

M. W. Boyer, General Manager

April 14, 1953

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

MONTHLY STATUS AND PROGRESS REPORT, MARCH 1953 - DIVISION OF BIOLOGY AND MEDICINE



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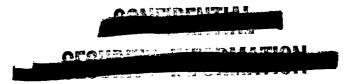
Transmitted herewith is the Homilly Status and Progress Report for this Division severing the month of March 1953.

Enclosure: Report

CC: J. H. Burchard

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MONTHLY STATUS AND PROGRESS REPORT

MONTH OF MARCH, 1953

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nical guidance (in an advisory it has been possible to allay public alarm which might have resulted from erronsous speculations; to been the Gemmission official channels for immical guidance (in an advisory depactly) on fall-out problems, and to assemble, evaluate, and interpret all fall-out data collected by the various test monitoring groups. As the quantitation was the data of the data to the continuous test and the continuous continuous as the continuous Organisation during the Spring 1953 Test Surie all interested groups currently informed, and taining sound and effective public relations. tive data become available, evaluations a Program for Coordination (UNCLASSIFIED) A new office A new office has ed, and has t all fall-out data col-roups. As the quantita-and interpretations are a relayed through to provide tech--charted in mein-

Health Service has been obtained in interpreting temperate of fall-out to the public. To assist this tifically qualified personnel were designated at tlations throughout the country to provide authority to whom Public Health officials could tarm for spe notified through the likely to fall in the information relating to fall-out. As a part of this program, way in the path of expected fall-out Hevada office whe cooperation of the U.S. Public Dere of both AEC instalgouroes. actengeneral

Freliminary Date on Fall-out Studies.

Shot 11

relatively narrow band almost due ex to 200 miles from point sero. The fall-out from the first detonation of the current series the Mevada Proving Grounds occurred in stretching from about als of activity were

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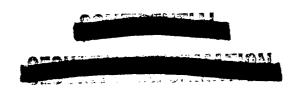
relatively high but did not exceed the maximum permissible exposure at any populated area. The highest calculated gamma dose for populated areas was at Rockville, Utah, where the estimation was about 2 roentgens for a ten-week period. But even this how level has built-in safety factors because it assumes: (1) that people remain in the locality continuously; (2) that none of the activity is lost through weathering; and (3) that there is no attenuation due to intervening walls, floors, etc. The above 2-roentgen calculated dose therefore represents the extreme estimate.

The fall-out from the first shot provided a good opportunity to check the effect of weathering on activity since the fall-out area was concentrated in a narrow band. Also, on the second and third days after detonation a strong wind blew across this area. Honitoring teams returned to the fall-out area on the fourth day after detonation and checked the actual radiation levels with those that were calculated from the reading of the first day. The actual readings on the fourth day were lower than calculated readings by factors of 3 to 6.

Shot #2

The fall-out following the second detonation on March 24 occurred to the northeast from the Test Site. The locality receiving the heaviest fall-out was Lincoln Mine where there are about 300 people living at present. Here the activity rose to about 600 mr/hr at 2 hours after detonation. At about 7:00 o'clock a.m., Pacific Standard Time, the people at the mine were advised by the Test Organization to remain indoors. Approximately 2 hours later the people were advised that they might go about their normal activities but to remain indoors as much as feasible during the remainder of the day. The calculated ten weeks dose at Lincoln Mine, based on the same assumptions as above, is about 3 roentgens. Since the fall-out occurred so soon after detonation, it is estimated that 1 roentgen of this dose was accumulated in about the first 8 or 10 hours. Readings taken both indoors and outdoors indicate that the former levels were about 55% of those found outdoors, and thus, of course, the accumulated dose to those remaining inside would be less than the above-quoted dose of 3r.

A small amount of fall-out which occurred in the Salt Lake City-Ogden region about 14 hours after detonation reached a peak of 4.8 mr/hr. This quickly dropped, so that 45 minutes later the reading was about 0.7 mr/hr and then continued to decrease at the usual rate found during fall-out activity. Based on the same assumptions as above, the calculated 10 weeks' dose in these areas is about 40



milliroentgens or 1-1/3% of the maximum permissible exposure.

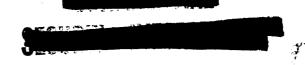
Civil Effects Test Program. (Communication) While analysis of test data has not been completed, it appears that predicted blast pressures were achieved inside the communal shelters tested. This preliminary result tends to been out the accuracy of the shock type tests of scale model shelters conducted at Aberdeen Proving Ground earlier in the year. However, there is reason to think that these blast levels heretofore considered acceptable may have to be medified downward, with further redesign of shelter entrances, if subsequent analysis of the sminal experiments verifies early indications of effects acceptable more severe than expected.

is has been reported ear-Telemetering Program. lier, remotely controlled rediction detection and weather reporting instruments, telemetering their data by radio to a control control point, are being tested during the current test series. In date, where fall-out has occurred in the vicinity of the three experimental stations, accurate weather and fall-out data have been reported in advance of reports received from mobile monitoring teams. Excellent reception has been obtained up to 25 miles from the Central Foint. and surprisingly good results have on occasion been obtained up to 70 miles samy. Thus, it would appear technically feasible to locate stations at greater distances from the Control Foint than had been considered practical prior to the tests. While only three stations have been employed in the experiment to date, multiplication of this number by a factor of three, or thirty, or a hundred may be fessible. By the use of more powerful transmitting or relay techniques, or by hooking the system into telephone pairs, it is theoretically possible to cover a 200- or 500-mile some quite as effectively as the present high-cost, multiple-numpower mobile teams. One of the beauties of the telemetering system, readily noticeable during the recent tests, is that the peak in man-hours is reached prior to the detonation, rather than immediately following. As a result, while a flurry of activity ensues in other branches of radiological activity immediately after shot time, the telemetering crew can sit back and wait for the telenetering stations to report in. The stations can also be interrogated by signal impulse, responding with wind valocity, wind direction, temperature, humidity, and so forth. The risk ever-exposure to radiation, always present in mobile operations, is practically eliminated.

