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MONTHLY STATUS AND PROGRESS REPORT

FOR DECEMBER 1948

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A Report Submitted

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January 5, 1949

W. E. Kelley, Manager

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MONTHLY STATUS AND PROGRESS REPORT

FOR DECEMBER 1948

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I. ADMINISTRATION

Arrangements have been made with five contractors for the adoption of the new Integrated Financing Plan. Contracts with the du Pont Company and the United Carbon Products Company were closed out. Conferences were held regarding labor-cost phases of proposed CFFF contracts. A Transportation and Traffic Branch was established in the NYOO Office of Administrative Operations. Several important positions were filled in the NYOO organization. Steps were taken to carry out the transition to the new AEC personnel program.

New Integrated Financing Plan

Arrangements have been made with Associated Universities, Inc., Linde Air Products, Electro Metallurgical Co., the University of Rochester, and Raytheon Manufacturing Co. (Alston Plant) for the adoption of the new Integrated Financing Plan. New auditing procedures, an inherent part of the plan, became effective at the first four contractors on January 1, 1949, and at Raytheon on February 1. It is expected that a sixth contractor, The Kellogg Corp., will also be added to the list on February 1, 1949.

During the first 6 months of the current fiscal year the NYOO Finance Division processed 8,000 bureau vouchers. Included in this total were 2,400 bureau vouchers submitted by the above-named contractors. It is expected that during the next six months these contractors will submit approximately 50 vouchers, since the new plan requires the submission of only one voucher per month by each contractor, with occasional additional vouchers to cover special situations.

Closing-Out of Contracts

All Government-owned property remaining at the E. I. du Pont de Nemours plant at Deepwater, New Jersey, has been disposed of, and contracts W-7405-Eng-6, W-7405-Eng-22, and W-7405-Eng-3 were completely closed-out. These contracts are now ready for final payment. The contract with United Carbon Products Company at Bay City, Michigan, No. AT-30-1-Gen-127, has also been completed, and disposition has been made of all Government-owned property. The contract will be closed out, effective Dec. 31, 1948, by a lump-sum payment.

Contractor Personnel Relations

Representatives of NYOO took part in conferences and follow-up meetings with representatives of several organizations relative to labor-cost phases of proposed CFFF contracts. Reimbursement provisions, covering wages, salaries, and personnel policies were worked out, and most points of

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disagreement have been resolved. The following organizations were involved:

Friez Instrument Company
Sonntag Scientific Company
Harshaw Chemical Company
Raytheon Manufacturing Company
Harvard University
Nuclear Development Associates, Inc.
Efficient Engineering Company
Brush Beryllium Company

Procurement

In accordance with a request from the Washington Office, approximately 70,000 lbs. of critically-needed aluminum was obtained from surplus sources for shipment to the Los Alamos Project.

Approximately \$50,000 worth of laboratory equipment was obtained from excess and surplus sources for use in the New Brunswick Laboratory.

Establishment of a Transportation and Traffic Branch

Effective December 7, 1948, a Transportation and Traffic Branch was established in the Office of Administrative Operations, with Mr. J. N. Cook as Branch Chief. It will be the responsibility of this Branch to study and coordinate all traffic activities of the New York Operations Office and its sub-areas, and plan methods to effectuate an integrated and sound traffic program.

Placement

The major emphasis in recruitment activities for the month of December was placed on staffing the New Brunswick Laboratory. The authorized strength for this installation is 62 positions. Fourteen employees have been selected for transfer from the National Bureau of Standards prior to opening of the Laboratory on April 1, 1949. Six professional personnel and 1 clerk are on duty at the Laboratory at the present time. In the maintenance and custodial group 4 patrolmen, 1 head patrolman, and 1 janitor are on duty there also.

Eighteen professional personnel, grades P-1 to P-6, were selected during the month of December, and are in process for security clearance. One stenographer and 5 patrolmen are also in process of clearance. Two vacancies of considerable importance were filled: Director of the Chemistry Laboratory, and Chief of the Radiation Section, both in the NYCO Medical Division. Recruitment for these positions was started September 21 and August 25, respectively.

NYCO Personnel Relations

Activities in personnel relations were concerned with the new status of AEC personnel, reductions in force, job analysis, survey of travel policies, and employee welfare.

