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RHTG 20,754

MONTHLY PROGRESS REPORT FOR APRIL 1949
DIRECTOR OF RESEARCH AND MEDICINE

The following items are listed for the first time	Assigned to	Status
Plutonium Metallurgy	Holland	At its last meeting, the GAC recommended that alternate locations be developed for plutonium metallurgy work. Dr. D. J. Pflaum, Division of Research, inquired as to the possibility of an Oak Ridge program to implement the GAC recommendation. It was suggested that the decision was sufficiently involved that informal discussion would not be fruitful, and that the best approach was a formal request for a feasibility study by ORO.
Y-12 Research	Holland Roth	On May 2 the formal announcement of change of staff responsibility for Y-12 was made. ORM staff members have been working with the Productic Division staff on research activities at Y-12 since the change-over of responsibility was predicted. Some problems at Y-12 in which ORM has had an active interest are outlined below.

Be^{10}:

Requests were received during the past month from ANL and from ORNL for enriched Be^{10}. The enrichment scheme has been discussed with Y-12 personnel concerned and satisfactory arrangements are believed possible. The major effect on the Y-12 isotope program will be a rearrangement of the stable isotope production schedule and will delay the production of Ni and Ru isotopes about six weeks. Detailed plans are expected to be made early in May and if it appears feasible to proceed with the concentration of Be^{10}, actual operations could start as early as June 1. Health hazard considerations are recognized and under no circumstances will operations start until proper safeguards exist.

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Dr. Holland

ChemRisk Document No. 2685

The following items are listed for the first time	Assigned to	Status
Y-12 Research (Continued)	Holland Stoeckle	**26 Program** Early in 1949, two uranium samples of about 2.5 milligrams each and containing approximately 20% U-236, were forwarded to Los Alamos for evaluation of nuclear properties of the U-236. Information was received from Los Alamos that the data collected on the samples was not sufficient to define the nuclear properties in question. The complete history of the samples has been requested, and is now being compiled. A meeting of interested parties from Oak Ridge, Argonne National Laboratory and Los Alamos will be held during the coming information meetings at Los Alamos for the purpose of clarifying the U-236 problem and possibly to plan other work leading to accurate evaluation of the U-236 nuclear constants. U-236 is of prime interest because some 15% of U-235 consumed in reactors is converted to U-236 by neutron capture.
Polonium Production by Cyclotron	Holland Roth	At the suggestion of E. O. Lawrence, Y-12 has outlined a research program aimed at converting calutrons to high current cyclotrons for production of polonium by bombarding bismuth with deuterons. The proposal has been forwarded to the Directors of Production and of Research, and will be discussed further at Los Alamos in May. Distinctive features of this method of production are (1) Longer lived Po^{208} is produced (2) It is independent of reactor operation (3) Much less bismuth need be processed, hence the chemical processing is simpler.
Instrument Stockpile and Emergency Plan	Stoeckle Haythorne	The commission has directed ORO to procure and maintain in stockpile some $125,000 worth of radiation detection instruments. A 100 man emergency team will be organized to use the instruments in the event of a radiological emergency. Procurement of the instruments will be initiated by the Instrument Branch before July 1. No action has been taken by ORM in effectuating the prescribed emergency plan other than participation in the activities of the AEC advisory committee on the ORO Emergency Plan.

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Sixth Semi-Annual Report to Congress	Stoeckle	Activities on Biology and Medicine will be spotlighted in this report. OBM has forwarded reviews of ORNL Health Physics, ORNL Biology and Carbide Industrial Medicine activities and the UT Farm Program.

