

MANHATTAN PROJECT, CORPS OF ENGINEERS
OAK RIDGE, TENNESSEE

August 27, 1946

Memorandum to: Mr. A. V. Peterson, Director, Research Division

Subject: GENERAL INFORMATION CONCERNING ISOTOPES BRANCH

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1. Great peacetime applications of atomic energy researches are anticipated in two major directions: (1) the production of useful power and (2) the uses of isotopes. The latter broad field is so important and so technical that a special branch, the Isotopes Branch, has been set up in the Research Division of the Manhattan Project to coordinate and administer: (1) isotope production and distribution within the Project and (2) a national distribution of radioisotopes outside the Project.

2. Although some applications of atomic energy are at present open to much speculation, there is no question concerning the usefulness of isotopes, both the radioactive and concentrated stable types, in science and industry. For a number of years before the war isotopes were becoming of increasing usefulness in researches in fundamental, applied, and medical sciences. Production of isotopes, and therefore the extent of isotopic applications, was limited before the war with the facilities then available. Because of new production facilities developed on the Manhattan Project, the already well-demonstrated uses of isotopes can be extended greatly, not only in geographic magnitude but in scope and intensiveness of application.

3. An isotope is a particular type of an atomic element, namely one having a specific mass or nuclear constitution. An ordinary element may have one or more, up to 10 in some cases, stable isotopic forms. By means of special isotope separation equipment, such as chemical exchange columns, diffusion apparatus, or electromagnetic devices, a specifically desired isotope may be concentrated for study or for use. These stable concentrated isotopes are basic to studies of the nucleus of the atom and are invaluable in many applications in fundamental and applied science. Studies of methods of concentrating isotopes and researches with concentrated isotopes are being pursued on the Project. In the case of those isotopes of no direct military value, the Isotopes Branch follows the progress of and recommends programs of research in production and utilization.

4. Types of isotopes not found in nature can be made by atomic bombardment with special devices such as a uranium pile or cyclotron. These man-made isotopes are generally unstable, giving off rays (alpha, beta, or gamma) before becoming stable. They are known as radioisotopes. The radioactivity of these isotopes permits them to be traced, i.e., followed

in all kinds of processes in which atoms take part. Radioisotopes are extremely valuable tools in chemical investigations of all kinds, whether these take place in a test tube, in a manufacturing process, in a plant, in an animal, or in man. They are finding more and more use in all fields of fundamental and applied science, for example:

Medicine	Veterinary Medicine
Pathology	Surgery
Physiology	Pharmacology
Radiology	Zoology
Entomology	Bacteriology
Botany	Physics
Biophysics	Physical Chemistry
Biochemistry	Organic Chemistry
Radio-chemistry	General Engineering and
Metallurgy	Industry
Petroleum Engineering	Soil Science

5. The Isotopes Branch is receiving requests from hundreds of non-Project institutions for materials for use in these and possibly more fields of fundamental and applied sciences. There is a Review Section within the Branch to make a preliminary review of requests for completeness, feasibility of research, availability of material, adequacy of facilities, etc. A Control Section will insure proper handling and recording of all requests, forms, and correspondence connected with requests. Allocation of available materials to requestors will be determined by the recommendations of non-Project advisory groups appointed by Major General L. R. Groves from nominations of the National Academy of Sciences. The Chief of the Isotopes Branch maintains liaison with the non-Project advisory groups in his appointed capacity as Secretary to the two main groups, the Interim Advisory Committee on Isotope Distribution Policy and the Advisory Subcommittee on Allocation and Distribution. Details of the arrangements for the national radioisotope program are contained in the official announcement which appeared in Science, Vol. 103, pages 695-705, 14 June 1946.

6. Coordination of the overall problems of the Project on research development, production, measurement, and applications connected with isotopes is effected with the aid of the Manhattan Project Technical Advisory Committee on Isotopes. This Committee has representatives from all of the major Project laboratories. The Chief of the Isotopes Branch is represented thereon as Executive Secretary. Close liaison must be maintained with the Operations Officer of Clinton Laboratories, the contracting officer who finally authorizes the sale of the material by Monsanto Chemical Company, who operates Clinton Laboratories for the Government.

7. Informal requests for radioisotopes have been received to date from about 300 institutions and individuals. Many requests showed interest in all types of isotopes. Submission of formal applications has been possible since the middle of July. During the first 6 weeks of the program approximately 150 formal applications have been received. Now that

institutions can plan their research programs with the knowledge that radiomaterials will be available to them a steadily increasing demand is anticipated. Much more extensive demands are anticipated when:

- a. Prices can be revised downward
- b. Production can be increased and made dependable so that medical and industrial users can be encouraged
- c. Concentrated stable isotopes can be made available off the Project
- d. More radioisotopes are added to the availability list

8. The future of Project and non-Project developments in the production and in the applications of isotopes is indeed great. New and much more powerful radioisotope producing piles will be built. New devices for producing radioisotopes will also be developed, for example, giant cyclotrons and synchrotrons. Researches with isotopes will not only lead the way to more and more knowledge of the fundamental sciences, but isotopes will assume increasing importance in practical applications in applied science, in medicine, and in industry. The production of radioisotopes may of itself become an industry, while the isotopes may become a scientific tool as routinely and widely necessary as a microscope - the tracer atom technique providing a universally useful "atomic microscope". The Isotopes Branch or its later equivalent should have increasing responsibility in the furthering of this important peacetime development of atomic energy.

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