First Report of the U. S. Atomic Energy Commission

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THE FOLLOWING REPORT IS RESPECTfully submitted pursuant to the direction of Section 17 of the Atomic Energy Act of 1946 which provides that "The Commission shall submit to the Congress, in January and July of each year, a report concerning the activities of the Commission."

The Atomic Energy Act was approved on August 1, 1946. On October 28, 1946, while the Senate was in recess, the President named the present members of the Commission [see *Science*, November 8 and December 13]. The members of the Commission required some time to sever their existing business and employment connections in order to comply with the requirement of Section 2(a)(2) of the Act that "No Member of the Commission shall engage in any other business, vocation, or employment than that of serving as a member of the Commission."

On November 13, the Commission held its first meeting, and since that time its members have devoted their entire time to the business of the Commission. Because of the magnitude and complexity of the undertakings and responsibilities vested in the Commission by the Act, and because of the necessity of uninterrrupted activity, the War Department consented to continue operation of the enterprise—known as the Manhattan Engineer District of the Corps of Engineers—until a transfer to the Commission could be effected without risk of interruption consequent upon the change from military direction by the War Department to operation by the newly-constituted statutory Commission. At midnight on December 31, 1946, this transfer became effective, by virtue of Executive Order 9816 [see *Science*, January 10]. The Executive Order was issued pursuant to the directions of the Congress contained in Section 9(a) and other provisions of the Act.

The relative brevity and lack of detail in this initial report of the Commission is explained by the fact that the Commission has been in responsible control of this very large undertaking for only about four weeks, and but two and a half months have elapsed since its first meeting. In its next semiannual report to the Congress, due in July of this year, it is the intention of the Commission to submit a comprehensive statement (within the limitations that the maintenance of security of information makes feasible in a public report). Prior to to that time the Commission will report, orally and in writing, to the Joint Committee on Atomic Energy, in accordance with Section 15 of the act, which provides that "The Commission shall keep the joint committee fully and currently informed with respect to the Commission's activities."

As promptly as possible the Commission will report to the Joint Committee the present status of the work of the Commission, the status of properties, facilities, contracts, personnel, financial condition and other similar facts, and plans for future development as those plans proceed. The Commission also will keep the Joint Committee fully and currently informed concerning the program of administration consistent with the policies of the Act (Section 1(b)(5)) and other policy determinations, among which some of the most important relate to methods of maintaining secure the information which must be kept secret in the interest of national safety.

Inspection of Manhattan District. The members of the Commission determined that their first step should be a survey of the facilities of Manhattan District. Accordingly on November 12, accompanied by Colonel Kenneth D. Nichols, the District Engineer, the Commission left Washington for Oak Ridge, Tennessee, administrative center and principal installation of Manhattan District. In the ensuing two weeks the Commission visited a number of major installations, making brief inspections and holding conferences with key executive and scientific personnel of Manhattan District and its contractors.

Transfer of Manhattan District. On October 26, the day President Truman named the members of the Commission, all five members conferred with the Secretary of War, General Eisenhower, and General Groves. Secretary Patterson offered the full cooperation of the War Department in the Commission's work and agreed to continue the Manhattan District operations under War Department jurisdiction until the members of the Commission could organize formally and acquaint themselves with the project. At the same time Secretary Patterson urged that the properties and functions then under the jurisdiction of Manhattan District, and required by the Act to be transferred, should be placed under Commission jurisdiction at the earliest possible date, and that as soon as possible military personnel should be released.

As already indicated, following the first formal meeting on November 13, all the members of the Commission spent the next two weeks visiting major installations of Manhattan District, consulting with key personnel of the District and its contractors, and studying the work and the problems of the project. As soon as these activities had proceeded far enough to afford a general familiarity with Manhattan District, its personnel and installations, the Commission took up the problem of bringing about the transfer of the project as contemplated by Section 9(a) of the Act [see *Science*, December 20].

The numerous details involved in the transfer of the properties, funds, personnel, and contracts were worked out during the month of December. During that month a large part of the time of the Commission was devoted to these matters.

