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HEALTH DIVISION PROGRESS REPORT

August 20 - September 20, 1953

PUBLICLY RELEASABLE
OS-6 JB 6/9/53

REF: H-94A

I. ADMINISTRATION (Thomas L. Shipman, M. D., Leader):

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A. General Remarks:

While the period covered by this report has been far from inactive, there have been no outstanding accomplishments which call for special mention. With the exception of four biochemistry laboratories, the new Health Research Laboratory is now fully occupied and all lines of work in progress prior to the move have been resumed. It is felt by the Division Leader that a state of continuing progress is a healthy one, and a perusal of the individual group reports will indicate clearly that progress is continuing along a wide variety of lines.

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B. Personnel: (Sept. 1 - Oct. 1)

1. New Hires:

9/8	FURCHNER, S. Helen	H-4	Group Office
9/21	HUGHES, Lora Belle	H-4	Radiopathology

2. Terminations:

9/1	WEBBER, Joe Bill	H-1	General Monitoring
9/16	ELLINWOOD, L. Edward	H-4	Radiobiology
9/18	MOORE, Thomas E. (Summer)	H-4	Biochemistry
9/30	VOGT, Glenn A.	H-DO	Property

3. Total Personnel:

SM	39
Military	3
RA	15
SCP	78
Military	1
ASC	24
TOTAL	160

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II. GROUP H-1, MONITORING (Dean D. Meyer, Leo G. Chelius):

A. General:

1. Jose B. Romero report[redacted]t. 1 for monitoring duty.

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2. The calibration of the emission rate from coated plutonium was repeated by exposing standard package film through one thickness of surgeon's gloves and one thickness of plastic identical to the wrist badge cover. A figure of 260 mr/hr as the emission rate from coated plutonium under the conditions given above was supplied by H-6. A film calibration using this figure has been half completed.

3. The problem of future meter calibration in relation to source size and facilities that may be required was discussed with Dick Watts. The calibration of the high range converted Model 100 demands an unusually large source. P-1 is considering going to the "well" type of source calibration such as ORNL employs, using the Victoreen r-chamber for finding the effective flux due to scattering rather than by direct calculation means. In this way they hope to reduce background and unnecessary exposure to other groups who are within the same building. The theoretical method of calibration originated by H-6 could eliminate the large source if the method can be accomplished from a practical standpoint, viz., ionic equilibrium distance and electronic behavior of the instrument on the very least sensitive scale.

4. A new model 520A Photovolt densitometer was tested and evaluated.

5. The ground surface area in the vicinity of the old "hot point" at TA-33 was surveyed for alpha contamination. A general activity of 500 c/m was detected near the crater of the underground chamber that was demolished following a high explosive structure strength test. W-3 plans to construct new buildings at this particular site and for that reason it has been recommended that the surface dirt be bulldozed by a contamination dozer into the existing crater.

6. James Lawrence monitored the Mark VIII OST Desert Phase. The monitoring was done at Site Able on Aug. 27. Considerable oxidation of the

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tuballoy was found as indicated by swipe tests. It was recommended that they clean up similar components in the future.

7. GMX-5 had a successful detonation containing Rala on Sept. 10, at Bayo Canyon. There were no incidents with the exception of the fire truck picking up 20 mr/hr contamination in extinguishing the fire.

8. H-1 assumed the responsibility of changing the filter queen air sampler paper in HT Shop effective Sept. 14.

9. On Sept. 17, H-4 personnel were monitored while they exposed the skin of two sheep. The radiation levels with the Sr^{90} sources in place were quite low, however, care had to be exercised in the manner in which the sources were fluorished at times and in what locations of the body were placed in relation to the sources when holding down the sheep's head. A more serious situation arose previous to the exposures when it was found that one of the sources had a moderate leak. Contamination spread was prevented by covering the source with a cellophane bag during exposures. Lead gloves were worn by persons having their hands in areas close to the source.

10. The paraffin neutron source shield in use at Pajarito Site was checked for the exterior radiation level in anticipation of building a small tin shed for enclosure in a remote area in order to reduce the present fire hazard.

