1/2" diameter hemisphere have been unsuccessful because of severe wrinkling. Fair success was attained with 2 mil nickel. [redacted] and new tools are being prepared for this work. Two more Au-Pt bars for the gun initiator cups were cast, swaged, and turned over to Langer. Work is about to commence on the preparation of indium filled steel tubing of about .040" O.D. for the G engineers. DOE b(3)
22. Plastics service Church, Arnold, M, Zweig	Non-conducting, high density (6.6 g/cc) rings have been prepared using about 30% polysterene and 70% ThO_2 for Fowler (G-3). Low conductivity copper-polysterene mixes have been prepared for G-7 for detonator work. So far, it has been difficult to hit the right conductivity, but improvement is expected soon. A change in detonator design is holding up this work. [redacted] Several plastic jars have been made for CM-8. The switch gap mount work has continued, but is now held up for lack of brass parts. No more lens covers have been requested since 8 were delivered.
23. Electroplating Slatin, Onstott	Some beryllium powder was gold plated for Hirsch for the $AuBe_2$ powder problem. Work on chromium plating the tungsten coils for the evaporation work is discontinued temporarily because of lack of coils; 200 coils were plated. [redacted] Other jobs included copper plating the inside of a large aluminum urchin model, and silver plating tuballoy for soldering experiments. DOE b(3)
24. Miscellaneous Kamm, Barnard, Hirsch, Church	Several days were spent trying various plastic adhesives for bonding metal to metal. This work was aimed at the old double hemisphere tamper model. [redacted] 3 per cent by weight of cadmium was added to a melt of Dow "J" magnesium alloy to find out if such an addition could be used for the magnesium carrying case. The cadmium addition did not appear to embrittle the alloy seriously.

GROUP CM-8 MONTHLY REPORT -- S. R. Jette, Group Leader -- June 1, 1945

JOB AND PERSONNEL	PROGRESS
1. Reduction of Uranium Baker, Raich, Hayward, Weiss	Testing of liners: Thirty type S (500 g) liners made at M.I.T. were tested. Several variations were made in manufacturing methods to eliminate poor bottoms. The use of 2% H_2O and of bottom tamping before pressing both gave satisfactory liners. Five type R (1000 g) liners made at M.I.T., fired at 1700°C for a longer time than the standard R liner, were tested and seemed inferior to the standard ones. Production of U for CM-11: Forty kilos of biscuit metal were made and issued to CM-11 for casting studies.
3. Reduction of Pu Baker, Raich, Hayward, Weiss	Nine reductions of PuF_4 with Ca on the 160 g scale using fluorides of 86 to 95% conversion from the oxide gave an average yield of 98.40%. A charge consisting of 0.3 moles of iodine per mole of Pu seems to be the most reliable for the lower converted fluorides. Two reductions of PuF_4 on the 160 g scale using fluorides of 75% conversion gave yields of 92.44 and 96.49%. The charges consisted of 0.5 mole iodine per mole of element. Five reductions of PuF_4 with Ca on the 300 g scale using fluorides of 85 to 94% conversion gave an average yield of 98.34%. A charge consisting of 0.3 mole of iodine per mole of element was found to be the most reliable. Nine reductions of PuF_4 with Ca on the 8 g scale made using fluorides on which process research in purification had been done gave an average yield of 97.0%.
11. Physical measurements Schnettler, Martin, Davis, Goldman, Simons	A study of the stability of the 3% Ga alloy has been made in the dilatometer. Annealed specimens were held at the various temperatures tabulated below without evidence of transformation.

