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August 13, 1952

M. W. Boyer, General Manager

John C. Bugher, Director, Division of Biology and Medicine

MONTHLY STATUS AND PROGRESS REPORT, JULY 1952 -  
DIVISION OF BIOLOGY AND MEDICINE

SYMBOL: BMA:RON

Transmitted herewith is the Monthly Status and Progress Report for this Division covering the month of July 1952.

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Report

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SURNAME	CECIL <i>Ron</i>	BROWN <i>BS</i>	BOYER <i>MB</i>
DATE	8-14-52	8-14-52	8/18

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**MONTHLY STATUS AND PROGRESS REPORT**

Division of Biology and Medicine  
MONTH OF JULY, 1953

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Weapons Test Activities

Monitoring Fall-out Data. (Tumbler-Snapper series) ( ) The fixed network of Weather Bureau stations for the collection of fall-out and airborne dust samples during the recent spring tests operated on full schedule until June 20. From June 20 to July 1, the operations were curtailed allowing for the collection of one sample a day instead of three at each of the collecting points. A skeleton network will be maintained to continue the sampling until full-scale monitoring is again required.

A total of 31,000 samples has been received by the Health and Safety Division of the New York Operations Office for analysis. The following tables give some results of the fall-out in various locations.

Table 1: Maximum Fall-out\*

Shot No.	Location	On Gunned Paper (Curies per square mile)	Approximate Gamma Dose Rate**
5	Vandover, Utah	400	1.60***
6	Grand Junction, Colo	14	0.06
7	Elko, Nevada	52	0.20
8	Boise, Idaho	100	0.40

- \* Total fall-out for the period of mobile monitoring (20 to 40 hours).
- \*\*  $\mu\text{r/hr}$  (microcuries per hour) at three feet above the ground.
- \*\*\* Maximum Permissible Levels for chronic exposure over a period of years is 300  $\mu\text{r/week}$ . Thus, from the health hazard standpoint, the above values are considered as not significant.

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Table 2: Maximum Airborne Dust

<u>Shot No.</u>	<u>Location</u>	<u>Microcuries per Cubic Meter****</u>
5	Ogden, Utah	0.23
6	Price, Utah	0.014
7	Elko, Nevada	0.16
8	Elko, Nevada	0.30

\*\*\*\*The concentration set for these tests was one microcurie per cubic meter.

Effects on Photographs Industry. [REDACTED] Eastman Kodak Company reported that during the Spring 1953 weapons tests the city of Rochester, New York, received only one heavy fall-out of radioactive fission products. It occurred on June 3 to 4, and contaminated the products at Kodak Park. High air activity at Kingsport, Tennessee, between June 4 and 9, made it necessary to shut down Eastman's cellulose ester production plant for two periods.

Civil Defense Activities

Test Participation Proposals by Federal Civil Defense Administration. [REDACTED]

The proposal submitted by FCDA to include four structures for testing (see May report) during the spring 1953 detonations has been reviewed and approved by the Structures Test Planning and Screening Committee. This part of the program, referred to as "Phase I" is to be treated on a priority basis independent of the omnibus proposal described below. Funds have been transferred from FCDA to the Commission to finance "Phase I" and construction of the structures by the low bidder, the Dodge Construction Company, will be handled through the Santa Fe Operations Office.

The balance of the program under consideration and recently submitted by FCDA is a proposal for a "Civil Effects Test and Demonstration Program." This proposal consists of three parts:

1. Scientific tests of structures, vehicles, utilities, and miscellaneous special items exposed to nuclear detonation.
2. Exercises in civil defense training, and attack conditioning for selected civil defense workers from states and cities.

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- 3. A demonstration to unlearned observers having civil defense responsibilities of a nuclear detonation and its effect upon structures and other facilities civil defense will be called upon to defend and restore in the event of enemy attack.

Consideration of the above proposal is awaiting further information as to revision in scope and methods of financing.

AEC Communal Shelter. ( ) Arrangements were completed in June by a letter of agreement to the Army Ordnance Corps for testing of scale models of communal shelters proposed for construction at Hanford. A revised shelter design was furnished the AOC, based upon field observations of the behavior of the prototype shelter exposed to several detonations during Operation Buster last fall. Preliminary data from the shock-tube testing have already been received from the Ballistics Research Laboratory of AOC. Indications are that the revised design is effective in reducing overpressures and that optimum design to minimize the blast hazard in relation to the other atomic bomb effects under conditions of operational use may require little or no basic change in present design. Planning is under way for the inclusion of two shelter units in the next continental test series. One of these units will incorporate the design changes indicated by the laboratory experimentation with the other serving a control, in order to afford field verification of scale-model findings expected from the final tests at the Ballistics Research Laboratory.