At that time Manhattan District had more than 5,000 direct employees, military and civilian. The contractors for the District who were operating its installations had more than 50,000 employees in that work. A major problem that had to be solved related to the fiscal and disbursing arrangements necessary to avoid any interruption in work when the transfer occurred. In cooperation with the War Department, the Department of the Treasury, the Bureau of the Budget, and the General Accounting Office, arrangements were made for the allocation of appropriations to the Commission under Public Law 663, and fiscal and disbursing procedures were established to assure continuity in operations. Through consultation with the War Department, the Department of the Navy, and the Military Liaison Committee, arrangements were perfected to make certain that those operations and functions essentially military in character should remain under military jurisdiction.

Arrangements also had to be made for the retention of military personnel in actual Commission operations during the transition period; procedures had to be worked out in consultation with the Federal Bureau of Investigation with a view to obtaining the FBI investigations required by Section 10 of the Act at the earliest feasible date; and numerous other matters connected with the transfer, and in which other government agencies were concerned in one way or another, had to be dealt with.

It is a measure of the cooperative spirit in which all these problems were approached by the various government agencies that the Executive Order and other formal documents covering the transfer were executed and the actual transfer completed on January 1, on a mutually satisfactory basis and without any interruption in continuity of operations.

Government-owned Facilities. The principal government-owned atomic energy installations transferred from Manhattan District and now under the jurisdiction of the Commission are:

1. Clinton Engineer Works, Oak Ridge, Tennessee, a 59,000-acre reservation, the site of the Manhattan District administrative headquarters, and of the following production and research units:

a. Electro-Magnetic Plant for the separation of U-235, operated by Tennessee Eastman Corporation.

b. Gaseous Diffusion Plant for the separation of U-235, operated by Carbide and Carbon Chemicals Corporation.

c. Thermal Diffusion Plant for the separation of U-235, not in operation.

d. Clinton Laboratories for general nuclear research, operated by Monsanto Chemical Company.

2. Hanford Engineer Works, Pasco, Washington, a reservation of nearly 400,000 acres owned or controlled by the Government, site of plutonium production plants and of research and development facilities, now operated by General Electric Company [see *Science*, November 1].

3. Los Alamos Laboratory, at Los Alamos, New Mexico, a 45,000-acre reservation, site of a research installation principally for the military applications of atomic energy, and operated under contract with the University of California.

4. Argonne National Laboratory at Chicago, Illinois, successor to the Metallurgical Laboratory, now housed in part on the campus of the University of Chicago, which is contractor for administration. The board of governors for this laboratory is composed of representatives of 25 midwestern universities and research institutions.

5. Radiation Laboratory of the University of California at Berkeley (not a government-owned facility—except for certain buildings and equipment).

6. Brookhaven National Laboratory, Patchogue, Long Island, now under construction on the site of Camp Upton, a general atomic research center to be operated by Associated Universities, Inc., representing nine major Eastern universities with the collaboration of other colleges and universities in the region.

7. Knolls Atomic Power Laboratory, Schenectady, New York, a research center for development of useful power from atomic energy, now under construction and to be operated by General Electric Company. Under arrangements made by the Commission, provision has been made for participation of interested segments of the national economy.

The Commission plans immediately to consult with representatives of interested American industries in such fields as utilities, electrical manufacturing, chemicals and others, in order to assure broad participation by private enterprise in its research and development program, looking toward the industrial applications of atomic energy.

8. Dayton Engineer Works near Miamisburg, Ohio, a research and development facility now under construction and to be operated by Monsanto Chemical Company.

In addition, activities contributing directly to the operations transferred to the Commission are carried on in a large number of other facilities. A partial list of the extensive research and development contracts includes those held by Battelle Memorial Institute, Columbus, Ohio; Columbia University, New York; Iowa State College, Ames, Iowa; Massachusetts Institute of Technology, Cambridge, Massachusetts; National Bureau of Standards, Washington, D. C.; United States Geological Survey, Washington, D. C.; University of Rochester, Rochester, New York; University of Washington, Seattle, Washington; Victoreen Instrument Company, Chicago, Illinois; and Washington University, St. Louis, Missouri.

Major Programs in Effect. The following principal programs, which had been initiated by Manhattan District, were transferred to the Commission:

1. The production of fissionable materials.

2. The declassification of atomic energy data, to the extent consistent with security, carried out on the basis of recommendations of a committee headed by Dr. Richard C. Tolman.