New Personnel Program. During the month of December, the new AEC personnel program was made known to all NYOO employees. The reasons for the new program and its implications for the individual employee were explained. This instruction was carried out by Division Directors and their representatives, who held meetings with the personnel of each Division at which the new program was explained and discussed in detail. Booklets were distributed, as well as the GM Bulletin and a New York Bulletin on the subject. Preparations have been made to execute SF 50's effecting the conversions within the proper time.

Reduction in Force. Because of the reduction in funds available for administrative expenses, the first phase of a job-elimination and force-reduction program was carried out during the month. Only a few persons were actually dropped from the rolls, since it was possible to effect a large shift of personnel from cancelled positions to vacant essential positions. The net result of this action, however, provided considerable savings in planned expenditures. Another minor reduction program will take place within the next two months.

Job Analysis. Substantial progress was made in the compilation of job descriptions. Most Divisions and Offices have completed a large percentage of their drafts, and these are being reviewed by the Classification and Wage Administration Branch. A sufficient number have been completed to constitute a preliminary sampling. Four desk audits were made to determine proper allocations, and, in addition, several discussions were held concerning the effect of organization changes on positions in the Medical and Technical Procurement Divisions. Three proposed positions in the New Brunswick Laboratory were discussed, and descriptions were prepared.

Survey of Travel Policies. A survey of industrial organizations in the New York area was made to determine the policies and wage differentials covering employees engaged in official travel or assigned to posts outside the continental United States. The data were requested by Washington.

Employee Welfare. All employees who were not members of the Surgical-Medical Group of our hospital plan were given the opportunity to enroll on December 16, 1948. Arrangements were made with the Enrollment Director of Associated Hospital Service for three interviewers to visit NYOO and explain the benefits of the Plans and the value of the Service. One hundred employees availed themselves of the opportunity to meet the Blue Cross representatives, and 85 new applications were obtained.

To help our thrift-minded employees with their Christmas shopping and other buying plans, a list of firms and stores selling nationally advertised merchandise at discount was prepared for their information. Catalogues were displayed, and individual identification cards were made available to those interested in the money-saving plan.

During the month, employees made 280 visits to the First Aid Room for treatment. Fifteen employees were referred to physicians; the remainder were treated by the nurse. Home visits were made to four employees for the purpose of giving nursing care.

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II. PRODUCTION

Steps are being taken to improve the quality of virgin uranium metal. Uranium rolling, which was interrupted during December, will be resumed in January, when increased amounts will be processed to make up the deficiency. A section of the Harshaw brown oxide plant was put through a trial run. Development work on continuous UF_4 production has been accelerated. An accountability survey was carried out at the Middlesex Warehouse by the Accountability Branch, Washington Office.

A final decision regarding the process to be adopted for future beryllium production has been postponed until January, 1949, as a result of the submission of new data by The Beryllium Corporation. Negotiations have been completed with the Brush Beryllium Company for the continuation of both process development and metallurgical fabrication development on a reduced scale. Renewed disagreement as to certain clauses has hold up execution of the contract with Burns and Roe for production of B_2O_3 by the Sheer-Korman process. A special extrusion of enriched uranium-beryllium fuel rods was carried out successfully at MIT. A program was formally instituted at Sylvania for the development of special fuel elements required by Oak Ridge. A metallurgical engineering coordinator is to be appointed, to coordinate metallurgical work at MIT, Oak Ridge and Argonne relative to the high flux pile. An Advisory Committee on Zirconium has been appointed and will hold its first meeting about January 5, 1949.

Uranium Metal Quality

On November 29, 1948, a meeting was held at NYOO to discuss methods for improving the quality of uranium metal. This action was prompted by reports from Hanford that slug performance had deteriorated as a result of low uranium density. Both metal production contractors, the Mallinckrodt Chemical Works and the Electro-Metallurgical Company, were represented at the meeting. It was decided that during the month of December, 1948, more metal would be cropped from the virgin billets, in order to eliminate the major portion of poor grade material, and thereby improve the average quality. The contractors are also conducting investigations to determine the optimum depth of cropping, on the basis of which future production specifications will be determined.

It is expected that production will not be adversely affected by this program, and that all requirements will be met. Another meeting will be held at St. Louis during January to discuss the latest developments in improving uranium quality. Representatives of Hanford as well as of the production contractors will be present.

Uranium Rolling

No uranium metal was shipped to either the Simonds Saw & Steel Company or the Vulcan Crucible Steel Company for rolling during the month of December. During January, however, sufficient material will be rolled

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to make up the deficiency. After February 1, 1949, Hanford intends to taper off its shipments of billets to about one carload per month.