11. The General Monitoring Section acquired additional office space, A-113 and A-114, and relinquished A-112.

12. The first official formal monitors handbook was received and distributed among members of the group. A number of these handbooks have been sent to health personnel in other AEC installations.

13. The glass window was installed in the source sealing chamber. An oil leak was evident after sealing, necessitating additional tightening and application of Permatex. Robert Wycoff of CMR-10 assumed the responsibility for overseeing the operation and leak prevention.

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14. Group H-1 was consulted by W-Division concerning health requirements for high pressure filling chamber to be constructed at TA-33.

15. The Group assisted J-Division on design specifications required to convert Rooms U-14 through U-20 for use as radiochemical laboratories.

16. Special soil sampling carried out in the CMR Laundry and Building 35, DP West, waste pits has required H-1 supervision. No contamination has been found on the equipment. This work is being continued in Building 35.

III. GROUP H-3, SAFETY (Roy Reider):

A. Accident Record

	Jan. 1 to Sept. 1, 1953	1952
Man-hours worked	3,496,196	5,985,003
Number of Disabling Injuries	10	18
Number of Days Lost	138	199
Frequency (Accidents per 1,000,000 Man-hours)	2.9	3.0
Severity (Days Lost per 1,000 Man-hours)	0.04	0.03

B. Industrial Accident Experience:

1. On Aug. 31, [redacted] machinist in Bldg. 202 at S Site, developed a right inguinal hernia. [redacted] was attempting to install a chuck, weighing about 100 lbs., in a 25-inch lathe. A hydraulic lift table had been used to get the chuck level with the ways of the machine. Chuck was rolled onto a board protecting the ways and while raising and pushing the chuck into place, the hernia developed. The shop is new and was not properly designed to be used as a shop.

A monorail was installed originally but is useable for only a few machines. The monorail will be extended to allow use for all machines for moving stock and heavy items.

[redacted] continued work after reporting the injury, entered the Los Alamos Medical Center on Sunday, Sept. 13, and underwent remedial surgery on Monday, Sept. 14.

2. [redacted] SD-1 machinist, incurred a contused left knee

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while working in the Graphite Shop of Sigma Building. [redacted] and another employee were lifting a piece of graphite which slipped from their grasp, striking [redacted] knee which was against the lathe. Lost time: 9 days.

C. Fires:

1. On Sept. 15, an electrical fire occurred in Room 5126 of the new CMR Building that resulted in approximately $450.00 damage. A motor on a small centrifugal pump became overheated, setting fire to wiring and apparatus causing damage to a recorder, controls, pump, motor and smoking up the laboratory. Fire was detected by passersby and extinguished by them using first aid CO_2 fire extinguishers. Building is unsprinklered but does have a fire detection system which did not operate. The system will be tested and checked. Either the type of pump used will be discarded or a motor with an overload device will be used hereafter.

D. Motor Vehicle Accidents:

	Jan. 1 to Sept. 1, 1953	1952
Miles Driven	1,170,017	1,820,000
Number of Accidents	25	49
Rate (Accidents per 100,000 Miles)	2.1	2.7
Total Cost	$ 818.00	$1,900.00
Accident Cost per 100,000 Miles	$ 70.00	$ 105.00

Three accidents occurred during the month and all involved Laboratory personnel backing vehicles from parking places (two were panel trucks and one was a van).

E. General Remarks:

1. Civil Defense Activities:

a. On Sept. 4, a test was made of the locally installed Cycalarms, a civilian defense warning device operated by a frequency change in the power supply. About fifty are installed in Laboratory facilities located out of hearing distance of the steam whistles.

b. The Laboratory Director, Safety Director, and Assistant Engineering Department Head took part in the local Civil Defense Test held on Sept. 16. The

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test included operation of the bell and light system, community warning signals, Conn rad System, and activation of the Field and Central Control Groups.

c. The Safety Director and representatives of the Engineering Department are making a resurvey of Laboratory buildings that might be used as personnel shelters in the event of a bombing of Los Alamos. Several new buildings have been completed and occupied since the last survey.