Industrial Health Program

Redistion Instruments

Improved Chemical Dosimeters. (UNCLASSIFIED) Under a cooperative program with the National Bureau of Standards, evaluation tests

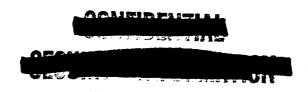


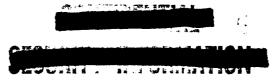
of new radiation detection instruments and their performance characteristics are made continuously. Under this program an improved chemical dosimeter has recently been tested for calibration and rate dependency. This dosimeter developed under the AEC project at the University of California at Los Angeles is a two-phase system consisting of water, chloroform, resordinol, and a dye indicator—bromoresol purple. Exposure rates up to 4,000 rountgens per minute were administered during tests. The results to date indicate that the dosimeter response is not significantly dependent on the rate at which the radiation is resulved. This lack of rate dependency should make the dosimeters useful in measuring high intensity gumma radiation such as the prompt radiation from an atomic bomb explosion. The readings were in general consistent within 7 20 per cent, which is very remarkable for a color comparison device of this type.

Research Activities

Sensitivity of Lymphoid Tissues. (UNCLASSIFIED) At Northwestern University Medical School researchers investigating methods for separation of various compenents of lymphoid tissue have isolated a protein in the cytoplasmic meleoprotein fraction which has unusual sensitivity to ultra-violet light and to alkalimity. This study is important as very little is known about the composition or properties of lymphoid tissues which are involved in many respiratory infections and presumbly influence virulence and growth of micro-organisms found in throat flors. Since lymphoid tissue is known to be highly sensitive to radiation damage, this finding may prove very significant, and further study is being made to define the function of the protein in relation to radiation sickness.

Protective Effects against I-Irradiation. (UNCLASSIFIED) Studies under way at the University of Southern California point to the possible protective affects against m-irradiation of fat content in dists. Experiments have shown that rats receiving a dist centaining a small amount of cottonseed oil were much more resistant to injury from x-irradiation than were animals on a fat-free dist. A marked variability in survival time was noted when animals on these distary regimens were subjected to repeated sublethal doses of x-irradiation in amounts of 300 rosentgens at weekly intervals. It was found that the smissle in which fat was present in the dist lived significantly longer than the group receiving a fat-free dist. On further examination, it was shown that the protective action was afforded by the presence of methyl limitents, a normal constituent of samy fats and oils. This fatty acid is considered to be an essential constituent of the diet; as little as ten milligrams per day ofter afforded significant protection to the x-irradiation damage.





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It is felt that the protective action may be related to metabolism of the skin as it is known that highly unsaturated fatty acids as lineleate play an important part in such metabolism.

Sometic Mutation Program. (UNCLASSIFIED) In cooperation with various Agricultural Experiment Stations, Brookhaven National Laboratory has initiated a program using the gamma radiation field for the induction of mutations in fruit trees or other plants of agricultural importance. The value of this program has been widely recognized and already a number of Eastern Experiment Stations have sent trees and shrubs to the Laboratory which have been set out in sectors at selected distances from the Cobalt 60 source. The trees or shrubs ranging in age from seedlings to mature flowering plants have been set out in the field so that they are exposed to chronic radiation, the dosage depending on the distance. Mutations induced by the radioactivity may be expected to appear in buds at any level of growth of the tree or plant. Later, cuttings can be transferred as scions to other non-radiated plants at the home agricultural station. By such large scale irradiation of many different kinds of trees and plants, it is hoped to develop new and commercially valuable varieties which the Experiment Stations can make available to the public. Mutations may be expected also in the seeds, but it takes very much longer to grow and test these germinal mutations than the sometic variants.

Abnormal Growth Induced by Radiation. (UNCLASSIFIED) An interesting and somewhat unexpected result of chronic irradiation in the gamma field at Brookhaven National Laboratory has been the observation in the spiderwort Tradescentia of marked abnormal overgrowth of flower heads and the presence of many abnormal buds on the stems. These appear on plants receiving between 12 and 37 rountgens per day of radiation. Below this range the growth is normal, but growth decreases when above the range. With dosages of approximately 100 roentgens, complete inhibition occurs. The appearance of these abnormally growing plants is very different from the normal. Mormally, the first to third suxiliary bud grows into a single flowering stalk, and buds at lower nodes are inhibited. In the critical dosage range cited above, from 4 to 5 auxiliary buds develop shoots forming a mass of fused or dissected leaves. These then grow out into single or multiple vegetative shoots, and each sends out a short flower stalk bearing a normally appearing flower head. Cuttings from these plants grow normally, showing that the abnormalities are due to physiological disturbances (perhaps auxin synthesis which inhibits growth is disturbed) rather than to mutation.

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