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SCOPE OF RESEARCH PROGRAM
AS OF 1 DECEMBER 1946.

Submitted by Major J. W. Howland.

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009 Research

Present (University of Chicago) Argonne National Laboratories
University of Rochester
University of California
Monsanto Chemical Corp (Clinton Laboratories) USPHS
University of Washington, Seattle
Western Reserve University
Columbia University
Monsanto Chemical Corporation (Dayton)

Contemplated University of Virginia
University of Tennessee
Ohio State University
University of Kansas

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Types of study include I General Studies in Radiation including (1) physical measurement of radiation, (2) biological effects of radiation (3) methods of detection of minimal radiation damages and (4) methods for the prevention of radiation injuries. II Hazards due to special Materials (for non-radioactive, radioactive and fission materials) (1) degree of toxicity (2) preventative measures. III Special Production Hazards and IV Hazards of Military Uses.

Argonne National Laboratories (University of Chicago)

1. General physiological picture of acute and chronic radiation.
2. Radiation effect on blood clotting, lymphocyte distribution and spread of infection.
3. Toxic effects of external radiation and absorbed radioactivity.
4. Response of blood cells to various types of radiation.
5. Chronic effects of radiation and radioactive materials in animals.
6. Mode of action of radiation in carcinogenesis.
7. Chemical and physiological basis of radiation effects.
8. Metabolism of radioactive elements.
9. Instrument standardization, design, etc.

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University of California

1. Studies of the metabolism of plutonium, uranium and fission products in rats and man.
2. Fission product tracer studies.
3. Metabolism of radium, actinium, americium & curium in animals and man.
4. Studies (pilot) on possibly hazardous artificially induced radioactive elements i.e. chromium, nickel, etc.
5. Beryllium tracer studies.

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
1ST REVIEW-DATE: 9-9-94
AUTHORITY: DADC DADC ADD
NAME: DICKS
2ND REVIEW-DATE: 9/1/94
AUTHORITY: ADD
NAME: KAM
DETERMINATION [CIRCLE NUMBER(S)]
1. CLASSIFICATION RETAINED
2. CLASSIFICATION CHANGED TO:
3. CONTAINS NO DOE CLASSIFIED INFO
4. COORDINATE WITH:
5. CLASSIFICATION CANCELLED
6. CLASSIFIED INFO BRACKETED
7. OTHER (SPECIFY):

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6. Treatment of plutonium poisoning.
7. Behavior of fission products in soils.
8. Biological effects of fission recoils.
9. Search for other U compounds which will localize in organs other than liver and spleen (15%).
10. Biological effect of disintegration products of boron and lithium of the neutron irradiation (15%).
11. Study of element 85 in the thyroid (15%).
12. Training of Crossroads personnel.

University of Rochester

Radiation and Radiology Section

1. Instrument design, measurement standardization, industrial monitoring.
2. Biological effect of tracer amounts of polonium, radium and uranium in human and animal subjects. Application of tracer experiments to serve other parts of the project.
3. Physiological effects of exposure to acute and chronic radiations including radio isotopes; search for therapeutic methods of value.
4. Development of possible chemical technique or methods of detection of radiation damage and the mechanism by which such effects are produced.
5. By means of spectroscopic methods to study distribution of uranium and other heavy metals of importance in animal tissue; search for possible clues as to the method of bony deposition of radioactive materials.
6. Study of the time intensity factor in radiation and development of methods of producing instantaneous exposure to radiation (A bomb effect).
7. Study of the metabolism of plutonium, polonium, radium, etc., in human subjects.

Pharmacology

1. Study of the inhalation toxicity of various uranium, beryllium and thorium compounds. Studies in the mechanism of production of inhalation toxicity.
2. By chemical technique, studies of the mechanism of uranium fixation in bones, uranium complex function, methods of excretion of uranium.
3. Toxicity of uranium, beryllium and thorium compounds by ingestion.
4. Pathological effects of uranium, beryllium & thorium poisoning and mechanism by which produced.
5. Physiological effects of uranium, beryllium & thorium poisoning.