[redacted]

JOB AND PERSONNEL	PROGRESS
12. Remelting of Pu metal Hammel, Litz, Satterlee, Fine, M., Streubing, McChesney	650 g castings (for 2 in. hemisphere): The first attempts by simply remelting purified metal and cooling in the same crucible were generally unsatisfactory. This was the first opportunity to work with larger quantities of metal and gave valuable experience. The principal difficulty arose from the oxide skins which floated to the top, frequently entrapping gas bubbles and giving an unsatisfactory surface after cleaning. One hemisphere was cut into four parts, each being neutron counted. The total count was 6.98 n/g/sec, mean deviation 2%. This indicated that the composition was uniform, particularly with respect to 410 distribution since 7 lots up to 14 were involved. The technique of remelting as-reduced buttons in an upper crucible and allowing it to run through a hole into a casting crucible has proved very satisfactory. MgO crucibles made by CM-7 were used for this work and for the alloys below. Gallium alloy preparation: Four alloys of nominal 3 atomic % were made on the 500-600 gram scale. The use of as-reduced rather than metal that had been previously vacuum melted noticeably improved the character of the ingots produced. Miscellaneous: A considerable number of castings of pure metal and of alloys were made for fabrication and other tests. A large proportion of time this month was spent in setting up resistance type high vacuum furnace equipment.
17. Reduction of 25 Baker, Raich, Hayward, Weiss	Twelve reductions of enriched fluoride from X were made on the 500 g scale giving an average yield of 100.05%. Two reductions of enriched fluoride from X were made on the 1000 g scale giving an average yield of 100.06%. These high values are due to the manufacturer's low values for assay. Three reductions of enriched fluoride from CM-16 were made on the 500 g scale giving an average yield of 99.72%.
23. Fabrication of Pu metal and alloys Schnettler, Goldman, Spindler, Loeb, Levinson	The fabrication of alpha-plutonium hemispheres was discontinued when it became evident that directional control of the β to α transition was necessary to avoid warping and cracking on large pieces. Initial fabrication studies were made in the

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CONFIDENTIAL

GROUP CM-8 MONTHLY REPORT -- E. R. Jette, Group Leader -- June 1, 1945 (cont.)

JOB AND PERSONNEL	PROGRESS
23. (cont.)	stable delta field (~ 400°C) with disastrous effects on the dies. The metal was found to be extremely soft, the resulting flash combined with the great difference in thermal expansion coefficients of the steel and Pu wedged the die plungers. A 20 g piece was formed in a 3/4" dia. die at room temperature. Though the unconstrained metal flowed readily to a reduction of height of over 50% at 20,000 psi, a load of 100,000 psi was required to fill out the corners sharply. To determine the optimum conditions of temperature and load for present equipment a series of 50 g samples were pressed. Results indicated that at a temperature between 200°C and 300°C a load of 30,000 psi would be sufficient. DO b(3
24. Corrosion protection Kirby, Covert, English, Ranftl	[redacted] Experiments were started to determine the durability of such coatings under anticipated handling conditions.

GROUP CM-9 MONTHLY REPORT -- W. M. Petruska, Group Leader -- June 1, 1945

JOB AND PERSONNEL	PROGRESS
1. Cupferron separation of heavier elements from plutonium Simi, Wildi	No further work. Final report on cupferron procedure almost completed.
8. Direct sparking of plutonium Conway, Nachtrieb	Completion of the double-compartment spark chamber and hood is promised by June 2. Following installation the direct spark analysis of product solutions will be resumed.
26. Summary of analytical services	Samples completed and reported during May, 1945

Group	No.
CM 4	2
CM 5	2
CM 6	22
CM 7	8
CM 8	15
CM 9	11
CM 11	24
CM 13	90
CM 14	2
CM 16	47
Ordnance	19
Physics	34
Miscellaneous	5
Total	281

31. Instrumentation Conway, Nachtrieb	Eastman Kodak has supplied film coated with 103-aF emulsion, in accordance with our request for a film which has low granularity, moderately high contrast, moderate speed, and is sensitized over the range 5500 - 7000 Å. The film has been tested in the 2 slit spectrograph method of extending range, and found to be quite satisfactory for pyroelectric analyses.
32. Application of the pyroelectric method to plutonium oxide Wexler, Nachtrieb, Conway, McCall	An arc stand has been completed and installed in the "dry box" for use in pyroelectric plutonium analyses. The controls for the arc holder are manipulated outside of the box by means of flexible shafts. Greater safety, convenience, and reproducibility have resulted from use of the new stand, and the pyroelectric analysis of plutonium is again on a routine basis.