B. Several orientation tours are planned for the coming weeks to acquaint the firemen and security personnel with new facilities of the Laboratory. Such tours are part of the Indoctrination of Security and Fire Protection Personnel program carried on by H-3.

C. A member of this office, along with the County Traffic Engineer, has made a traffic study of West Road in connection with the relocation of West Road and the construction of a new guard station.

D. At the request of the AEC Health and Safety Branch, a member of this office has made a study and compilation of Laboratory lost-time injuries caused by chemical hazards. The study covered the period of 1949 to the current month. Only four lost-time injuries were caused by chemical hazards: two were caused by nitric acid when a bottle broke while being opened and when a stock clerk put his hand in spilled acid resulting in 4 and 17 days lost time, respectively. A chemical engineer was burned about the head by sodium hydroxide when a transmission line broke (lost time: 3 days). A research assistant received chemical eye burns when a bottle of ammoniacal silver nitrate solution exploded in his hand (lost time: 1 day).

E. A night survey of the security lights recently installed at a number of operating lines at S Site was made by this office. The lights were considered to be a definite traffic hazard and it was suggested they be turned off or replaced.

F. C. Austin Burch gave a talk to a regular meeting of the local chapter of the American Society of Tool Engineers [redacted] Accident Prevention."

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IV. GROUP H-4, BIOMEDICAL RESEARCH (Wright H. Langham):

A. General Remarks:

Virgil Koenig attended the Gordon Conference on Proteins and Nucleic Acids in New Hampshire and the American Chemical Society meeting in Chicago. Gordon Gould attended the National Research Council Symposium on Atherosclerosis in Washington. He also conferred with Dr. George LeRoy and Michael Reese people in Chicago.

B. Biochemistry Section:

1. Koenig:

The work on the nucleic acids and polysaccharide of pneumococcus type III is being completed and will soon be written up for publication.

Much good scientific work was reported at the Gordon Conference and the American Chemical Society.

2. Hayes, Schuch:

A study of two rare photomultipliers has been completed. Supplied by Schaetti in Zurich, they are No. 8914 (Cs-Sb cathode and 12 Cu-Be dynodes), and No. 8651 (Li-Sb cathode and 17 Cu-Be dynodes). The relative cathode efficiencies are 4.4:1, Cs-Sb:Li-Sb. This inferior property of the Li-Sb cathode is much more than compensated for by its extremely low dark current. Tube No. 8651 gave a 50% counting efficiency for tritium with an accompanying tube noise of 1800 c/min at 0°C. RCA 5819 and Dumont 6292 tubes give noise rates of the order of 100 to 1000 times greater.

3. Hayes, Rogers:

Ever since the relative pulse height apparatus was moved to HRL building it has been giving very reliable data.

Aging studies have shown oxazoles to be considerably more unstable to ultraviolet radiation than oxadiazoles. Oxazole solutions stored in pyrex bottles on laboratory shelves have half-lives of about 1.5 years. The relative

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half-life of 2,5-diphenyl-1,3,4-oxadiazole to 2,5-diphenyloxazole irradiated with a mercury arc is 3 to 1.

Comparisons of plastic vs liquid scintillators have been run. Contrary to fantastic claims that plastics are 2.5 times as good as liquids in pulse height, our measurements show them to be equivalent for the best plastics and solutions.

4. Foreman, Hayes, Schuch:

A small detector has been designed and is now being constructed for good efficiency gamma detection from sources such as the blood stream in a human arm. This "arm counter" will be mobile and will have simple existing electronics.

5. Foreman, Trujillo:

The study on the metabolism of Ca EDTA in humans has been completed. We have now finished 5 I.V., 5 I.M., 5 oral, and 3 skin absorption studies. The metabolism is essentially that found in the rat except that the time relationships are prolonged. Another significant point of difference is that it appears that the material does pass into the red cells in a human, whereas this was not observed in the rat.