3. The production and distribution of radioactive isotopes, started by Manhattan District during the summer of 1946 [see *Science*, June 14]. Upon recommendations of an advisory committee appointed by General Groves, radioactive isotopes have been distributed to qualified institutions capable of observing the necessary health and safety precautions.

4. A broad program for the production of electric power from nuclear fuels, initiated by Manhattan District, with Monsanto Chemical Company and General Electric Company as prime contractors. A large number of industrial and research organizations are participating in this program, and a summary review of the status of the work was recently published by Manhattan District.

5. Studies of the possibility of applying nuclear energy to aircraft propulsion, being made under contract between the Army Air Forces and Fairchild Engine and Airplane Corporation as prime contractor. Through arrangements made with Manhattan District, space and technical services have been made available at Oak Ridge for the staff assigned to these studies by the Air Forces and the contractors.

6. A comprehensive accident prevention and health program, in effect throughout all facilities. Care has been taken to safeguard personnel against injury from radiation exposure and other hazards, and reports indicate that the program has been effective.

7. Broad research programs in the fields of health and biology, under way at Argonne National Laboratory, Los Alamos Laboratory, and at Clinton Engineer Works, in cooperation with the U. S. Institute of Public Health.

8. Training programs for the instruction of personnel in the handling of radioactive materials, in effect at Argonne National Laboratory, the Radiation Laboratory, and Clinton Laboratories.

9. The compilation of scientific developments resulting from the work of Manhattan District.

10. Research programs too numerous to list, many of which are classified secret, under way in both government and nongovernment facilities. These programs include the physics of reactors, development of materials for construction of reactors, metallurgy, radioactive isotopes, production processes, fundamental nuclear physics, ceramics, radiobiology, various types of instruments, and health measures.

Development of Organization. The Commission took steps to maintain as a going concern the organization transferred from Manhattan District. Colonel K. D. Nichols, District Engineer, was appointed Acting Deputy General Manager of the Commission. Colonel Nichols and all other personnel transferred from Manhattan District were instructed by the Commission to continue to perform their functions in the manner in which they had performed them under Manhattan District. The Commission thus made certain at the outset that there should be no interruption or loss of continuity in operations. At the request of the Commission, General Groves has consented to act as a consultant to the Commission.

The Act provides for the appointment by the President from civilian life of nine members of a General Advisory Committee to advise the Commission on scientific and technical matters relating to materials, production, and research and development. The President had appointed the following members of the General Advisory Committee on December 12, 1946: Dr. James B. Conant, President of Harvard University; Dr. Lee A. DuBridge, President of California Institute of Technology; Prof. Enrico Fermi, University of Chicago; Dr. J. Robert Oppenheimer, University of California; Prof. I. I. Rabi, Columbia University; Mr. Hartley Rowe, Chief Engineer of United Fruit Company; Prof. Glenn T. Seaborg, University of California; Prof. Cyril S. Smith, University of Chicago; and Mr. Hood Worthington, Chief Chemist of E. I. du Pont de Nemours & Company [see *Science*, December 20]. At the request of the Chairman of the Commission, the General Advisory Committee held its first meeting on January 3 and 4, 1947, for the purpose or organizing its work and determining the methods whereby it might assist and advise the Commission. The Committee designated Dr. J. Robert Oppenheimer as Chairman. The Commission has arranged to furnish for review by the General Advisory Committee a statement of the Commission's research and development, production, and materials programs. A report on research and development programs will be available for the next meeting of the Committee, February 2 and 3, 1947. Subsequent meetings of the General Advisory Committee are now planned at two-month intervals.

Before making a recommendation to the President, pursuant to Section 2 (a) (4) (A) of the Act, with respect to the appointment of a General Manager, the Commission sought the advice of the following advisory group: Karl T. Compton, President, Massachusetts Institute of Technology; Herbert Emmerich, Director of Public Administration Clearing House; Georges Doriot, Professor, Harvard School of Business; and John Lord O'Brian, Attorney (former General Counsel, War Production Board). After a review of the qualifications of a large number of individuals, this group submitted the names of several individuals, including Carroll L. Wilson, whom the group considered to be exceptionally qualified for this position. After careful consideration of these men, the Commission unanimously recommended to the President the appointment of Mr. Wilson. The President named Mr. Wilson as General Manager on December 30, 1946 [see *Science*, January 10].