It was reported previously that several billets had been forged, and that the rods so produced were to be evaluated at Hanford. Although no formal report has yet been received, Hanford has indicated that the grain structure is as good as that of rolled material, and that there is no appreciable difference in machining yields. Although there is no apparent improvement over rolled material, the forging technique should not be eliminated from consideration, since there may be some advantage relative to cost.

Harshaw Brown Oxide Plant

During the week of December 13, 1948, some of the facilities at the Harshaw Brown Oxide Plant were put through preliminary plant start-up tests. The first section of the plant to undergo a trial run was that for the reduction of orange oxide to brown. It was found that the continuous Rockwell furnaces had several gas leaks as a result of worn gaskets. When these gaskets were replaced, the Rockwell furnaces were found to operate satisfactorily. During this test only 800 pounds of material was processed; an analysis of the product has not yet been received. The pneumatic system for removing orange oxide from drying pots and feeding directly to the Rockwell furnaces operated effectively, and seems to offer an excellent method for transporting material during the process. The trial run was attended by representatives of Mallinckrodt and NYCO.

The digestion and extraction sections of the plant were also inspected, and minor installation changes recommended. Harshaw is preparing the ether plant for a test run, which will probably take place early in January.

Continuous Process for UF₄ Manufacture

Work is continuing on the development of equipment and methods suitable for the manufacture of UF₄ in a continuous process. The contractors responsible have been asked to speed up this development work, so that an answer to the problem may be obtained early in February, 1949. Thus, the design of a new green salt plant at the Mallinckrodt Chemical Works can be undertaken during the spring, and, if it is decided to undertake construction, work may be begun during the summer months.

Accountability Survey at Middlesex Warehouse

From December 6 to December 14, 1948, the Source and Fissionable Materials Accountability Branch, Oak Ridge Extension of the Washington Production Division, conducted a survey of the accounting procedures for source and fissionable materials at the Middlesex Warehouse. The survey team consisted of W. C. Youngs, Jr., C. D. W. Thornton, H. Norton, E. Hall and D. George.

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A major recommendation by the survey team was that tests should be made of the sampling and analytical methods applied to the ore. It was recommended also that the assaying of the ore should be expedited. A complete report on this survey will be received in the near future.

Anticipated Beryllium Production Program

In the November report it was stated that a comparative technical report on the new beryllium production processes proposed by the Brush Beryllium Company and The Beryllium Corporation would be forwarded to Washington in December. This report would provide a compilation of all the data obtained in the study of the two processes, and would include calculations of cost to the Commission for each program at a variety of locations, discussions of various design and operating features, and recommendations as to which process should be used in supplying AEC beryllium requirements. It was also planned to submit a summary of the decisions reached by NYOO regarding the choice of a process and the action to be taken immediately for its execution.

This report had been virtually completed during November, and was ready to be submitted to the Washington Office early in December. At this point, the Beryllium Corporation stated that important new information had been obtained regarding the Company's process. Consequently, it was agreed to postpone the final decision and to withhold submission of the report until the new data could be evaluated by NYOO.

The data in question were received at NYOO on December 23 and were reviewed in detail with representatives of The Beryllium Corporation at their plant on December 27. This new information will be considered in the final recommendations of the New York Office, and included in its report. It is expected that the report, recommendations, and related information will be in the hands of the Washington Office during the first or second week in January.

Development Program at Brush Beryllium Company

At the Brush Beryllium Company, an intensive program for the development of a new, efficient, low-cost process for the production of beryllium metal has been carried out during the past year. Pilot plant operations have been conducted to perfect a process which could be put into operation at an early date on a production basis. In early December, a considerable portion of this work had been completed, and the company submitted a formal proposal for the construction and installation of a new production process on the basis of the pilot plant results. It is this process which is currently under consideration, together with that of The Beryllium Corporation, for possible use as the new AEC beryllium production process. This phase of the operations at Brush under the development program can now be considered complete.

In addition to the pilot plant work, however, there have been several other programs carried out under the Brush development contract

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which appear to warrant continuation. Some of these will further reduce the cost of producing beryllium metal and will make available to the Commission new, inexpensive means of producing materials which now must be manufactured by cumbersome processes. NYCO is also desirous of continuing the fabrication development program that has been in operation at Brush for the past twelve or fifteen months. Consequently, negotiations were held with the Brush Beryllium Company during December for the continuation of both the process and fabrication development programs on a somewhat reduced scale during the next six months. These programs, if successful, will be of great immediate value to the Commission. Both programs will now be incorporated into one large overall program under a single contract. On the basis of past experience, it has been decided that a cost reimbursable type contract will probably be most advisable in this case. Action is being taken by NYCO to issue such an overall development contract to Brush within the next few days.