[redacted] PURPOSE	PROGRESS
33. Wave-length determinations of plutonium lines.	Work to be resumed when double-compartment spark chamber and hood are installed.
34. The analytical separation of zirconium, thorium and other impurities from plutonium by hexone extraction Rudoff, J. Miller, Wildi	Studies on the distribution of bismuth and gallium between hexone and an aqueous medium 2-3M in NH_4NO_3 and 8M in NH_4NO_3 have been completed. For both elements, present at from 0.5 to 5 g/l., less than 1% is extracted into the hexone. Recoveries of Bi, Th, and Zr from the NH_4NO_3-destruction phase of the method average 88%, according to the best technique used to date (fuming with equal parts of HNO_3 and HCl under an infra-red lamp). The solution is evaporated just to dryness and then taken up in HCl. Failure to recover these elements from a hexone extraction of spiked plutonium was traced to the presence of large concentrations of magnesium in the plutonium which prevented normal excitation of the Th, Zr, and Bi. Recoveries of Th, Zr, and Bi are found to be low if the electrodes are not sparked on the same day the solutions are evaporated thereon. This is due to the tendency of the film to weaken mechanically and deteriorate with age. In this condition the impurities are dislodged from the spark without being appreciably excited.
37. Tannic acid method for Zr and Ti in uranium and plutonium Simi, Nachtrieb	The best recoveries of Zr and Ti are 53% and 34% to date, using Sn as an internal standard and a graphite spark for excitation. Tin tannate is not a very good carrier for Zr and Ti in 0.2N HCl. Use of Zr as a carrier for Ti and Ti as a carrier for Zr has been tried with no substantial differences in recovery. Recovery will now be studied as a function of acidity.
38. Studies in extraction Conway, Bachelder, Nachtrieb	A distribution ratio of over 1000 for Fe^{+3} between di-isopropyl ether and HCl has been found for 7.5N HCl. The empirical formula of the extracted complex is $HFeCl_4$ for acid concentrations below 8N. There is evidence for the existence of H_2FeCl_5 in the ether phase for extractions from 10 - 12N HCl. Optimum conditions for the di-isopropyl ether extraction of gallium from HCl are being sought. Data are not yet complete, but the evidence is that very favorable distribution ratios exist for HCl concentrations somewhat above 5N.

[redacted] PERSONNEL	PROGRESS
39. Determination of sulfate in 40 solutions Tephowitz	This procedure has been written up for the "Operators Manual" and is now used routinely in the analysis of Hanford solutions.
40. Attempt to develop a method for uranium in urine Bachelder	Problem discontinued.

JOB AND PERSONNEL	PROGRESS
8. Remelting and casting of 25 metal Selmanoff, Butler	By the end of May approximately 38 kg of cubes had been prepared and delivered to Omega. Production of further cubes was stopped by mutual consent of those concerned in order to prepare for the gun job.
	[redacted] Three tuballoy bolts were radiographed by Sgt. Tenney's group and showed no unsoundness.
7. Hot pressing of uranium and 25 Whitehead	Several experiments were carried out to determine proper die dimensions and weight of slug for hot pressing 25 shells for an initiator container. Satisfactory results were obtained.
10. Centrifugal casting of uranium Hamilton, Diedrick, Selmanoff, Wernick	A process was frozen which uses type V crucibles of MgO and a mold consisting of MgO plates and a steel ring coated with Aquadag. Numerous castings in both shapes were made using Baker's uranium biscuits. The maximum size of melt was 5 kg. A standby centrifugal casting unit was approximately 50% complete. In general the process appears ready for production.
13. Uranium coating and miscellaneous cleaning Pannell, Freeman, Hermann	Production cleaning of cube castings continued. [redacted] It was demonstrated that cadmium plate can be applied satisfactorily to tuballoy.