The following problems were treated in the previous monthly report	Assigned to	Status
Budget and Personnel Ceiling at the ORNL	Cook Holland	The Oak Ridge National Laboratory operating cost is still about at a level approximately $1,000,000 per year above the normal gross budget of $12,850,000. Total personnel is 1980. The Laboratory has stated that further reduction of cost will have to be accomplished by reducing the technical staff. Of 780 persons in the research and operations divisions, about 12% would have to be eliminated to attain the necessary cost reduction of 8%. The Laboratory management has thus far declined to make the decision as to what activities will be curtailed.
ANPP	Holland Roth	The Director of Reactor Development has informally requested that the ORNL assume the responsibility for performing research and development necessary to accomplish the commission's obligation to the Aircraft Nuclear Propelled Program. A moderate feasibility study covering three to five years is contemplated, after which the decision can be made on the project's desirability. The ORNL can probably do the job by adding a high-powered reactor design group and obtaining more capable leaders for their shielding and materials groups. The Ad Hoc Committee on the Air Nuclear Propulsion Program (ANPP) met at Oak Ridge on April 27 and 28. In addition to representatives of AEC, representatives of the Navy, NACA, and the Air Force attended. The Committee concluded that the principal interests should be placed on materials and shielding. In terms of urgency in so far as time is concerned, less emphasis should be placed on air frame and components. The Committee approved the establishment of a working committee to review the fiscal year 1950 programs of the various agencies participating in ANPP. It was agreed that this Committee would include consideration for tug-tow research proposals.

The following problems were treated in the previous monthly report	Assigned to	Status
ANPP (Continued)	Holland Roth	AEC was asked to report on the status of the NEPA advance criticality experiments. Announcement was made that in all probability the ORNL would assume responsibility for the phases of the program. Nepa has received permission to use a building at Y-12 to study control problems, using a DC electrically heated furnace as a simulated reactor power source to drive a turba-jet engine.
Administration of Research Contracts	Holland Vandon Bulck	Approved projects with University of Florida and University of Oklahoma have been received but contracts have not been negotiated. It is expec that these will be completed in May.
UT-AEC Agricultural Research Program	Stoeckle	Mr. F. S. Chance, Vice-Dean of the School of Agriculture, has been made Project Leader in a recent reorganization. Laboratory construction is on schedule.
ORINS Cancer Research Program	Roth Stoeckle	The Division of Biology and Medicine has rendered a final decision to hold the construction cost to the originally estimated $194,000. This limits the new wing to one floor complete, with provision for vertical expansion if justified. The Austin Company is working on the design.
Health Physics Training Program	Stoeckle	Arrangements with the Oak Ridge National Laboratory have been completed for eight weeks on-the-job training in Health Physics for 15 Radiologic Safety officers. A definite date for beginning the course will be established by MBE representatives on May 4.
ORINS University Participation	Holland Roth	The ORINS proposal is being reviewed by Carbide. The Laboratory has informally concurred, but the Carbide General Superintendent has not yet agreed to the program outlined.

The following problems were treated in the previous monthly report	Assigned to	Status
Release of Medical Records	Holland Stoeckle	No progress has been made toward permitting the release of medical recor in conformance with standard industrial medical practices and necessary security restrictions.
Criticality Facilities for ORO	Holland Roth	Carbide is actively reviewing needs for criticality facilities so that the desirability of a new central facility can be determined. Their review has been stimulated by the GE request to do Pu studies for Hanfor and by the offer of Hapa to contribute to the cost of establishing the facility.
Construction of Radioisotope Production Buildings	Belcher	The project is 68% complete.
Chemical Corps-AEC Filter Program	Roth	The revised program, prepared by Y-12, has been submitted to the Directo of Research for approval. The proposed program would have an annual budget of $200,000, funds to be supplied equally by the AEC and the Chemical Corps.
Liquid Waste Disposal	Roth Allred	A report is being prepared by ORNL on a review of the overall Commission liquid waste disposal program and the application of investigations being conducted at the Laboratory on the overall program. Construction of the evaporator for concentrating metal-free hot chemical waste is progressing according to schedule. Operation of the evaporato will be started during the month of May with a minimum of protecting in order to relieve the critical shortage of storage space. Mound Laboratory has begun investigation on the Hanford Crib Waste problem.
NW Program	Roth	Approval from the Washington office to scale-up Zr-Cb separations from Redox wastes was received during the current month. ORNL has been so informed and preparations for the transfer of the operations to a shielded cell are now underway.