Sheer-Korman Process for Beryllium Chloride

In the November report, it was indicated that a definitive contract with Burns & Roe would probably be executed early in December for the construction of a pilot plant based on the Sheer-Korman Process, and that work on the plant would then be started on a large scale. During December, however, the representatives of Burns & Roe suddenly rejected many of the clauses which had been definitely agreed upon, and it was necessary to re-open negotiations concerning many of the basic principles of the contract. At the present time, many important clauses, including the patent clause and that covering the scope of the work, have not yet been fully agreed upon, and it is uncertain when a definitive contract can be executed. Several additional meetings with representatives of Burns & Roe have been scheduled, however, and it is hoped that final agreements will be reached early in January. Space has been obtained for the work at the U. S. Navy Shipyards, Maspeth, L.I., New York.

Enriched Uranium-Beryllium Alloy Fabrication

It has been reported previously that considerable effort had been expended at MIT in conducting a series of tests and dry runs, in preparation for the fabrication of a special lot of test fuel rod samples containing enriched uranium for Oak Ridge National Laboratory. The necessary clearances were obtained for MIT to carry out the actual beryllium-uranium fabrication, and the work was finally performed during December.

The fabrication program was initiated on Sunday, December 12, under special security guard, and continued as planned through December 17. The extrusions proceeded without mishap, except that the last rod extrusion could not be completed because of a break in the extrusion ram. All finished pieces and unused uranium were shipped by special courier to Oak Ridge on Friday, December 17. With the exception of one fabricated piece, all requirements at Oak Ridge were met.

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Development of Special Fuel Elements at Sylvania

As a result of discussions with Dr. Sidney Siegel of Oak Ridge, tentative plans were made for a program at the Sylvania Metallurgy Laboratory, directed toward the development of powder-metallurgical techniques for the fabrication of special test fuel elements for contemplated Oak Ridge reactors. It appears that unusually good metallurgical qualities can be imparted to such elements by the use of powder-metallurgy techniques.

During the past two months, arrangements had been made between NYOO and Sylvania for the establishment of such a program, but formal action had been withheld pending receipt of the necessary authorization from Oak Ridge. In December, authorization was received, together with a detailed description of the work desired. Formal authorization for Sylvania to commence this work was therefore given by NYOO.

Coordination of Beryllium Fabrication

In the Fall of 1947, NYOO was informed by the reactor group at Oak Ridge that special beryllium extrusions would be required on a production basis for use as the moderating material in the projected high flux pile. As a result of several meetings between NYOO and the Oak Ridge group, arrangements were made for the construction of a production casting plant for beryllium and the initiation by the MIT Metallurgical Laboratory of a program for the development of a commercial process for beryllium extrusion. At that time, the high flux pile was being given high priority by the Commission, but soon thereafter this work was de-emphasized. Although the work continued at MIT, a lack of technical coordination became evident between MIT and Oak Ridge. As a result, the groups at MIT and Oak Ridge have not been fully aware of each other's problems and requirements.

In order to remedy this situation, a meeting was held at NYOO on December 29 to determine what steps could be taken to improve the technical liaison between the MIT and Oak Ridge groups, so that the work at both places could be carried out most efficiently and expeditiously. This meeting was attended by representatives of the Oak Ridge group, the Washington Office, MIT, and NYOO. After considerable discussion, it was agreed by all parties that a metallurgical engineering coordinator should be appointed by the Oak Ridge group to coordinate high flux pile fabrication work by NYOO contractors with the pile construction and development program now being carried out at Oak Ridge. The coordinator will arrange for all work related to high flux piles which is to be done through the New York Office. It is expected that the Coordinator will be appointed in Oak Ridge early in January, and that he will begin discussions with NYOO shortly thereafter.

Advisory Committee on Zirconium

In the November report, mention was made of a contemplated Advisory Committee on Zirconium to assist NYOO in directing the zirconium development program and in establishing an AEC zirconium production

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program. During December, contractual negotiations for service on the Committee were successfully completed with Professors W. C. Schumb and M. Cohen of MIT and W. C. Fernelius of Syracuse University.