A great deal of careful consideration has been given to the form of organization best adapted to suit the purposes of the Commission and, in particular, to the functions of the four divisions of research, military application, production, and engineering provided for by Section 2(a)(4)(B) of the Act. The Commission has concluded that these four divisions should be staff divisions responsible for planning, review, and evaluation of the work of the Commission under these broad functional categories.

Under this concept of organization, the Division of Military Application assumes a far more important position in relation to the entire program of the Commission than would be the case if it were merely a line operating division concerned with direct supervision of such portions of the Commission's operations as might be identified as primarily relating to military applications. The Division of Military Application will be concerned with the broad and complicated interrelationships between military planning and the research, development, and production programs of the Commission.

In view of the great responsibilities placed upon the Commission by the Act, that its operation shall be conducted always with the paramount objective of assuring the common defense and security, the Commission has given most careful consideration to the essential qualifications for the officer who shall be the Director of the Division of Military Application. The Commission has discussed its views of the qualifications for such officer with the Secretaries of War and the Navy and have asked them to submit the names of the best qualified officers in their respective services. The Commission has under consideration a small group of exceptionally qualified officers who have been so recommended, and expects to make the appointment in the near future.

As Director of the Division of Research, the Commission has appointed Dr. James B. Fisk, formerly Assistant Director of Physical Research at the Bell Telephone Laboratories and recently appointed Professor of Applied Physics at Harvard University [see *Science*, February 14]. Dr. Fisk was recommended to the Commission by a subcommittee of the General Advisory Committee, appointed for the specific purpose of making recommendations for this position.

As Director of the Division of Production, the Commission has appointed Mr. Walter J. Williams, former Director of Operations at Oak Ridge for Manhattan District and recently appointed Manager of Field Operations of the Commission.

The appointment of the Director of the Division of Engineering will be announced later by the Commission. A five-man advisory panel, recommended by the General Advisory Committee, has been requested to make recommendations for this position.

The Commission has made appointments to some other key staff positions. These include the Director of Organization and Personnel, Mr. G. Lyle Belsley, who was formerly Assistant Administrator of the National Housing Agency and Executive Secretary of the War Production Board; and the General Counsel, Mr. Herbert S. Marks, who was formerly Special Assistant to Under Secretary of State Dean Acheson.

The Military Liaison Committee. Pursuant to Section 2(c) of the Act, the Secretary of War and the Secretary of the Navy have designated the following representatives of their departments as members of the Military Liaison Committee: Lieutenant General Lewis H. Brereton, USA, Chairman; Major General Lunsford E. Oliver, USA; Colonel John H. Hinds, USA; Rear Admiral Thorvald A. Solberg, USN; Rear Admiral Ralph A. Ofstie, USN; and Rear Admiral William S. Parsons, USN.

Informal contact between members of the Commission and the Military Liaison Committee was established prior to the Commission's first meeting. Since the Commission's inspection tour of the Manhattan District installations, the Commission has met with the Military Liaison Committee, and there have been frequent contacts between the staff of the Commission and the Committee. Discussions have centered around problems of organization, procedure, the development of close liaison and working relationships. The Committee was consulted in the preparation of the various papers and in the working out of the various arrangements covering the transfer of the Manhattan District to the Commission. Matters now under joint consideration by the Commission and the Military Liaison Committee include production of fissionable materials, security problems, research programs, relations with the General Advisory Committee, and relations with the Joint Research and Development Board, which is under the chairmanship of Dr. Vannevar Bush [see *Science*, January 24].

Maintenance of Security. The Commission has maintained in full force the security measures of Manhattan District and has under consideration the adequacy of those measures in terms of the requirements of national defense and of the Act.

The Commission has met with the Attorney General and with the Federal Bureau of Investigation for the purpose of establishing procedures for the investigation of personnel and of security violations.