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HW Program (Continued)	Roth	The ORNL has begun work on the program to study the effects of gamma radiation on explosives. This work is being done in cooperation with the Army Ordnance Department. The Chemical Corps expects to have a weapon assembly ready in August for medium scale HW tests. Oak Ridge will probably irradiate tantalum for the first four assemblies, 250 pounds for each assembly.
Bala	Roth Shilling	A radio-barium source was shipped to Los Alamos, April 22, in accordance with the latest production schedule which calls for four, at a frequency of one every three weeks until the end of June. ORNL desires to start May 1, 1949, a Bala process improvement study of 13 months duration leading to construction of additions to the present facilities that are required to meet the commitment of 10,000 curie sources by June, 1950. This study, design and construction will require an estimated $660,000. The Laboratory budget contains $43,000 for this purpose, leaving $617,00 of new money to be provided by the Director of Production. Seventeen more new people must also be added to the Laboratory staff. The propose and ORO recommendation for this project has been submitted to the Direct of Production. Equipment required for the preliminary Bala investigations on the presen process is being installed in a semi-works cell. The equipment should be available for initial test on June 1. Preliminary chemical investigations are being carried out to determine the feasibility of replacing the evaporation and the barium nitrate and barium chloride precipitation steps in the present barium separation process by ion exchange. The object of such a process change would be to decrease processing time, increase the yield and purity of the produc and to increase the ease of the operation.
Hanford UAP Metal Recovery at ORNL	Roth Allred	Shake-down testing of the UAP pilot plant equipment for handling Hanford metal waste is nearly completed. Minor equipment alterations have been necessary to insure operability. The solvent extraction process development has produced encouraging preliminary results.

The following problems were treated in the previous monthly report	Assigned to	Status
23 Separation	Roth Allred	23 Solvent Extraction Construction of the 23 pilot plant is progressing as scheduled. The completion date is estimated to be September 1.
25 Separation	Roth Allred	25 Solvent Extraction Preparations are underway for the start-up of 25 investigations in the hot pilot plant on about June 1.
Redox	Roth Allred	The first 100% Hanford activity level runs have been made in the hot pilot plant. No difficulty was experienced and results are considered satisfactory. Recovery of Pu and U and fission product decontamination have been wit process specifications. These test runs have been made using the ORNL developed acid deficient flowsheet. A preliminary survey to determine the feasibility of extending Redox work at ORNL to include Pu studies was submitted to the Division of Production in Washington on April 21. The general conclusion from the survey is that the Laboratory could undertake this work if the Commission requests it. Equipment alterations and additions to pilot plant, semiworks, and laboratory would be involved. Additional funds would be required above the Laboratory budget and additional men would be needed if the work is carried out without serious interruption of several programs to which the Laboratory is already committed.

The following problems were treated in the previous monthly report	Assigned to	Status
High Flux Reactor	Roth	A review of the plans for the Materials Testing Reactor was made at Oak Ridge on April 25 and 26 by representatives of AEC from Washington, ORNL, ANL, GE of Hanford, GE of Schenectady, and DuPont. While no formal conclusions were reached it was the general consensus that: a. There was no indication that the reactor will not do the job as planned, and the general status of feasibility has not changed. However, a commitment of funds by AEC is required to firm up this conclusion. b. The reactor and minimum facilities directly associated with it would cost about $25,000,000. This figure was considered highly uncertain c. There appears to be some need to bring in operating people for consultation on the designs. d. The present process for the manufacture of fuel elements has not been analyzed with a point of view of making it a production line process. However, reductions in processing costs may be expected. The present studies on the Uranium-Aluminum alloy content and possible modifications leading to an increased factor of safety to balance out fuel element distortion due to irradiation should be pushed vigorously.
Beryllium	Roth	Although the Reactor Steering Committee has decided to concentrate major effort toward the development of vacuum cast beryllium for the Materials Testing Reactor, some work is being continued on QM Metal as a second front. Recent developments at the Brush Beryllium Corporati show that large beryllium pieces can be fabricated by the sintering technique. Since QM metal has the desired metallurgical properties and since it can be fabricated readily, QM metal appears quite attractive in the light of continuing fabrication difficulties on the vacuum cast metal. Representatives at the Laboratory are currently studying corrosion properties and radiation effects on the QM metal.