A barium-lanthanum project is being investigated. This is a study in humans to obtain a correlation between body burden and urinary excretion. At present we are devoting our efforts to methods of assay using a scintillation counter.

6. Anderson, Schuch:

The design of the human counter is being continued. Working drawings are being prepared by the drafting department.

Professor James R. Arnold of the Institute for Nuclear Studies, University of Chicago, was here as a consultant, and considerable valuable information was obtained on his approach to the measurements of natural radiocarbon.

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He has been concerned mostly with the problem of circuit stability and has surpassed our apparatus considerably in this respect. It was decided not to publish the measurements which were made here on live and dead alcohol samples since Hayes has already independently published similar results and since Arnold is making considerable progress toward the more important problem of sample synthesis.

7. Anderson, Lotz:

Dose monitoring measurements of the fast neutron flux from the Cockcroft-Walton with copper foils were carried out.

The old carbon-tritium apparatus, the original scintillation circuit, has been set up for tritium measurements preparatory to a study of the degree of dehydration of irradiated rats.

8. Anderson, Schuch:

Work has begun on the construction of a tissue-equivalent ion chamber apparatus similar to that of Harold Rossi. A "neutron insensitive" graphite chamber will be built first while the Plastics Shop is working on a tissue equivalent, conducting plastic.

9. Gould, Keegan:

Studies have been made of the effect of massive high dose rate gamma ray radiation on the blood-brain barrier.

10. Gould, Keegan:

Effect of irradiation on lipid synthesis in rats. -- Six rats, same sex, were given 2500 r of X ray. After 24 hours, C^{14}-acetate was given to the irradiated animals and also to a control group of matched weight and sex to measure the rate of synthesis of lipids following large doses of radiation.

11. Gould, Keegan:

Nine hypophysectomized female rats and five female same-litter control rats were injected with C^{14}-acetate. Rates of equilibration of newly synthesized

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cholesterol molecules and fatty acids in whole blood, liver and carcass are being studied.

12. Gould, Kohr, Keegan:

Study of turnover rates and rates of synthesis of cholesterol by a system of double labeling with H^3 and C^{14} on hypothyroid and control rats and rabbits. -- Hypothyroid condition produced by injection of I^{131} five months before this phase of the experiment. Analysis of data has not been completed.

13. Gould, Keegan, LeRoy et al:

Continuation of study on rates of appearance of labeled cholesterol in plasma free, red cell free, and plasma ester fractions in humans. -- The peak for plasma free is reached close to three hours, somewhat slower than in dogs, but much faster than in rabbits or rats.

Abstract of paper to be presented at the Fall Meeting of the Central Society for Clinical Research written and sent in.

14. Gould, Kohr:

Tritium labeled dihydrocholesterol has been prepared in which only the cholesterol molecule was labeled rather than at the double bond where it possibly would be lost in metabolism.

15. Gould, Kohr:

A series of metabolism studies have been completed using tritium labeled compounds. Two rats each were fed T-cholesterol, T-dihydrocholesterol (mentioned above), T-sitosterol, T-lathosterol ester, and T-cholic acid. The sterol fractions were assayed in the liquid scintillation counter. The sterol fractions were purified through the dibromide wherever adequate material was present, and the purified cholesterol assayed. Analysis of the data has not been completed.

16. Vier, Magee:

Using the 1-C^{14} labeled caffeine (1C^{14},3,7 trimethyl xanthine), a

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six-hour metabolic analysis of organs and tissues, respiratory air, urine and feces was made on three rats which were given the drug intravenously. Total recovery of the injected activity was excellent. During the six hours an average of approximately 35% of the activity was eliminated by the rats (27% via the urine, 7% as respiratory $C^{14}O_2$, and 1% via the feces). None of the organs concentrated the caffeine to any appreciable extent, although the liver contained the greatest amount of activity (3.5% of the total dose) present in any one organ. The liver also ranked highest in activity per gram wet weight of tissue, but this feature was not sharply defined from the activity/gm found in other tissues.

At present an identical study to the above is being made on three rats sacrificed 24 hours after intravenous injection of the 1-C^{14} labeled caffeine.