It is planned that the first formal meeting of the Committee will take place about January 5, 1949. At this time, details of various proposals for zirconium production will be presented to the committee, together with all documents and background material pertaining to these programs. The Committee will be asked to review this material, and to prepare recommendations for submission at a meeting to be held during the latter part of January.

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III. ENGINEERING

Construction of the foundation for the AEC training building at the University of Rochester was begun. Contracts were advertised for mechanical installations in the Boiler House and for structural work on the Plant 6E Building at the Mallinckrodt Chemical Works; construction work progressed on the Boiler House and the Facilities Building. Exterior alterations to the New Brunswick Laboratory were completed, and a contract for interior alterations was awarded. A meeting was held by the Munitions Board to acquaint the AEC, the armed services, and their contractors with the national program for the allocation of industrial capacity.

University of Rochester

A. Friederich and Sons of Rochester, New York, began work on December 2 under their sub-contract for construction of the foundation to the AEC training building at the University of Rochester, and at the end of the month the work was 18% complete. The building is being erected to provide educational and training facilities to implement the research program jointly sponsored by the University and the AEC.

During the month, bids were received for furnishing and erecting the structural steel work for the training building. The Bethlehem Steel Company was low bidder. The tentative starting date for this work, May 15, 1949, will be advanced if steel can be obtained earlier than anticipated.

Mallinckrodt Chemical Works

The contract for mechanical installations in the Boiler House was advertised for bids on December 17; bids will be opened January 11, 1949. The contract provides for the installation of Government-furnished boiler auxiliary equipment, together with the necessary controls and piping. Also advertised for bids was a contract for work on the Plant 6E Building, providing for the building superstructure and railroad siding. Advertisement of this contract was made on December 29; bids will be opened January 25, 1949.

The J. S. Alberici Construction Co. completed the work under their contract for the concrete foundations and floor of the Boiler House. The same company signed a contract for construction of the Boiler House superstructure on December 8, and began work under that contract during the last week in December. All concrete in first floor columns, second floor slab, and inside stair wells was poured by the George L. Cousins Contracting Co. under a contract for construction of the Facilities Building superstructure. The forms for concrete roof slab have been erected.

New Brunswick Laboratory

Frank Belluscio and Sons, Inc., Elizabeth, New Jersey, completed alterations to the exterior of the building which will house the New Brunswick Laboratory, as well as construction of the chemical storage and bottle

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storage sheds and a garage. The Belluscio Company was also successful bidder for Construction Contract No. 2, covering alterations to the interior of the laboratory building, and work under this contract has already begun.

Industry Allocation Program

Mr. James T. Bray, Chief, Mobilization Planning Branch, Washington, and Mr. David Farragut, of the same office, visited New York for a meeting of the Munitions Board, which was held at the Brooklyn Navy Yard on December 2. This meeting was one of a series which the Munitions Board had scheduled for large key cities during December to review the national program for the allocation of private industrial capacity with personnel of the armed services and AEC. Prior to the meeting, Mr. Bray acquainted the representatives of NYCO and its contractors with the tentative procedure for AEC participation in the Munitions Board program.

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IV. RESEARCH AND DEVELOPMENT

Activities during December included continuing action in the Kellogg metal recovery program and the Columbia University nuclear physics research program. Nuclear Development Associates in New York has conducted a special investigation for the Reactor Development Division in Washington thru NYCO. Several programs in basic metallurgy are in their beginning stages. Methods of detecting uranium ore beds are being investigated.

Basic Physics Research at Columbia University

Neutron transmission experiments are continuing with both unclassified and classified chemical elements. Beta ray spectra and half lives are being measured with high resolution apparatus. Isotopes for these measurements are procured from the Isotope Branch in Oak Ridge.

A proposal for investigating methods of robot-tracking the trajectories of nuclear particles in photographic emulsions has been forwarded to the Washington Division of Research for review. It has been requested that the Division consider the plan in conjunction with similar projects and in relation to the total AEC research program. An apparatus to control the moving microscope stage in such work, so that an operator can focus on individual grains of emulsion, is already in operation. Control of motion to one micron is claimed.

Metallurgical Research at Carnegie Institute of Technology

A letter supplement to Contract AT-30-1-Gen-359 has been issued for two additional basic research programs:

1. Thermodynamic properties of Binary Alloy Systems, under the direction of Dr. J. C. Warner and Dr. Paul Fugassi, Department of Chemistry.
2. Fundamental Research on the Corrosion of Metals and Alloys, under the direction of Dr. J. C. Warner and Dr. D. S. McKinney, Department of Chemistry.