Research Activities.

Brookhaven National Laboratory

Effects of Thermal Neutron Exposure on Plants. (UNCLASSIFIED) The relationship of polyploidy to the effects of thermal neutrons on plant seeds has been investigated using dry seeds of rye, barley, maize, wheat, and oats which were exposed to thermal neutrons in the nuclear reactor for periods of 4, 8, 12 and 16 hours. The flux was approximately  $4.6 \times 10^8$  thermal neutrons/cm<sup>2</sup>/sec., and the gamma contamination was 100 roentgens/hr.

Diploid seeds, carrying 2n chromosomes; tetraploid seeds, carrying 4n chromosomes; and in wheat and oats only - hexaploid seeds, carrying 6n chromosomes were used in the tests. It was found in all cases that the tetraploid seeds were the most resistant to injury. This finding differs from that previously found with x-irradiation showing that the strain with the highest chromosome number was the most resistant. The most striking evidence, however, was that the injury from thermal neutrons was uniform, all plants grown giving constant reduction in size compared with the controls. Injury from x-irradiation is variable, running from no effect to a more extreme reduction in size than that from neutron irradiation. Thus, clear differences between the effects on plants of the two forms of irradiation are established.

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Use of Animals as Dosimeters. (UNCLASSIFIED) The use of the rat as an indicator for the dosage of x-radiation appears to be possible from experiments recently conducted. A rat which has been exposed to sublethal doses of x-radiation will lose weight for a period of time and then gain weight at the same rate as an unirradiated rat. The time required for the rat to regain the weight lost at the time it received the irradiation will be proportional to the radiation dose up to 600 roentgens. By means of this index, increments of 50 roentgens in dose can be detected from the average weight changes of a group of five rats.

Argonne National Laboratory

Toxicity Studies of Radioisotopes. (UNCLASSIFIED) Experiments at ANL on the long-term toxicity of U-233, Ra-226 and Pu-239 when given intravenously to female mice have been in progress for 400 to 600 days. Results to date show that bone tumors produced by plutonium appeared 100 days earlier than those following radium or uranium injection; plutonium produced tumors were also more numerous. This excess in toxicity of Pu over Ra is attributed to their different patterns of concentration in bone. In order to determine the relative biological effectiveness (RBE) of alpha ray and beta ray exposure, it is hoped that experiments may be made to test radioisotopes of the same element emitting either type of radiation, possibly using Pu-239 and Pu-241.

Radiation Protection from Epinephrine. (UNCLASSIFIED) Large doses of epinephrine given young chicks before irradiation with 1000 roentgens protected against killing, both in the initial two-day period and in the later period, five to ten days after exposure when most deaths occur. This result was observed only when the epinephrine dose was large enough to produce shock, and it may be associated with the resultant anoxia caused by arteriolar constriction. Other drugs which alter autonomic effector cells or the nervous system were ineffective.

Effects of Radiation. (UNCLASSIFIED)

1. Analysis of the effects of 1,000 to 1,000,000 roentgens of x-rays on cell division in the protozoan *Paramecium* shows only: (a) a transient decrease in growth rate which is maximal immediately after irradiation; and (b) a disturbance of the orderly process of division.

2. Continued experiments at ANL are being made to discover a humoral (Blood serum) factor involved by the spleen which might have protective value in radiation exposure. A series of dogs with the spleen lead-shielded were treated with 450 roentgens x-rays; the spleens were then removed and perfused. The perfusates do contain a factor which gives protection, but only if injected into other animals before irradiations. This factor appears to be concentrated in the globulin.

General

Atomic Bomb Casualty Commission. ( [redacted] ) The status of the ABCC under the provisions of the Peace Treaty with Japan has now been resolved. Under the Occupation, the project and its personnel enjoyed certain very valuable privileges and concessions not provided for in the Treaty. However, through the efforts of the Department of State and the Department of Defense, and the very considerable assistance of U. S. Ambassador Murphy, the Japanese have agreed to allow the AEC to continue to supply logistic support to ABCC, to permit ABCC personnel to use Military Payment Certificates (equivalent to U. S. currency), and to grant personal income and excise tax exemptions.

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