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Experimental Surgery. [redacted]

1. Clinical, hematological and pathological effects of acute lethal radiation.
2. Methods of bone marrow transplantation.
3. Studies in bone marrow reserve and radiation effect.
4. Tissue culture studies related to bone marrow production.
5. Effect of folic acid and rutin on marrow regeneration.
6. Studies in metabolism of iodine by thyroid (15%).

Experimental Hematology.

1. Comparative study of blood histamine and hematological effect in cells.
2. Studies on life cycle of blood platelets
3. Studies on life cycle of WBC leukocytes.
4. Studies on marrow reserves after radiation.
5. Evaluation of coagulation defects following irradiation.

Genetics

1. Continuation of studies of effect of chronic radiation on mice.
2. Continuation of studies on effect of acute and chronic radiation (X-ray) on Drosophilia.

Monsanto Chemical Co. (Clinton Laboratories) USPHS

1. Continuation of studies on the biological effect of slow fast and thermal neutrons on rats and mice.
2. Continuation on studies on the comparative biological effect of penetrating radiation.
3. The effect of internally deposited plutonium on bone healing.
4. Cytological program on the biological effect of radiation on simple cells and tissue.
5. Instrumentation and techniques of radiation monitoring.

University of Washington (Seattle)

1. Acute and chronic effects of external radiation on fishes.
2. Breeding studies on salmon following radiation.
3. Studies on the effects of Hanford effluent on salmon and trout.
4. Effect of internally deposited radioactive materials on fishes.
5. Field studies on the effect of possible Hanford pollution on fish life of the Columbia River.
6. Plankton experiments - effect of radiation on higher forms (new).

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7. Feeding experiment on deposited radioactive materials (new).

Monsanto Chemical Co. (Dayton) New program being organized.

1. Biological effects following chronic exposure of animals to plutonium by inhalation and parenteral administration.
2. Correlation between chronic exposure of workers and polonium excretion rate.
3. Mechanism of action of polonium toxicity.
4. Development of special health physics technique for specific use in polonium purification.

Western Reserve University

1. Investigation of the toxic effects of thorium and its isotopes.
2. Comparative studies on the biological effect of external radiation and that from internally deposited radioactive materials.
3. Use of radioactive isotopes in fundamental biological research.

These general titles are given inasmuch as a program has not been actively formulated.

Columbia University

1. Studies on the measurement of fast neutrons for biological dosage.
2. Development of a method of measuring neutron dose by chemical means.
3. Measurement of radioactive isotopes for biological and medical application.
4. Correlation of tissue doses and biological effects produced by external irradiation and by radioactive isotopes internally administered.
5. Exploratory biological experiments to extend use of radioactive isotopes as tracers on therapeutic agents (15%).
6. Studies of the fundamental biological action of ionizing radiation.
7. Measurement of the radiation of radioactive isotopes to provide data for the protection of personnel and films in transit.

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University of Virginia - Dr. Alfred Chanutin

Study of the effects of various types of radiation (alpha, beta, gamma & neutrons) on the circulating blood proteins by electrophoresis and protein fractionization technique. To determine whether means of early detection of radiation damage can be accomplished in this way.

University of Tennessee - Dr. Henry Wills

Study of the mechanism of toxic effects of uranium and other heavy metal compounds on the kidney. This is a continuation of Dr. Wills' work with the Rochester Manhattan Project during the war and contributes to that general study.

Ohio State University - Drs. Pool and Myers

1. Development of the "neutron camera" for analysis of types of neutron energies and recording of same.
2. Methods of overall measurement of total energy of beta ray and gamma ray dosage.
3. Methods of radio autography of tissues using special magnets already developed at Ohio State University.

University of Kansas

Methods of measurement of radium content of human body by breath radon analysis after deposition of radium.

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