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Roy Snapp, Secretary to Commission

October 22, 1953

Howard Brown, Executive Officer  
Division of Biology and Medicine

400

INFORMATION PAPER REPORTING STATUS OF PROJECT "GABRIEL"

SYMBOL: EME:HCB

Attached please find a status report on Project "Gabriel" which has been prepared in response to the Commission's request at Meeting 898.

BEST COPY AVAILABLE

Attachment

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16-56867-1 ☆ U. S. GOVERNMENT PRINTING OFFICE

October 20, 1953

This document consists of 6 pages  
No. 3 of 3 copies, Series a

ATOMIC ENERGY COMMISSION

Memorandum for Information

STATUS OF PROJECT GABRIEL

At meeting 898, the Commission requested a report on the problems to be studied by Project GABRIEL. The following report is submitted by the Director of Biology and Medicine.

~~... contains information affecting  
the meaning of the  
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[REDACTED]

ATOMIC ENERGY COMMISSION

STATUS OF PROJECT GABRIEL

Report by the Director of the Division of Biology and Medicine

SUMMARY

The general objective of Project GABRIEL is the study of the probable effects, with particular reference to the inhabitants of affected regions, of the fall-out of radioactive materials from the use of large numbers of nuclear weapons.

Rand Corporation is nearing completion of an extensive a theoretical study of the probable distribution of fall-out from single events as present data and theory will support. A complete report of this phase of their study is expected about January 1, 1954.

An exploratory sampling of the occurrence of strontium 90 in selected areas of the United States and several foreign countries is making good progress. Collection of samples is well under way and assay programs in three laboratories have been started.

Related studies of soil-plant-animal relationships and of toxicity of strontium 90 are in various stages of progress or of planning.

[REDACTED]

[REDACTED]

[REDACTED]

ATOMIC ENERGY COMMISSION

STATUS OF PROJECT GABRIEL

Report by the Director of the Division of Biology and Medicine

OBJECTIVE OF PROJECT GABRIEL

1. The objective of Project GABRIEL is the study of the probable effects, with particular reference to the inhabitants of affected regions, of the fall-out of radioactive materials from the use of nuclear weapons in warfare. Depending upon the conditions under which such weapons are used, the major interest may lie in the short range contamination from the use of a single weapon or in the number of weapons required to produce levels of contamination hazardous to the population of a major area.

STATUS OF PROJECT AS OF OCTOBER 15, 1953

2. The program involves the following phases:
- a. Probable distributions of fall-out from a single event or from a small number of closely related events under various conditions;
  - b. Long range behavior of fall-out from multiple events;  
and
  - c. Evaluation of health hazards resulting from radioactive fall-out under the range of conditions which may be anticipated from actual warfare.

[REDACTED]

3. Several programs currently supported by the Division of Biology and Medicine were initiated specifically to supply information on the distribution and probable effects of radioactive fall-out from nuclear detonations. These include:

a. Studies of environmental effects of continental tests by the Atomic Energy Project at the University of California at Los Angeles, started at the Trinity test site in 1947 and extended to include the Nevada Proving Grounds;

b. Monitoring of the radioactivity of fall-out from weapons tests at approximately 100 stations in the United States and 70 stations outside the United States;

c. A theoretical study by Rand Corporation of the probable physical behavior of fall-out under conditions of interest; and

d. Studies of the occurrence in soils, vegetation, dairy products, animals and humans of strontium 90 and other fission products from nuclear weapons tests. Principal participants are identified in Item 8.

4. The Atomic Energy Project of the University of California at Los Angeles has, in connection with the several series of tests at the Nevada Proving Grounds, studied the occurrence of radioactive materials in soils, plants and small animals taken within a radius of one or two hundred miles of the test site. These studies are supplemented by laboratory investigations of the uptake by plants of radioactive materials from soils containing fall-out from the test site, of the inhalation by small animals of radioactive dusts from the test site, and of related subjects.

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5. Rand Corporation was given a contract in 1952 to make a theoretical study of those aspects of GABRIEL which, on the basis of available information, are amenable to such study. Their principal effort has been aimed at predicting probable fall-out from a single detonation under various conditions of use. A complete report on this phase of their studies is expected about January, 1954. A progress report was presented by Rand at a session of the General Advisory Committee on the afternoon of August 18, at which Commissioners Murray and Smyth were present.

6. Rand's primary contribution to the long-range aspects of GABRIEL has been related to the organization of a conference in July, 1953 to provide a critical review of the entire project by qualified personnel in related fields, and to the writing of a report on the conference. The final version of this report is essentially complete.

7. Following the 1953 Rand Conference, the code name SUNSHINE is frequently used to refer to that portion of Project GABRIEL dealing with direct sampling of the occurrence of strontium 90 as the result of weapons tests.

8. Of the radioisotopes resulting from the detonation of nuclear weapons, strontium 90 appears to be critical in the determination of hazardous long-range effects. An exploratory sampling of the occurrence of strontium 90 in humans, animals, milk, vegetation and soils is in progress. Through the cooperation of the Bureau of Plant Industry,

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U. S. Department of Agriculture, samples of soil, vegetation, milk and animals from selected areas of the United States and samples of soil and vegetation from several foreign countries are being obtained. Human samples are being obtained through individual arrangements with hospitals and practicing physicians.

9. Assays of the materials sampled for strontium 90 are being made by W. F. Libby of the University of Chicago, J. L. Kulp of Columbia University, and John Harley of New York Operations Office. Studies of other characteristics of the samples bearing on the soil-plant-animal relationships involved are being made by the New York Operations Office, the Department of Agriculture, and others. It is expected that these studies will contribute to GABRIEL in the following ways:

a. Actual samples of the present human content of strontium 90 from some 40 detonations of nuclear devices under partially known conditions will add to the confidence with which one can estimate orders of magnitude of human uptake from other devices detonated under similar conditions. In general it will be difficult or impossible to evaluate the relative contributions of individual detonations.

b. Correlation with fall-out data and with the results of controlled experimental studies will permit better estimates of quantities of material which may be hazardous under the various conditions which may be anticipated in nuclear warfare.



[REDACTED]

The extent to which actual sampling of strontium 90 is desirable can be determined only on the basis of results from the exploratory program now in progress.

10. Although a reliable estimate of the present distribution of strontium 90 will represent a substantial contribution to GABRIEL, additional information is needed to permit reliable estimates of changes in availability for human uptake as a function of time and of biological effects as a function of dose and of dose rate. While studies of radiotoxicity already represent an important phase of the general program of the Division of Biology and Medicine, aspects of particular interest to GABRIEL are being coordinated and emphasized as circumstances permit.

11. In the event that GABRIEL develops a substantial basis for apprehension concerning the long-range effects of strontium 90 in the environment as a result of nuclear warfare, it may be expected that the project will be extended to include possible means of minimizing the hazards from such occurrence.

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# Office Memorandum • UNITED STATES GOVERNMENT

TO : Dr. John C. Bugher, Director of  
Biology and Medicine

DATE: July 31, 1953

FROM : Roy B. Snapp, Secretary

SUBJECT: COMMISSION REQUEST FOR INFORMATION ON GABRIEL STATUS

SYMBOL: SECY:JHS

1. At Meeting 898, in the course of discussion on AEC 21/12 - Semi-annual Status Report to the President and the NSC - the Commission:

REQUESTED a report on the specific problems to be studied by  
Project GABRIEL.

2. You are requested to take the action necessary to implement this decision.

3. We will be happy to assist in reproducing this report and circulating it to the Commission.

*Roy B. Snapp*

Roy B. Snapp  
Secretary

cc: General Manager  
Director of Military Application

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