[redacted]

GROUP CM-12 MONTHLY REPORT -- [illegible] Leader -- June 1, 1945

JOB AND PURPOSE	PROGRESS
1. A. Monitoring and decontamination in Tech Area James Tribby	During the "D" building clean-up, nearly 300 boxes of material were checked with the portable "Poppy" unit. Hot material was separated from non-contaminated material expendable contaminated material was disposed of in the contaminated dump. Twenty boxes of contaminated material were sent to contaminated storage. Thirty boxes of contaminated material were cleaned plus 15 motor and pump units and other incidental items. Thirty boxes of glassware were sent to the glass washing shack for cleaning. 401 special items were decontaminated (exclusive of high room counts), plus a large number of small items. It was necessary to increase the decontamination staff to take care of this increased volume of contaminated items to be cleaned. Improvements in decontaminating solutions and techniques gave more rapid and satisfactory results. Studies on permeability of various types of rubber gloves to 49 and Po are being carried out. In addition, improvements in cleaning solutions, laundry wash solutions, filters, (including filters from hoods), are being studied. A total of 1930 hot spots were decontaminated exclusive of hot spots resulting from accidents. This is an average of 66 hot spots per day in CM laboratories through the Tech Area. The number of high counts in rooms increased for 2 days after the "D" building clean-up, and then decreased to the normal. The highest nose count for May was 3696 c/m; the highest average nose count was 333 c/m and the average of all these counts was 27 c/m. Five contaminated accidents occurred in CM laboratories during the month; one due to ether explosion, one to boiling over on hot plate, and three from spillage. In addition, decontamination service was supplied after an accident in Gamma building, room 32.
1. B. Monitoring and decontamination in DP West Area Roger Whealy	A series of tests were carried out to determine the efficiency of filtering systems of dry boxes planned for use at DP in removing contamination from vapor. The systems tested were: (a) a stack of six respirator pads used as a filter, (b) a cylindrical steel container packed with glass-wool, (c) a combination of the two previous systems in series. Air was bubbled through both cold and hot contaminated solutions. Records of gas flow were kept to determine safety factors for the systems. The filter pads proved very effective in removing the contamination from dry air. Neither system proved effective when the contaminated solution was heated. Further investigation of

[redacted] PERSONNEL	PROGRESS
1. E. (cont.)	methods which might be effective in case of boiling solutions are being continued.
1. F. Monitoring and decontamination in DP East Area	Start of operations in this building is scheduled for June 15th. It is hoped that by that time sufficient personnel will have arrived to be assigned to this section.
3. Instrument section	The following list of instruments were used during the month: 8 alpha hand counters 25 Plutos 2 GM survey meters 1 Snoop 1 Poppy The following instruments arrived from Chicago during the month: 3 GM survey meters 2 L & W survey meters (beta and gamma) 2 Poppy units (alpha survey meters) 1 Alpha hand counter (air filled) 3 Air monitoring units (on loan from Medical Group) The above instruments are being calibrated and being put into use as rapidly as possible, considering available personnel. One member of this section was sent to Chicago to discuss our health problems and to become familiar with the instruments, which are to be supplied to us.
4. Laundry Niles Wells	The total amount of protective clothing washed in the laundry is as follows: 1. 23098 pieces of protective garments 2. 11627 rubber gloves 3. 564 respirators The number of persons required for the laundry at DP Site has been determined, and steps have been taken to obtain the additional employees. Two additional girls are already at work at the present laundry. An experiment whereby gloves are being washed periodically with Sulpho-Soap while being used by the laboratory technicians is under way and shows promise of substantially lowering the contamination of the gloves and lengthening the amount of time they may be used before sending them to the laundry.