A study was made on the new beta gas-flow counter recently obtained from Group CMR-7, $BaC^{14}O_3$ plates of varying thicknesses, a standard C^{14} plate and plates made from tissue homogenates containing C^{14} were run in triplicate at different voltage levels. The efficiency of the counter and the background rate at the different levels were also made.

Work with the two-dimensional filter paper sheet chromatograms for the separation of the metabolites of caffeine from rat urine is under way. Circular type chromatography has also been applied to the same urine samples.

C. Radiobiology Section:

1. Rothermel, Strang:

Observations of the physical signs of rats and mice exposed to massive, rapid doses of gamma radiation have been extended. Studies on median survival time after doses of from 1,000 to 100,000 r were repeated. All the data on the intensity source involving rats and mice are being assembled.

2. Rothermel, Strang, Sanders:

Observations on the incidence of lens opacities in mice exposed to

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X rays and neutrons are continuing.

3. Ellinwood, Sanders, Schweitzer:

Omega. - Exposed mice to 4 mev gamma rays with PAPP and glutathione protection, to supplement earlier work done.

GTS Site. - Exposed mice at the same dose rate as for those above to use as controls.

Cockcroft-Walton. - Exposed mice to use in a spleen-thymus experiment.

Chronic Toxicity of U^{233} and U^{238}. - The experiment on the chronic toxicity of uranium is being continued. The prophylactic effectiveness of allyl thiourea and epinephrine against X radiation has been determined.

4. Worman, Larkins:

During the past month we have been occupied in preparation of equipment, planning, and setting up, as far as possible, the animal surgery, X ray and source exposure rooms. The furniture is now ready in animal surgery. A source pit will soon be under way for source storage in B-142. Plans have been drawn up for wiring and the installation of the jib crane for the 250 KV Maxitron in B-138B.

Room B-120 is now ready for beginning work again on the tissue equivalent plastics and depth dose work using various methods of dosimetry.

5. Boone, Woodward, Turney:

Studies on cell surface adsorption of radioactive compounds. - The adsorption of C^{14} nicotinic acid and its amide on cell surface of Lactobacillus which has been converted to Coenzyme I and II has been essentially completed. The bands on the chromatograms have been conclusively identified as Coenzyme I and II with the aid of controls and the Coenzyme-requiring organism, H. parainfluenzae. A preliminary report entitled "The Isolation of C^{14} Labeled Coenzyme I and II by Paper Chromatography" is being prepared for publication in Science.

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With the use of microbiological assay, an attempt will be made to determine the approximate specific activity of the Coenzyme I.

The amount of labeled CO_2 formed from C^{14} labeled nicotinic acid and the amide has been measured by metabolizing cells of Lactobacillus.

6. Boone, Turney:

RBE of various radiations on microorganisms. — Difficulty in repeating the gamma line has been the greatest problem. Some attempts with the use of tritium have been made, but the work is to be delayed until the cobalt source room is made available so that conditions will be more constant.

Basic work on the uptake of C^{14} labeled isoniazid by Mycobacterium and the relationships of pyridoxine to its mode of action is continuing.

V. GROUP H-5, INDUSTRIAL HYGIENE (H. F. Schulte, E. C. Hyatt):

A. General Remarks:

An important feature of the work this month was the renewed emphasis on all phases of lithium work. A very large number of samples were collected and analyzed. In addition, a wide variety of other samples were handled by the Laboratory Section. The Test Section's activities, again, were centered around providing information to various agencies from the large mass of data collected at Upshot-Knothole.

B. Test Operations:

Considerable effort was expended in consolidating the data collected during Upshot-Knothole to make it more readily available for future reference. A draft report was prepared on "Monitoring of Milk for Fresh Fission Products." This report is now being reviewed by interested individuals within the Laboratory. Studies are continuing on the energy spectrum of the beta radiation associated with fallout particles. Information and maps were assembled from data on past test operations for the committee which is studying the future of the Nevada Proving Grounds. A display of sampling

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and other equipment used on test operations has been assembled for the benefit of several special groups who will be visiting the Laboratory in the near future.