A definitive supplement is in preparation.

Massachusetts Institute of Technology

A letter supplement to MIT's contract was issued for an additional basic research program on solid solutions and grain boundaries, to be directed by Dr. M. Cohen of the Department of Metallurgy. A second new program on heat transfer to liquid metals, to be directed by Dr. E. R. Gilliland of the Department of Chemical Engineering, was contemplated. This program has been cancelled, however, because the person who was to have done the work is now unavailable. A definitive contract for the entire research program is in preparation.

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Feasibility Report on Atomic Device

Nuclear Development Associates has prepared a report on the feasibility of an atomic device which will be delivered to the Reactor Development Division in Washington on January 3. The group has been proceeding under a letter contract; a definitive contract is near completion.

Harvard University Computer

A definitive, cost-reimbursable type contract was sent to Harvard University for 50% of the operating time of the Harvard University Aiken Mark I Computer during the calendar year 1949. The other 50% has been separately contracted for the Army Air Forces (Air Materiel Command), which had also approached Harvard University for the use of the machine. No difficulties are foreseen in this arrangement for the joint support of the machine, since the authority for assigning problems in both instances is invested in the Harvard Committee on Applied Mathematics and the Computation Laboratory.

In reaching its decisions on the selection, schedule, and priority of problems, the Committee will consider the following points:

1. The intrinsic scientific interest of the problem.
2. The value of the problem as a means for training personnel.
3. The value of the problem for the development of computing techniques.
4. The relevance of the problem to the Commission's field of interest as specified in Section 3(a) of the Atomic Energy Act of 1946.
5. The capabilities of the machine.

Uranium Recovery

Preliminary discussions of a Kellex proposal for the operation of a laboratory were conducted in Washington on December 6 between AEC representatives from Washington and New York, and representatives of the Kellex Corporation. In its proposal, Kellex offers to purchase land and provide standard building construction and standard facilities. It is understood that the AEC will use such facilities and will pay for any special equipment or unique facilities needed for Commission work, in addition to paying for direct laboratory operating costs and overhead. The Commission and other participants in use of the laboratory would be expected to pay for the amortization of the facilities over a 5-year period. It was agreed at the meeting that NYCO and Kellex would continue the negotiations, and prepare a balance sheet summarizing the financial aspects of the various possible arrangements involved in the Kellex proposal. Negotiations between NYCO and Kellex regarding contract clauses necessary to an arrangement of this type have been undertaken during the past month. To date, a method

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satisfactory to both parties for amortization of the facilities has not been found. If a suitable formula is worked out, Kellex will then present the proposal to the Board of Directors of Pullman, Inc., for their approval, prior to formal submission to the AEC. Negotiations are continuing.

The feed preparation process proposed by Kellex for recovery of uranium from Hanford wastes involves a precipitation of sodium diuranate and extraction of the precipitate in a continuous arrangement. The feasibility of this step has been proved by tests conducted at the Sharples Co. laboratory in Philadelphia during the last week in December. A simulated waste was prepared and the uranium was precipitated as sodium diuranate. Two different centrifuging machines were tried, the Sharples horizontal superdecanter and the Sharples vertical nozzle-injector. The "Superdecanter" gave only about 30% removal of uranium precipitate; the "Nozzle-injector" gave 99.35% removal. Since this was the first test with the nozzle-injector, somewhat better results are probably possible. Also, slight changes in the method of precipitation will probably improve the separation. Further tests will be made at a later date.

Detection of Uranium Orebeds at Positions Remote from Source

This project is being investigated at the request of the AEC Raw Materials Exploration Office in New York. Calculations have been made to determine the possibility of detecting diffused helium, or the alpha activity of diffused uranium solutions. Drill sites in Colorado were visited, and gas and core samples were collected. Tests of these samples are now being conducted; on the basis of the results obtained, further plans will be made.

V. BROOKHAVEN NATIONAL LABORATORY

Steps have been taken to expedite the progress of pile construction. A contract was awarded for the construction of Accelerator Project offices, and invitations to bid have been issued for biology laboratory construction. Erection of the Meteorological Towers Project has been completed. The Information and Publications Division offers a review of the activities of the research library, the classified library, and the publications group.