CM PERSONNEL	PROGRESS
Records C. Dunlap	The following summary is given to indicate the type of records kept at the present time. This summary will not be given again until changes or additions warrant it. A daily record of all counts of rooms monitored by CM-12 personnel is kept by this section. These counts include all CM Tech Area laboratories and will include all CM Site laboratories. A weekly record is kept of all rooms not occupied by laboratory personnel, but in buildings where contaminated material is in progress. In addition to this, a daily monitoring and decontamination record of all room counts above tolerance limits, showing the results obtained after decontamination is prepared. Occupants of H building and room 8 of V building are informed of the condition of working areas within their laboratories by means of floor maps on which all daily counts appear. Hand and nose counts taken daily are added to these maps. Similar maps are prepared for D, D annex and Sigma buildings counts being transferred to the blackboard maps in the hallways. Other routine records prepared and kept in CM files are as follows: Daily: (Nose counts of exposed CM personnel) (Hand counts of H building and laundry personnel) Weekly: Desk counts CM-12 monitoring and laundry equipment Doorknobs Drybox gloves (Contaminated glassware after washing. (Contaminated clothing after washing. (Contaminated respirators after washing. (Continuous monitoring is made of the three above, but recorded only once a week) Check of inside of respirators throughout laboratories. Hood vents in D building. Semi-Weekly: Counts obtained by sampling laboratory and hallway desks. Monthly: Laboratory Pluto survey. Explanatory record reports are made of the following as the occasion demands: (1) all nose counts above tolerance limits, (2) contaminated operations performed by outside services, (3) contaminated accidents within the CM Division.

[illegible] MONTHLY REPORT -- W. H. Hinch, Group Leader -- June 1, 1945 (cont.)

[illegible] AND PERSONNEL	PROGRESS
[illegible] (cont.)	Duplicate copies of all records indicating general [illegible] conditions and all records and reports pertaining to personnel exposed, are sent to the Medical Group.
[illegible] Miscellaneous	A CM Health Handbook is to be written jointly by the [illegible] and Medical Group. It is hoped that this Handbook will be available before DP operations begin.

[redacted]

[illegible] AND PERSONNEL	PROGRESS
1. West Area building construction (for CM-13) Goodwin (CM-1), Cremer (CM-13), Veltman	More detailed reports on this and other jobs are given in the CM-13 weekly status reports. Buildings 51 (office) and 52 (laboratory) are nearly completed, and furniture installation has started in Building 52. Building 51 (filter house) is under way and installation of the electrostatic filters has commenced. Although construction is slightly behind schedule it is anticipated that these buildings will be ready for occupancy by the end of June.
2. West Area building construction Goodwin (CM-1), Veltman, Walker (CM-1), Cox (CM-1), Neal	Construction is about a week behind schedule. During May construction advanced from 18% to 31% for the total project.
3. Wet chemistry operations Duffield, Pittman (CM-5), van Winkle, Hochwalt	Equipment layouts and detailed piping drawings for all four operations have been completed by draftsmen of Group CM-13. The architects are preparing the final drawings and some of these have been completed. Installation of a small fraction of the process piping has been completed by the contractor. A mock-up of the Operation 4 (purification) piping has been built by the plumbers to give them practice and to facilitate final installation. A portion of the glass apparatus used in the purification operation was set up in Building 5 while a shot was made at Beta Site to find out whether rubber mounting would be necessary to prevent breakage due to concussion. No disturbance of the apparatus at all was observed.
4. Reduction operations Baker (CM-8), Bakes (CM-5), Cox (CM-1)	All ordering and detailed installation drawings are essentially complete. It appears that Operation 5 (hydrofluorination) will run on a 24 hour schedule and that Operation 6 (bomb reduction) can run on an 8 hour schedule.
5. Metallurgical operations Kolodney, Hayes, Hays (CM-3)	[redacted] Designs are being worked out as completely as possible.
6. Furniture design and procurement Sherrer	Approximately five carloads of furniture have arrived. Much of this has already been installed. The final shipments of furniture should arrive by June 20 approximately.
7. Procurement and receiving Nelson, White	Approximately 750 different items have been ordered. Much of this is now on hand, and promised dates indicate that all items will arrive as soon as [redacted]

