Progress Report to the Joint Committee on Atomic Energy

JANUARY THROUGH MAY 1950 (U)

UNITED STATES ATOMIC ENERGY COMMISSION

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2. Carry out full-scale weapons tests in 1951 at Eniwetok, including proof tests of new fission weapons and experimental tests of methods of initiating thermonuclear weapons:

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Extensive preparations are being made to record the results of these tests so that information essential to the thermonuclear program can be obtained. This has necessitated redesign of the towers on which the weapons are to be placed, in order to support the additional instrumentation required.

In the latter part of April, General E. E. Quesada, Commander, JTF-3, Dr. Alvin C. Graves, Deputy Task Force Director for Scientific Affairs, and other members of the Task Force principal staff made an inspection of Eniwetok and supporting bases and discussed planning preliminary to JTF-3 assuming command of the Proving Ground before January 1, 1951. Construction of proving ground facilities by Holmes & Narver, Incorporated, is slightly ahead of the revised schedule. (End of TOP SECRET section.)

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PART VI

BIOLOGY AND MEDICINE

The principal aspects of the Commission's program of biology and medicine to receive emphasis during the next 12 months are:

1. Civil defense liaison activities, including the development of radiation detection instruments;

2. Studies to establish permissible levels of exposure and methods of radioactive waste disposal;

3. Studies of radiation injury and long-term effects of radiation, including the work of the Atomic Bomb Casualty Commission in Japan;

4. Training of health physicists in radiation protection; and

5. Study of the toxicity and metabolism of carbon 14 and tritium.

Civil Defense Liaison

The Commission's program in civil defense was outlined in testimony and statements submitted to the Joint Committee in executive session, February 17, 1950, and in the open hearing, March 17, 1950. Progress in significant phases of the program since then is described below.

Instructor training courses. The Radiological Monitoring Courses at Brookhaven National Laboratory, at the Atomic Energy Project, University of California at Los Angeles, and at Oak Ridge, began in March and April. There were 15 participants in the Brookhaven course, 12 at the University of California, and 21 at Oak Ridge. Similar courses will be given at two additional locations, Reed College, Portland, Oregon, commencing in June, and the Illinois Institute of Technology, Chicago, Illinois, beginning in July.

One-week courses in the Medical Aspects of Atomic Warfare were held at seven locations during March, April, and May and had the following participation:

Institution	No. of students
University of Rochester Atomic Energy Project	30
Johns Hopkins University School of Medicine	23
Argonne National Laboratory	25
Western Reserve University School of Medicine	23

Institution	No. of students
University of Utah School of Medicine	8
University of California at Los Angeles Atomic Energy Project	27
University of Alabama	8
Total	144

Emergency radiation control program. Organization and training of the emergency monitoring teams continued under the jurisdiction of the Operations Offices. Allocation of stockpile radiation detection instruments to the teams was nearly completed. The Hanford Operations Office was engaged in assembling standard individual kits to be used by the four teams in that area. The New York Operations Office and the Oak Ridge Operations Office reviewed operating plans and manuals for their respective emergency radiation control programs.

Technical information for the NSRB. The third and last report in the series to be abstracted from the Weapons Effect Handbook was forwarded to the National Security Resources Board on April 14, 1950, for use in their civil defense planning program. Radiation Detection Instruments is the subject of this interim report.[1/]

Radiation Detection Instruments

In January the Radiation Instruments Branch, Division of Biology and Medicine, was transferred from Oak Ridge to its present location at the National Bureau of Standards, Washington, D. C. This move will facilitate general AEC-wide coordination in radiation detection instrumentation and will permit closer work with the Bureau.

Contacts were made with 38 industrial concerns for the purpose of obtaining their ideas on the development of a simple, inexpensive radiological safety instrument. As a result of these contacts, 27 proposals ranging in cost from approximately $3,500 to $50,000 each were received from 15 companies. These proposals, suggesting the development of 9 different types of devices, are being reviewed and contractual action on several is expected to be initiated.

Six projects for the development of simple, inexpensive radiation detection instruments were being carried on by instrument experts at various AEC laboratories:

1. An ionization chamber instrument about the size of a photographic light meter was developed by the Oak Ridge National Laboratory.

1/ The report was transmitted to the Joint Committee by letter, April 13, 1950.

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2. The New York Operations Office developed an inexpensive Geiger counter dose rate meter capable of measuring up to 100 roentgens per hour of gamma radiation. This device is being production-engineered by an industrial concern, and it is anticipated that the instrument can be produced in quantity for less than $15 each.

3. A dose-rate meter employing a quartz fiber electrometer is being developed at Argonne National Laboratory.

4. Brookhaven National Laboratory completed preliminary studies on portable scintillation counters and further development work will be done.

5. The Atomic Energy Project at the University of California at Los Angeles developed a color-changing device for measuring radiation, consisting of a number of capsules containing liquids which change color at predetermined total exposures.

6. A liquid dosimeter is being developed at the University of Rochester's AEC facilities. The electrical conductivity of the liquid changes upon exposure to radiation, and the change is measured with an ohmmeter-type attachment calibrated in roentgens per hour.

In addition to these projects, the AEC sponsored a research program at the Naval Radiological Defense Laboratory to investigate several approaches to the civil defense instrument problem. The AEC is also sponsoring the further industrial development of an electrostatic dosimeter invented by Dr. C. C. Lauritsen of the California Institute of Technology.

Close coordination is being maintained with the military and other governmental agencies regarding these projects to assure that duplication of effort is avoided. (End of [redacted] section.)

Toxicity of Carbon 14, Tritium, and Neutrons [redacted]

Carbon 14 and tritium. With the increasing research use of tritium and carbon 14, and the prospective hazards of handling production quantities of tritium, more complete information is needed on the toxicity and metabolism of these materials and their effects on plants and animals. Work is being initiated as rapidly as possible on the biological effects of carbon 14 and tritium on both plants and animals with special attention being given to mammalian species.