C. Lithium:

Operations on lithium hydride were begun in the new CMR Building before they had been reviewed by this Group. Relatively high concentrations of lithium hydride resulted and the Group was called on to make recommendations. A large number of air samples were collected and recommendations were made for the installation of exhaust ventilation ducts and general improvements in operating techniques. As a result, the air concentration of lithium hydride was rapidly reduced below our recommended maximum concentration of 25 micrograms per cubic meter. Several conferences were held with CMR-AE and with CMR-6 personnel in order to improve the existing conditions.

In Building 96 machining activities on lithium hydride increased greatly and additional air samplers were placed in operation. Members of the Group supervised the changing of the CWS-6 filters and later removed the filters entirely since the high pressure drop interfered with adequate exhausting of the hoods. These filters will be replaced if arsenic or other additives are incorporated in the lithium hydride. Co-operation has continued with CMR-11 in the development of recovery equipment for lithium.

D. Beryllium:

The samll sampler heads used for sampling beryllium in CMR Building have been replaced by Filter Queens, thus freeing the Gast pumps for necessary work elsewhere. The new high efficiency glass filter papers were tried in this apparatus, but it was found that some material in these filters caused interference in the analytical procedures. Whatman #2 filter papers are now being used for this purpose. It was possible to utilize the Filter Queens which collected only general room air samples because of the great reduction

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of beryllium work now being done by CMR-2.

Installation of the exhaust system is continuing in the new Beryllium Shop. Members of this Group have been supervising this work and have made a preliminary study of static pressure and air flow in the system. These showed that the final blower was inadequate and that the motor on this system was far below the size that had been specified. This will be replaced by a larger motor.

The morin which is used in the determination of beryllium is being purified and as a result the sensitivity of the analytical method has been increased. This work will continue.

E. Uranium:

A co-operative study in the tuballoy shop is being started by Groups H-1 and H-5. Group H-1 is running five Filter Queen samplers daily and Group H-5 will make ventilation studies and collect breathing zone samples and urine samples. Somewhat more space is being made available to this shop and it seems appropriate to initiate a comprehensive program of cleaning and ventilation improvements at this time.

F. Plutonium:

The duct sampling and testing program at DP West has been terminated and a critical study is being made of the results obtained on more than 300 samples collected during the two months study. The sampler-counter-alarm, built by this group, is being used on special jobs at DP West and will be placed on other stacks for continuous testing.

G. Lead:

An investigation was made of the irritating fumes produced when lead shapes from overseas tests were melted in the Foundry. Chemical examination of the material on the shapes does not reveal any known hazardous material. It was recommended that the remaining shapes be washed and brushed prior to melting and this treatment has eliminated the irritating fumes. In addition, breathing

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zone air samples were taken and analyzed for lead with results below the maximum permissible level. Urine samples were also analyzed for lead with negative results.

H. Carbon Monoxide:

Several test were made for carbon monoxide in the high pressure air system in the new Shop Building to determine whether this air was satisfactory for breathing in the new sandblast cabinet. While all tests were negative, this does not guarantee that carbon monoxide will be absent from this air at all times. Further recommendations will be made for this sytem.

I. Boracatol:

Boric acid and TNT samples are being collected during preparation of the material. Sufficient data have not yet been obtained to predict the exact exposure to be expected on operations of this type. However, the evidence does indicate that it is still below the guide tolerance value of 2 milligrams per cubic meter.

J. n-Hexylgallophenone:

An inspection was made of the equipment at S Site where this material is used. It is presently being used in very small quantities and since little is known of its toxicity, recommendations were made that the operators wear respirators and gloves during the weighing and batch operations.

K. Miscellaneous:

Cadmium samples were collected during casting at TA-33 with negative results. Atmospheric dust samples were collected for information to Group H-6 on an experiment being conducted by them. Detailed design data and specifications were prepared for the installation of spray nozzles in the cyclone at the incinerator. Preliminary work has been done on an apparatus for setting up known concentrations of tritium for calibration of field instruments. Preliminary studies on ventilation of hoods were made in the new Health Research

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Laboratory. Much detailed work remains to be done on this.