The following problems were treated in the previous monthly report	Assigned to	Status
Pile Mock-Up	Roth Allred	The Mock-up was assembled for review by the Reactor Steering Committee, by representatives of the Atomic Energy Commission, and by a group of consultants who were in Oak Ridge for the purpose of reviewing the proposed Materials Testing Reactor on April 25 and 26. Assembly of the mock-up was carried out with only minor difficulty. The mock-up is scheduled to undergo extensive testing of the control and shim rods, of the cooling system, of the stability of the fuel and reflector assemblies under simulated pile hydraulic conditions, and of corrosion resistance. Approximately 20 mock fuel assemblies and 5 removable beryllium assemblies which meet fabrication specifications are available for tests in the mock-up. The proposed testing program will extend over a six months period.
Xe^{135} Cross Section	Roth Ruch	One run was completed during the current month and it is possible that this run will be the last. The problem is essentially completed with only a few checks on accuracy remaining. The result of nearly two years of combined effort of various scientists of the Chemistry and Physics Divisions at ORNL establishes a broad resonance of about 3.4 megabarns for approximately 0.1 ev neutrons.
Fundamental Chemistry Programs	Roth Ruch	The microwave equipment to be used in the determination of molecular structures containing radioactive atoms is essentially complete. The chemical synthesis problems originally encountered for use in the adopted equipment are essentially solved. Milligram amounts of radio-chemically pure I^{129} are now available for the initial studies. It is expected that the first test runs will be made in early May. Plans have been completed and the minor equipment alterations are under-way on the I^{135} equipment, to permit the production of curie amounts of iodine 134 (Half-life of 54 minutes). The purpose of the experiment is to determine accurately the gamma energy of I^{134}, which is now reported only as greater than 1 Mev. The gamma energy determination will utilize the gamma, n reaction on heavy hydrogen. The Organic Section of the Chemistry Division at ORNL, is scheduled to transfer to the Y-12 site between May 15 and June 1. By June 1

The following problems were treated in the previous monthly report	Assigned to	Status
Fundamental Chemistry Programs (Continued)	Roth Ruch	it is expected that the routine production of ethyl formate will be underway with a capacity of 50 to 100 millicuries per month. The stock pile of tagged methyl alcohol is being maintained at about 30 millicuries. A new process for the bulk separation of fission products is being tested for the first time on a curie-level scale. Indications are that the new scheme will be successful. The overall separation scheme is: 1. Slugs dissolved in Hcl and iodine isotopes volatilized. 2. Precipitation of the acid insoluble sulfides on Pt carrier, separating isotopes of Ru, 43, Pd, Sb, Sn, etc. from the residual uranium and fission product solution. 3. Fluoride precipitation resulting in the further separation of the fission product rare earths and plutonium.
Ecological Survey of White Oak Lake	Stoeckle McCrady	The first collecting trip in the White Oak Lake Ecological Survey will be made this week when Eschmeyer and Setter will collect fish. Sometime after May 15, Dr. T. F. Hall will visit the area for several days and collect and classify macroscopic and microscopic flora. He feels that an algologist will be needed to classify algae down to species. Dr. Willis Snow is to study the insects and macroscopis fauna other than fishes. These studies are all part of a comprehensive survey the purpose of which is to obtain data on the long time effects of a continuous and measurable amount of radiation from fission products upon a balanced population of plants and animals in or adjoining a contaminated body of water.

The following problems were treated in the previous monthly report

	Assigned to	Status
Dayton Biology Program	Stoeckle McCrady	The Mound Laboratory has satisfactorily standardized a spectropho technique to take the place of routine red cell counts, which is much faster and equally accurate. The Laboratory has also begun on the histopathology of postum in the white rat and has some int preliminary observations on the liver.

The following problem has been completed

	Assigned to	Status
NEPA-ORNL Van de Graaf	Holland Roth	The joint ORNL-Air Force Van de Graaf program, under which Nepa wi procure a machine to be housed by the ORNL and operated jointly, h full approval of all concerned. Procurement of the machine is some eighteen months hence.