[illegible] AND PERSONNEL	PROGRESS
5. Hydroxide-Oxalate process development Bluestein, Gross, Sands, Skinner, Spence, Balagna (CM-9)	During the first half of the month several possibilities for improving the oxalate yields were investigated. No appreciable improvement in yield was effected by changing the HNO_3 and $H_2C_2O_4$ concentrations. The use of Nd or Ni (whose oxalates are less soluble than lanthanum oxalate) as carriers had no marked effect on yields. A search was made for a reagent which could be added after the oxalate precipitation, to scavenge unprecipitated La. Na_3PO_4 was tried and abandoned because of the difficulty of pH control. However, the addition of a small amount of HF after incomplete oxalate precipitation turned out to improve the yields without interfering with the filtering properties of the oxalate precipitate. The composition of the resulting precipitate is now being studied. To avoid BaF_2 precipitation, the concentration of the HNO_3 used to dissolve the $La(OH)_3$ has been changed from 0.35N to 0.5N. This fluoride modification has been used in four hot runs (sources from 70 to 700 curies) resulting in 98 - 99% yields for the oxalate-fluoride step.
6. RaLa Operations Bluestein, Dodson, Friedlander, Gross, Knobeloch, McCann, Rice, Skinner, Spence, Zeltmann, Steinhardt (A-6)	Shipment 8 arrived May 19 and has since been milked three times using the modified process described above. The overall yield in each of these three runs was 34 - 37%, giving sources of 620, 440, 345 curies. Only 2 - 3% of Ba was carried in the hydroxide step of each of these runs, making Ba recoveries unnecessary. The low Ba losses are probably attributable to the absence of Fe impurity in shipment 8, which reduces the filtration time for the hydroxide precipitate and thus the amount of $BaCO_3$ and BaO_2 formed; the simple occlusion of barium compounds by $Fe(OH)_3$ is, of course, also eliminated. Shipment 9 arrived May 31 and has been combined with the remainder of shipment 8. A source of about 1200 curies of La^{140} is now on hand. Six small Ba-La sources were prepared for various groups.
7. Alternative processes Bluestein, Gross, Skinner, Sands	Some work was done on a two-step process involving precipitation of $La(OH)_3$, solution of the precipitate in HNO_3-H_2SO_4 mixture and precipitation of an alkali-La double sulfate. The H_2SO_4 is used in the dissolving step to metathesize any Ba compound carried by the $La(OH)_3$ to $BaSO_4$ and keep it on the filter. The $BaSO_4$ unfortunately holds back too much La. The yields in the double sulfate step were also unsatisfactory under all conditions studied, although some improvements are certainly possible.

... PERSONNEL	PROGRESS
... Apparatus Modifications Bluestein, Dodson, Friedlander, Knobeloch, McMann, Spence, Wahlmann	The pressure-vacuum system has been simplified and ... control board with more reliable flow meters and pressure indicators has been installed. The filter apparatus has been modified considerably. The elimination of the filter tube previously used for air-stirring has appreciably reduced the hold-up of active material on the filter apparatus and eliminated the possibility of activity solution backing up into the vacuum-pressure system outside the lead shield. All valves have been redesigned to operate more positively and with less exposure to personnel. A new system for holding spongy platinum pads in place has been put into operation.
9. Radiochemical studies Bonner, Sands	The growth-decay behavior of recent Ba-La shipments has given rise to the suspicion that γ-emitting impurities are present. A radiochemical analysis of each incoming shipment is therefore planned, and work on this project has been started. Earth samples are now being taken after each RaLa shot and their decay is followed on a GM counter to determine the amount of Ba^{140} impurity present in each RaLa sample delivered.