L. Air Cleaning Seminar:

A great deal of time was devoted to preparation for the Air Cleaning Seminar and the Stack Gas Committee Meeting which were held in Los Alamos at the end of this reporting period. A discussion of the Los Alamos incinerator was prepared at this meeting by a member of the Group. Following two days of meetings, the visitors were taken on a field trip which included the Health Research Laboratory and sites where air cleaning equipment could be inspected. A number of the visitors spent additional time with members of the Group discussing specific industrial hygiene problems after the close of the meeting. In addition to these visitors, Mr. Pope A. Lawrence, of the National Cancer Institute, spent several days with members of the Test Operations Section.

M. Statistical Summary:

1. Air samples collected or field tests made for:

Atmospheric dust	8
Beryllium	78
Boric Acid	7
Cadmium	2
Carbon Monoxide	2
HCN	2
Lead	4
Lithium	143
Plutonium	16
Plutonium (cascade impactor)	12
TNT	18
Mercury	1 room survey

2. Plans approved 1

3. Sanitation:

Water samples collected	50

4. Analyses completed:

Air:

Arsenic	13
Beryllium	78
Boric Acid	7
Lead	4
Lithium	[illegible]
Uranium	[illegible]
TNT	18

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Biological (Urine):

Barium-Lanthanum	2
Electrolytes (K,Na)	2
Lead	7
Mercury	4
Plutonium	80
Polonium	39
Tritium	155
Uranium	113
Uranium (radiometric)	23

Miscellaneous:

Electrolytes in blood (K,Na)	2
Tritium in water	14

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VI. GROUP H-6, RADIOLOGICAL PHYSICS (T. N. White):

A. Special Problems Section (S. Shlaer, H. Israel):

1. General Remarks:

Geroge Angleton went on leave Sept. 15. Edwin Bemis was on vacation from Aug. 27 to Sept. 9. S. Shlaer, H. Israel and E. Storm attended meetings of the American Physical Society at Albuquerque during the period Sept. 2 to 4. Robert Barker was on vacation from Sept 3 to 20.

2. Work in Progress:

a. Changes which will extend the working range of the densitometer are being made. When the modification is completed, the instrument will measure to a density of five instead of measuring to a density of three as it presently does.

b. The study of the effect of high intensity thermal radiation on soil surfaces is progressing. The scope of the experiments has been extended to include radioactive material. This has been done by using arc electrodes of neutron-irradiated copper bars. The irradiation was done in the Water Boiler. Preliminary experiments indicate that measurable quantities of radioactive materials are distributed about a sealed room in which the arc is flashed. These experiments are continuing, but in the future it is planned to replace

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the copper electrodes with aluminum electrodes, copper plated at one end.

c. Drawings are being made for the recently designed free air ionization chamber.

d. Further analysis of the radiation from the [redacted]ence sensitometer has been made. Here the purpose was to study the effects on the ratio of fluorescent radiation to background brought about by changing 1) the peak kilovoltage at which the X-ray machine is operated, and 2) the amount of filtration in the primary beam.

In connection with the film badge development program, of which the work just mentioned is a part, arrangements have been made with GMX-1 for the acquisition (temporary) of a 150 KVP machine. Plans have been made for setting up and using the machine in the HRL Building. With this machine, it is hoped to carry the work with fluorescent radiation well beyond the present 35 kev limit.

2. Work Completed:

a. A parallel plate ionization chamber to be used in connection with the film badge development program has been designed, built and operated.

b. Calculations have been made to determine reasonable compositions of a film badge filter. In determining composition, cost and availability of materials were considered along with the ability of the filter to bring film response to the desired range.

B. Meteorology Section (Maj. George J. Newgarden, 3rd, OIC)

1. Personnel:

a. Maj. G. J. Newgarden returned to the Laboratory 24 August after attending a weapons orientation course conducted by USAF at Maxwell AFB, Montgomery, Alabama.