Construction

Meetings were held on December 3, 13, 22, and 28, among representatives of the H. K. Ferguson Co., AUI, and the AEC, to consider measures for insuring completion of the pile on schedule and within the new budget estimates. To expedite the construction, Mr. George Lindquist of the H. K. Ferguson Co. was appointed construction manager on December 8, with full authority over all field operations. A re-evaluation of the progress schedule indicates that the pile is 92 per cent complete, and the entire project 70 per cent complete.

The north wall and reinforced concrete roof of the Cyclotron-Van de Graaff building are ready for pouring, and form work for the cyclotron chamber has been erected. The foundation for the cosmotron has been poured, and the required detail work is being finished. A contract was awarded on December 21 for construction of the Accelerator Project office wing, and invitations were issued on December 30 for biology laboratory construction. Erection of the meteorological towers and installation of equipment has been completed.

Information and Publications Division

Recently there has been a steady increase in the demands made by the laboratory's scientific staff on the various technical services of the Division. This is a result of the current shift in emphasis throughout the Laboratory from the planning to the research stage of activities. Such demands can be expected to increase still further, particularly in the fields of literature searching, publications, and compilation.

In the research library, the basic collection of books and bound periodicals is now virtually complete, and aggregates 18,000 volumes. Approximately 650 current periodicals are now being received. During the past six months, approximately 3500 loans have been recorded, an increase of 500 over the first half of the year. Over 1100 questions have been received by the reference desk since July 1, 1948.

Some work on the translation of outstanding articles from the Russian scientific literature has begun, and a central repository of translated Russian papers, to which other research organizations are interested in contributing, is being established. It is planned to circulate lists of the titles of such translations, in order that photostat

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copies can be made available to interested parties. The weekly selected reading list, which has a circulation of 750, is now receiving contributed selections from the Technical Information Branch, Oak Ridge, in addition to the selections made by Brookhaven scientists. It is expected that other AEC installations may also forward selections, in order to give the list maximum coverage of the literature. Sections covering electronics and engineering have been recently added to the list.

The classified library now has over 6400 classified report titles, 2650 memos and letters, 450 photographs, 950 prints and 125 notes. All of this material is classified, and is handled in accordance with the existing security regulations. A continuous inventory is maintained on the file of classified reports, and a regular six-weeks check is made on classified material charged to staff members. It is planned to set up a small branch office of the classified library in the new Nuclear Reactor Building, in order to afford convenient service to scientists working in that building.

The publications group has produced 24 reports and other documents during the past six months, exclusive of the weekly bulletin and the weekly selected reading list. It is expected that this output will be surpassed during the next half-year period, because of the increasing number of reports emanating from the various scientific departments and projects in the Laboratory. An editor, experienced in the handling of scientific manuscripts, has recently been added to the group.

The information group has formed a reference library of organizational manuals, personnel rosters, and catalogs from colleges and universities, AEC offices, and other government and industrial organizations throughout the country.

Other activities of the division include the compilation of data on the atomic nuclei, which will be issued periodically in tabular form, and the formation of a small library of audio-visual aids for atomic education, including albums of photographs of outstanding interest in the field of nuclear energy.

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VI. MEDICAL

The health situation at the Harshaw Chemical Company has been completely evaluated, and a report was issued on dust conditions there. Field tests on methods of combating ether fires were conducted. Negotiations of research contracts for certain relatively small projects were begun at the request of the Division of Biology and Medicine, Washington Office.

Health Problems at the Harshaw Chemical Company

During the period September 21-30, 1948, dust samples were collected in Area C of the Harshaw Chemical Company. This survey was a follow-up of one conducted on June 15, 1948, and was more thorough than any previously made. The objectives were as follows:

1. To estimate the cumulative exposure to personnel employed.
2. To estimate the effectiveness of present control measures.
3. To provide a basis for future control designs and procedures.
4. To provide data for the justification of present and future radioactive dust control recommendations.

The data showed that a considerable group of employees are exposed to concentrations of alpha-emitting dust well above the maximum acceptable level. Ninety-one employees of a total of 100 are exposed to 1.5 to 374 times the acceptable alpha level (70 disintegrations per minute per cubic meter). The breakdown is as follows:

1. Thirty-three (33%) inhale alpha-emitting dusts at from 140 to 374 times the acceptable level.
2. Forty-three (43%) are exposed to 10-20 times the acceptable level.
3. Fifteen (15%) are exposed to 1.5-10 times the acceptable level.
4. The remaining employees, or less than 10% of the total plant personnel, are exposed to acceptable concentrations of dust.