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[redacted]

[redacted]

Number of foils and of shipments

Martin, Roberts, Redman, Foster (U-1)

[redacted] Polonium alpha source with the [redacted] Beryllium-Boron neutron source with the [redacted] counting rate [redacted] made for the various members of the group. Neutron backgrounds were determined for the foils remaining, where 75 curies received this [redacted] Checks of the Po content by [redacted] counting were made on [redacted] of these foils.

Heavy deposits and their stabilization

Carrill, Gillespie, Prestwood, Robinson, Sullivan, Vier, Weinstock, Wolf

Four foils were plated to determine the mechanism [redacted] stability of heavy electroplated deposits of Po [redacted] thin electroplated films of metal. In the table below the stabilizing film is indicated in the foil number. [redacted] three were plated with Po from 1.5N HNO_3 while the [redacted] plated from 1.5N NaOH.

Foil	Activity	Surface Density of Po	Thickness Stabilizing Coat	% Po lost on Shaking	Neutron After plating
	curies	curies/cm^2	mg/cm^2	%	%
H D Ag-1	0.430	5.25	0.2	17	0.0012
H D Cu-1	0.800	5.08	0.2*	9	0.0084
H D Ni-1	0.332	11.0	0.5-1.0	1.6	0.0009
H D Ni(NaOH)	0.168	3.6	0.4	7.7	0.0160

* codeposited with the Po

These foils have been heat treated at 250°C for 40 hours and are being studied for diffusion by Vier.

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From the distribution of ranges of the alphas the polonium was considered to have diffused completely into the silver.

Preparation of heavy deposits has been successful by electrodeposition from 1.5N HNO_3, by electrodeposition from 1.5N NaOH and by distillation of Po in high vacuum.

[redacted]

[redacted]

[illegible]

PROGRESS

An investigation has been made of the distribution of polonium metal either plated or distilled on the various shaped objects connected with the production of an initiator. For this purpose, appropriately designed pinhole cameras were constructed which consisted essentially of a holder for the polonium plated object, a 0.2 mm pin-hole in 1 mil gold foil, and a photographic plate or film on the opposite side of the pin-hole at distances which resulted in 2 to 4 times linear magnification. The [illegible] alpha particles thus recorded themselves in the emulsion and effected an enlarged image of the original plated surface.

[redacted]

Electroplated deposits were found to be uniform provided that the cathode was maintained to a constant potential (within 1%) relative to the solution, whereas without such control the deposits were spotty, and in some cases non-adherent.

A high density spot of polonium distilled onto platinum was found to have increased its diameter by about 5% (0.1 mm) after standing two weeks at room temperature in the open air.

[redacted]

A codeposited copper and polonium electroplated deposit was completely unsatisfactory due both to non-adherence of the deposit and to polonium loss during heating.

[redacted]