The Commission has been able to obtain the services of Mr. Frank J. Wilson, Chief of Secret Service until December 31, 1946, as consultant on security policies and problems.

The Commission also has obtained the services of Mr. Thomas O. Jones as Special Assistant for Security to the General Manager. Mr. Jones was formerly an officer assigned to the Manhattan District. He served as security officer at the Los Alamos installation and was designated by General Groves as the security officer at the Bikini tests.

Production of Fissionable Materials and Atomic Weapons. The production operations which Manhattan District had under way at the time of the transfer are being continued. Much of the information relating to the production of fissionable materials and atomic weapons vitally concerns the common defense and security. This information received the highest security classification by Manhattan District and that classification has been continued by the Commission.

The primary application of atomic energy is today

in the production of weapons. These weapons require fissionable material of considerable purity and this requirement was the main reason for the construction of the installations at Oak Ridge and Hanford. Fissionable material also is necessary for the development of many of the peacetime applications of atomic energy. In addition, the basic raw material, uranium, is the same either for weapon production or for the peacetime applications. There is accordingly a very deep and basic relation between weapons and the peacetime uses of atomic energy. The long-range security of the Nation may very well depend closely upon the wise and speedy development of the applications of atomic energy. Research and development work on improved atomic weapons is in progress at installations now operated by the Commission.

In December General Groves informed the Commission that improvements in the processes for the separation of Uranium 235 at Oak Ridge would permit considerable savings in operating costs and result in substantial reduction in the number of employees required at one of the Oak Ridge plants. After careful study of a report from Colonel Nichols, the District Engineer, the Commission concurred in the necessary operating changes. Every effort is being made by the Commission to assure the retention of key personnel whose jobs have been discontinued as a result of the operating change.

Research and Development Programs. A comprehensive report on the status of research and development programs was initiated by the Commission. For this purpose the Commission called a meeting in January of laboratory directors, representing Argonne National Laboratory, Brookhaven National Laboratory, the University of California, Clinton Laboratories, General Electric Company, Iowa State University, and Los Alamos Laboratory. The reports prepared by these laboratory directors will furnish a basis for recommendations by the Director of the Division of Research and by the General Advisory Committee and will enable the Commission to plan and evaluate research and development projects. Meanwhile, a number of specific administrative decisions have been made by the Commission in order to assure continuance of programs initiated by Manhattan District pending thorough review by the Commission.

Source Materials. The Commission has under consideration a plan for the control of source materials, as provided by the Act. Meanwhile, the wartime control over uranium exercised by the War Production Board is being continued by the Office of Temporary Controls.

An important phase of the Commission's programs will be the development of new sources of uranium and and thorium. The Commission has met with Secretary Krug and other representatives of the Department of the Interior for the purpose of considering how best the services of the U. S. Geological Survey may continue to be employed in this field and for the purpose of discussing other ways in which the Department of the Interior and the Commission might cooperate.

Health and Medical Program. A medical committee, under the chairmanship of Dr. Stafford L. Warren, was appointed by General Groves to advise Manhattan District on health and medical problems. The committee consisted of representatives of laboratories and other installations holding contracts with Manhattan District. The Commission called a meeting of this medical committee in January with a view to the preparation of a report on the status of health and medical programs. It is expected that a report will be available to the Commission shortly.

Labor Relations. During the interval between V-J Day and transfer of the activities of Manhattan District to the Commission, elections were held by the employees of the principal contractors at Oak Ridge. The employees of Carbide and Carbon Chemical Corporation are now represented by a CIO union and the employees of Monsanto Chemical Company by an AF of L affiliate. Labor contracts, negotiated by these companies and their respective unions, had been presented to Manhattan District for approval. At the request of the Commission, the contracts were examined by an advisory board consisting of David A. Morse, Assistant Secretary of Labor, George H. Taylor, former Chairman of the War Labor Board and a member of the faculty of the Wharton School, University of Pennsylvania, and Lloyd K. Garrison, former General Counsel and later Chairman of the War Labor Board [see *Science*, January 10]. Pursuant to the recommendations of this advisory board, the Commission approved execution of the contracts subject to further consideration of those clauses affecting security and continuity of work.