These findings are consistent with the results of other NYOO investigations, and show that the equipment and procedures presently used for the control of alpha-emitting dust and fumes are completely inadequate. The last survey points up the urgent need for control measures, which have been previously recommended in considerable detail to the contractor. The situation was discussed in a conference held during the month with the Plant Manager. A summary of the survey findings, together with all recommendations to date, will be given to the contractor, whose attention has been called to contractual obligations for observing health and safety requirements.

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Field Tests of Ether Fire-Fighting Equipment

A number of NYCO contractors handle large amounts of ether. The high volatility, very low boiling point, low auto-ignition temperature and wide explosive range of this material make it extremely hazardous; nevertheless, practically no experimental work or practical experience is available regarding the controlling of ether fires. The obvious solution was to conduct appropriate tests. Accordingly, NYCO arranged such a program on November 15-16.

The practical tests simulated hazardous conditions that might be anticipated in our plants, and included such conditions as leaking packing glands, leaking valves, leaking flanges, broken sight glasses, spill fires, and ruptured piping both on the ground and overhead. All available types of extinguishing agents were employed: carbon dioxide, low-velocity water fog, high velocity water fog, carbon tetrachloride, regular mechanical foam, and dry chemical. It was found that dry chemical was the most effective of the agents tested for controlling incipient ether fires, and extinguishers using this agent are being installed in our ether-handling operations.

A technical report on these tests was issued on December 18, and was distributed to all concerned by the Safety and Fire Protection Section, Washington AEC. Colored photographs of the tests were made; colored motion pictures which were taken are presently being processed.

Fundamental Research

A contract has been negotiated with Columbia University for the expansion of its research program in the field of thyroid physiology and its applications to thyroid disease. The contract will specifically include the development of a method for assaying thyrotropic hormone by use of radioactive iodine uptake and secretion by thyroid glands *in vitro*. The budget for the first year is \$4,600 plus overhead of 25% of direct payroll.

A contract has been negotiated with Johns Hopkins University to enable the University to expand its research program in the field of sanitary engineering studies and radioactive waste problems. The work will emphasize the adsorption and assimilation of radioactive wastes by bacterial slimes on the surfaces of pipes, stream beds, and other substrates. The budget for the first year is \$12,204, which includes overhead of 8% of the total cost.

A contract will soon be negotiated with Mt. Sinai Hospital, New York City, involving a first year budget of \$5,000, plus overhead to be determined. It will provide for the measurement of tissue dose from beta- and gamma-active radioisotopes.

The technical supervision of all the above contracts will be provided by interested members of the Division of Biology and Medicine, Washington Office. These contracts are of a basic research type developed

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by NYOO for work which is generally of a continuing nature, and which can be reviewed from year to year with reference to results and budgets. Unless restricted data are involved, results obtained under these contracts are published without restriction.

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VII. LICENSING

Since March, 1947, the Licensing Division has issued 1,632 licenses in the following categories:

	March 1947 Through <u>Dec. 1948</u>	During <u>Dec. 1948</u>
Producers	263	6
Processors.	34	-
Distributors.	267	2
Consumers	<u>1068</u>	<u>30</u>
	1632	38

Nearly all of these licenses are for one year's duration. Approximately 733 have been renewed for an additional one year period. Others will be renewed from time to time as their expiration dates are reached and applications are made for extension.

Examination of the inventories and records of domestic processors, distributors and consumers of source material continued during the month.

The following exports were authorized during December:

Incandescent Mantles.	542,063*
Uranium Acetate.	1.0 lbs.
Diluted Pigment (10% U-phosphate)	20.0 lbs.
Thorium Dioxide5 lbs.
Thorium Nitrate	15,420.0 lbs.
Thorium Oxide	150.0 lbs.
Thoriated Tungsten Wire	7.7 grams

Shipments of incandescent mantles were made to 38 countries. Large quantities of thorium nitrate for the manufacture of mantles were sent to India, China, Austria, Egypt, and Germany. Authorization was granted for export of 150 lbs. of thorium oxide to Canada for use as a catalyst. Thoriated tungsten was shipped to France and Mexico for use in vacuum tube manufacture. All other exports involved small quantities of uranium or thorium to be used for medical or analytical purposes.

* The ThO₂ content of these mantles is estimated at 542 lbs.