[illegible]	[illegible]
[illegible] Group	[illegible] have been developed and tested and equipment is ready for preparation of the first complete initiator. This will contain approximately half the full scale quantity of Be and will be assembled June 2.
[illegible] Chemistry [illegible] Fisher, Goldblatt	The apparatus for the calorimetric measurement of Po samples has been calibrated for the range 50 millicuries to 5 curies and has been put into satisfactory operation. Fourteen samples have been measured during the month. Of these five were original foils from Monsanto chips. The measurements on four of these samples agreed with [illegible] 0.6% or less with the reported values. The measured value for the fifth foil disagreed with the reported value by about 25%. A second determination six days later agreed with the first within 0.2%, correction for decay being made.
	A second calorimeter of the same design as the one now in use has been built. This instrument is large enough to contain a complete initiator. Experiments are planned for other types of calorimeters of simpler design which may facilitate rapid measurement of a greater number of samples. Apparatus for the calorimeter room at DP Site is now being constructed.
3. Protective coating studies Martin, Roberts, Raub, Redman	Protective coatings for Be have been studied on a large number of specimens. For the earlier studies a Po source on Au or Pt was placed adjacent to the surface to be tested and the change in neutron background measured. Later this method was replaced by the more rigorous test of measuring the neutrons produced by Po deposited directly on the surface. From 50 to 100 millicuries are used in each test and neutrons emissions of one tenth the tolerance percentage can be measured with an uncertainty of 10%. There appears to be little difference in the quality of the Po deposited by electrodeposition and by distillation. The neutron yield, expressed in neutrons per curie second, as measured by the use of 50 to 100 mc is very close to that obtained when using several curies. Accordingly, at present this test is considered to be a valid test of the degree of protection of the beryllium.

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It should be noted that these are individual cases and such

[illegible]	PROGRESS
[illegible]	protection cannot be attained with 100% certainty. In fact a considerable fraction of the surfaces tested have [illegible] needed tolerance. It is noteworthy that a number of Po deposits on prepared beryllium surfaces have been sealed in helium and the neutron background has not increased grossly over a period of a few days.

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Backing coats of silver and of copper have been put on a large number of test pieces to prepare them for sectioning by group CM-2.

9. Gamma ray measurements

Martin, Hall, Roberts

A Geiger-Müller counter has been set up for measuring the gamma activity of Po deposits. The experiments have confirmed the suggestion of DeBenedetti, LADS-205, that the gamma rays of Po (0.85 Mev. intensity 6.6×10^{-6} c of radium per c of Po in equilibrium) can be used for estimating the quantity of Po in amounts greater than one curie with an accuracy of 5 to 10%.

10. Instruments for DP Site East Area

Cuykendall (G-2), Martin

The procurement of satisfactory instruments for DP Site is being handled by Cuykendall and his section. Five Simpson proportional counters have been received from the Metallurgical Laboratory but have not been operated successfully as yet. Low geometry attachments are being constructed to measure in the range from 100 microcuries to 25 curies. Two BF_3 proportional counter units, using B_{10}, are being prepared by group CM-4.

11. Special preparations

Durrill, Gillespie, Sullivan, Prestwood, Robinson, Wolf

Preparation of special test pieces for Group G-10 has been carried along on a limited scale.

[redacted]

[illegible] PROBLEM	PROGRESS
[illegible] Recovery of 25 from [illegible] residues [illegible], Connelly, [illegible], Wilkinson	Little operation during the month. The equipment for [illegible] reduction crucible was moved to [illegible] Building. [illegible] refrigerating system for cooling the ether condensers [illegible] the extraction column was received and partially installed.
[illegible] Recovery from fabrication residues [illegible], Menker, [illegible], Wichers	About 1300 g. of purified 25 as T_3O_8 was recovered [illegible] residues from remelting and machining operations. [illegible] were no important changes in methods.
[illegible] Recovery from miscellaneous residues Menker, Walsh, Wichers	Progress was made in working up accumulated solutions resulting from the cleaning of fabricated metal. About 450 g. of green salt, accidentally fused during the conversion of oxide, was successfully reclaimed by dissolving in a saturated solution of aluminum nitrate and extracting this solution with ether.
4. Reprocessing of 25 metal Entire group staff	Plans were made and equipment assembled for the repurification of the 25 metal now in the form of "cubes". This operation will probably begin in June.
5. Conversion of purified oxide to fluoride Walsh, Lasovick, Goldsmith, Waddell	The metal recovered and purified under job 2 was converted to TF_4.
6. Preparation of gold and platinum for initiators Browning	
7. Preparation of special reagents Browning	No work other than maintaining the usual supply of quartz-distilled water, hydrochloric acid and nitric acid.

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