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DIRECTOR OF RESEARCH AND MEDICINE

THIS DOCUMENT CONSISTS OF
NO. 4 OF 6 SERIES

Program or Problem Description	Assigned To	Status
The following described problems are listed for the first time and were not reflected in previous report:		
Joint Chemical Corps-AEC filter program	Roth	Revised program prepared at meeting of Chemical Corps, Carbide, and AEC in Edgewood. Carbide to be requested to submit new proposal for the program.
Redox	Roth	Work has proceeded as requested by Hanford. Slugs are arriving on schedule. We are reviewing costs of this project to determine whether or not it will be necessary to charge Hanford for the work.
Trittium	Roth	ORNL is preparing a plan for attack of this problem. An informal request for availability of new process irradiated and non-irradiated slugs has been presented to Chicago.
Rala	Holland Roth	ORNL has been requested to submit a comprehensive review of their facilities and their ability to fulfill the rala requirements for the next several years. Laboratory report not yet available.
Particle problem	Holland Belcher	Work is continuing on the installation of filtering equipment. Approval has been granted for paving of roads and planting of grass. Final road plans will be available in approximately one week. Pile is now being operated on a meteorological control basis.
Construction of Radioisotope Production Building, ORNL	Belcher	Conference was held with Mr. S. C. Barnett in Rucker's absence to discuss advisability of proceeding with this project, in view of radioactive particle problem at the laboratory. Mr. Barnett stated Carbide's policy would be to proceed on the assumption that a final solution to the particle problem would be found. Urgency of the isotope facilities is such that a decision must be made now.

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T. F. Davis, Analysas Corp. 7-6-89
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Program or Problem Description	Assigned To	Status	Anti Completi
The following listed problems were treated in previous monthly report:			
Liquid waste disposal	Holland Stoeckle	October meeting of interested group has not been held. Fish samples have been taken from river. Dr. Paris Stockdale, a Geologist, is now participating in this work. Since previous report, two additional men have been assigned by Weather Bureau to meteorological phase of program. Mr. Ruchoft serving as USPHS coordinator between Los Alamos and Oak Ridge is now at Oak Ridge for discussions in connection with this problem.	
Review of Dayton Research Program	Holland	Dr. Hochwalt of Monsanto has requested that the classification of the biological project employing various organic vehicles in order to study the skin absorption of their material be changed from Category II to Category I, i. e., of immediate importance. This request was approved. Following meeting with consultants suggested by this office, we will again meet with Monsanto for a final approval of the Biology program.	
Replacement for Lt. Col. David H. Naimark	Holland	Arrangements have been made with Col. James P. Cooney, MC, USA, for a medical officer, acceptable to AEC, to replace Col. Naimark. It is anticipated that the officer will be available shortly after the first of the year and in time to receive a three to four month period of indoctrination prior to Naimark's reassignment.	
Disposal of surplus contaminated materials, equipment and scrap by ORO	Roth Stoeckle	Revised staff paper now being prepared.	
Assignment of RW Program to ORNL	Holland Roth	Awaiting Washington action on Noyes committee report.	
Decision on NEPA's previous request on Criticality Experiments by: (a) Special site with new construction by NEPA (b) Sharing proposed new facilities at ORNL	Roth	(a) Request for site for Criticality work to be included in total site required for NEPA activities. (b) No action pending decision on combining K-25 and ORNL Criticality activities.	

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Program or Problem Description	Assigned To	Status	Estimated Completion
Training Program ORNL	Holland Roth	Further action deferred pending Washington approval of laboratory budget.	
Reorganization of Oak Ridge Hospital	Holland	Recommendations of the Rorem report are being placed in effect. Names of eligible candidates for membership on the Board of Directors are being accumulated. Dr. F. G. Foucar, Pathologist, has submitted his resignation effective October 15, 1948. Arrangements are being made with a Knoxville Pathologist for part time services.	
National Bureau of Standards	Holland Roth	A recommendation has been made that this activity be transferred to the Washington offices of the AEC. Final determination has not been formally received from Washington office.	