Patents. The Commission has appointed Casper W. Ooms, Commissioner of Patents, William H. Davis, Chairman of the Department of Commerce Patent Survey Committee, and John A. Diener, former President of American Patent Law Association, as an advisory panel to recommend to the Commission policies, procedures, and staff organization for the effectuation of the patent provisions of the Act (Section 11). Following a report and recommendations by this advisory panel, the Commission expects to appoint a Patent Compensation Board as required by the Act and to institute appropriate patent regulations and procedures.

Budget and Fiscal Program. The Commission has submitted to the House Appropriations Committee a full statement of the transfer to the Commission of War Department funds for the Manhattan Project and a budget justification of appropriation requests for the fiscal year 1948. Pursuant to Public Law 663, the President has withdrawn $506,000,000 from the War Department accounts for the Manhattan Project, of which $5,000,000 has been allocated to the Federal Bureau of Investigation and the balance to the Commission. Of the $501,000,000

allocated to the Commission, $263,991,000 was immediately obligated to cover contract and other obligations transferred to the Commission.

The President's budget for the fiscal year 1948 includes $250,000,000 for Commission expenditures and $250,000,000 for Commission contract authorizations. In estimating its requirements, the Commission has necessarily, because of the short time available, relied largely on the experience and estimates of Manhattan District. The Commission is proceeding with the development of its own financial and budgetary plans and estimates as a matter of primary importance. In its next report it will be in a position, therefore, to discuss these matters more fully.

Accounting Control. One of the important problems confronting the Commission relates to the setting up of measures of accounting control that will be consistent with the requirements of a government undertaking and at the same time adapted to the special character of the Commission's enterprises. Because of the novelty and difficulty of many of the questions involved, the Commission has sought the advice of leading experts in this field with respect to the choice of a controller. The following panel was established to advise the Commission in this matter: Mr. Edward B. Wilcox, Partner, Edward Gore & Company (Chicago), and President, American Institute of Accounts; Mr. Walter L. Schaffer, Partner, Lybrand, Ross Bros. & Montgomery (New York); Mr. Paul Grady, Partner, Price, Waterhouse & Company (New York); Mr. Donald Stone, Assistant Director in charge of Administrative Management, Bureau of the Budget; and Prof. W. Arnold Hosmer, Professor of Accounting, Harvard Graduate School of Business Administration.

This group has met with the entire Commission and the General Manager, and has held a number of meetings with the Commission's staff. It is expected that as a result of the work of this group the Commission will shortly be in a position to appoint a controller and to initiate the work that needs to be done in order to set up a constructive system of accounting controls.

Relations to Work of United Nations Atomic Energy Commission. On October 28, 1946, the day the President named the members of the Commission, the Commission called upon the Secretary of State, Mr. Byrnes, and Under Secretary Acheson, to discuss in a preliminary way the relations of the Commission to the responsibilities of the State Department, and to establish liaison.

On October 30 the Chairman of the Commission called upon Mr. Bernard Baruch and his associates of the American delegation to the United Nations Atomic Energy Commission at their office in New York City. On behalf of the Commission Mr. Lilienthal stated the Commission's desire to cooperate with Mr. Baruch in whatever ways might appear helpful to him in his great responsibility. Informal liaison was established through the services of Joseph Volpe, Jr., formerly consultant to Mr. Baruch and now a Deputy General Counsel of the Commission, and technical liaison was established through Dr. R. C. Tolman, head of the American Delegation's Technical Advisory Committee. A number of informal communications and consultations have followed. The Commission has assured Senator Warren R. Austin, Mr. Baruch's successor as American Representative, of its desire to cooperate with him in whatever ways he finds may be helpful.

Legislation. Section 17 of the Act which directs the Commission to submit to the Congress, in January and July of each year, a report concerning the activities of the Commission, also provides that "The Commission shall include in such report, and shall at such other times as it deems desirable submit to the Congress, such recommendations for additional legislation as the Commission deems necessary or desirable."

The Manhattan District operated during its existence largely upon the wartime powers of the President. A comprehensive review of the arrangements made under these wartime powers is currently under way in order to fit them into a pattern for peacetime operation under the Act. The Commission has not yet had an opportunity to determine whether additional legislation is required.