Neutron toxicity. With the prospective operation of the Experimental Breeder Reactor and the Materials Testing Reactor at the Reactor Testing Station, more information is needed on the biological effects of neutrons so that these and other reactors may be operated without great risk. Information on the permissible exposure to neutrons is of special importance to development of submarines and aircraft powered by reactors.

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Research was initiated on the biological effects of neutrons on animals with the view that the information thus obtained may be extrapolated to man.

Biomedical Program for Future Weapon Tests

In preparation for the 1951 weapon tests, an experimental animal colony was established on the Island of Japtan. A breeding colony of rats, mice, dogs, and pigs is being maintained to produce animals adapted to the environmental conditions of the test. Experiments were designed to provide information on mid-lethal doses, pathological, hematological and biochemical effects, thermal radiation injury, and biological dosimetry using various species. (End of [redacted] section.)

Radiation Injury and Long-Term Effects ([redacted])

Radiation cataract studies. An intensive ophthalmological program was initiated following the survey completed in November, 1949, by Dr. David G. Cogan of Harvard Medical School, to determine what, if any, late ocular effects resulted from the atomic bombings in Japan. Thus far, 40 definite cases of radiation cataract and 40 probable ones have been discovered out of 800 individuals examined. Further data with respect to the incidence of radiation cataract in Japan should be forthcoming by the end of the year.

Atomic Bomb Casualty Commission. In May the Commission approved an augmented operating program for the Atomic Bomb Casualty Commission (ABCC). This action was based upon a thorough review made by the Commission and the National Research Council concerning ABCC activities and future plans for operations in Japan. A special consideration influencing the review of the program and the Commission's decision has been the need for securing promptly as much technical and medical data as may be presently available from Hiroshima and Nagasaki in order to guide current civilian defense planning in the United States.

Lifetime effects of radiation. Much of the work to date on the effects of radiation on mammals has covered only a short period of the total life span. Investigations have now been started with dogs to study the lifetime effects of radiation. The work is in two phases and covers daily exposures over the life span of animals and radiation at weekly intervals. Information will be obtained on longevity, work capacity, reproductive capacity, and biochemical, hematological, and other physiological effects.

Environmental Studies

An enlarged water supply decontamination research program was developed by AEC, the U. S. Public Health Service, and the Department of Defense. The Public Health Service will provide the technical staff and assist in technical supervision, while research will be conducted at the Oak Ridge National Laboratory where a new laboratory is to be ready by

the end of the year. Initially, the investigations will be on the ability of existing methods of water treatment and purification to remove radioactive contamination from water supplies.

A proposed Columbia River survey was agreed upon by the U. S. Public Health Service and is now under consideration by the Hanford Operations Office. The survey will obtain information on the hydrological, physical, chemical, and biological characteristics of the River as they relate to Hanford plant operation and waste disposal before and after future impoundment of the River by McNary Dam, now under construction. The study is expected to begin July 1 and last two years; the costs are to be borne by the Public Health Service.

Various surveys were initiated at the Reactor Testing Station, among them a meteorological survey by the U. S. Weather Bureau and a geological study by the U. S. Geological Survey, and plans are being made for radioactive background studies. An ecological survey of the White Oak Pond and drainage basin at Oak Ridge was begun in collaboration with TVA.

Health Physics Training

The second group of 21 fellows training in health physics at Oak Ridge and the University of Rochester will complete the regular courses in September, 1950. An additional three fellows were offered an opportunity to take broader training in radiation biophysics, and two are now studying at the University of Minnesota and one at the California Institute of Technology. As an extension of this plan, the Advisory Committee for Biology and Medicine recommended that the AEC establish approximately 20 fellowships for predoctoral training in biophysics.

After the National Research Council withdrew from administration of the AEC predoctoral fellowship program, administration of a national program was undertaken by the Oak Ridge Institute of Nuclear Studies. Arrangements were instituted with Vanderbilt University for its participation in the Oak Ridge part of the program. Graduate credit is offered for course work at both training centers (Rochester-Brookhaven and Oak Ridge-Vanderbilt), and provision is made for selected fellows to take master's degrees upon an extension of the fellowships. From among 194 applicants, 40 fellowships were awarded by the Fellowship Committee, composed of representatives from Rochester and Vanderbilt Universities, Oak Ridge National Laboratory, Oak Ridge Institute of Nuclear Studies, and the AEC. This group will begin their training in the Fall of 1950.

Cancer Research Plans and Facilities

Argonne Cancer Research Hospital. The contract between the University of Chicago and the Atomic Energy Commission for operation of the Argonne Cancer Research Hospital and the contract for the lease of the property to the University of Chicago were signed. Bids for construction of the Hospital are now being taken and an award is scheduled for June.

Oak Ridge cancer research unit. Construction of the cancer wing at the Oak Ridge Hospital was completed, and the unit was equipped and ready to receive patients at the end of May. A plan for the initial cancer research activities was established and includes among other studies the following:

1. The use of radiogallium in the treatment of experimental and, later, human cancer;

2. The properties of radioruthenium in the treatment of surface tumors;

3. The use of radiomanganese in the treatment of thyroid tumors;

4. The action of antimony compounds in cancer by radio tracer techniques; and

5. The development and design of a telecobalt therapy unit to use a thousand curie source when this becomes available. The project is being carried on in conjunction with the Post-Graduate School of Medicine, the University of Texas, and the M. D. Anderson Hospital for cancer research.

Research Proposals Approved

A list of the research proposals approved by the Division of Biology and Medicine during the period January through April, 1950, is shown in Appendix D. (End of [redacted]ection.)

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