2. Operations:

a. Two studies on fallout at Nevada Proving Grounds were prepared for Gaelen Felt of J-Division.

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b. Weather data for the Upshot-Knothole series were compiled for Mr. Hoerlin of J-Division.

c. The Weather Section supported experimental tests at TA-33 and Bayo Canyon.

d. A climate study of the Marshall Islands was prepared for Duncan Curry of J-Division.

e. A draft of the fallout technique used by the Weather Section in support of tests at Nevada Proving Grounds was completed and forwarded to Headquarters, AWS, for publication as an Air Force manual.

C. Nuclear Field Test Section (W. R. Kennedy and P. R. Schiavone):

1. Buster-Jangle:

The final Rad-Safe report on Buster-Jangle was completed and sent to J-Division.

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2. Tumbler-Snapper:

No change in projects.

3. General:

a. Further measurements with the extrapolation chamber were made on the coated piece of plutonium used for H-1 film calibration. A dose rate of 660 mrep/hr was obtained with no absorber other than the chamber walls (0.0002 inch nylon). Addition of 0.001 inch cellophane (3.3 mg/cm^2) reduced the dose rate 40%. With a total absorbing system of one layer of surgeon's glove latex (23 mg/cm^2) plus 40 mg/cm^2 of polyethylene a dose rate of 260 mrep/hr was observed. The figure of 260 mrep/hr will be used as the palmer dose rate for coated pieces handled with surgeon's gloves.

To study the variation of surface dose rate of coated pieces with differences in material history, six coated plutonium cubes of differing age and in-pile periods were borrowed from W-1. The cubes were too small for proper extrapolation measurements, but relative dose rate measurements at fixed

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chamber spacing and with the same geometry were made. The extrapolation chamber measurements were substantiated by a radiographic method. By using various thin absorbers with the cubes, it was determined that the hard radiation components (above 50 kev) were about the same for all cubes. In general, the soft radiation was apparently greater with large MWD values for the plutonium. Analysis of the results is not complete.

b. Coding and debugging of the bomb cloud gamma spectra problem for calculation on the IBM 701 calculator has continued. Progress has been slow due to bugs discovered in the coding system. Nevertheless, the calculation has progressed well towards completion.

4. Laboratory Activities (A. O. Dodd and B. F. Schnap)

a. Routine analyses of CMR Building waste retention tanks were made. The maximum assay from any one tank was approximately the long time maximum permissible concentration (3300 d/m/l, Pu).

b. Drinking water from DP West Site and circulating water from Equipment Room No. 3, DP West, were free of plutonium. Circulating water from Equipment Rooms No. 2 and No. 4 contained trace amounts of plutonium well below the drinking water MPC.

c. Six mercury samples were assayed for CMR-2. Two samples contained traces of plutonium.

d. A soil sample submitted from R Site by H-1 was prepared for assay, assaying being done by H-5. 1.8 mg uranium/gm soil was reported.

e. Fifteen soil samples were taken from the stream bed of Pueblo Canyon, starting at the head of "Acid Canyon" (where the old Tech Area acid sewer outfall occurred) and extending down to Totavi. Amounts of plutonium were found in all samples ranging from traces up to a maximum of approximately eight times the tentative soil maximum permissible concentration value mentioned last month. All values found exceeding the tentative MPC of 22.2 d/m/gm were

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located within the Project Area. Only one sample exceeding the MPC was found outside the contaminated area presently fenced.

Samples	Pu d/m/gm 1953	1947
Within fenced contaminated area		
No. 1)) Upstream of present	1.2	0.3
No. 2) waste disposal	0.8	5.4
No. 3)) plant outfall	2.0	4.8
No. 4	124.00	None taken
No. 5	172.0	None taken
Outside fenced contaminated area, within project		
No. 6	48.0	0.6
No. 7	19.8	0.5
No. 8	14.2	2.0
No. 9	13.8	0.7
No. 10	17.4	0.4
No. 11	6.2	0.5
Outside Project		
No. 12	7.6	0.4
No. 13	5.4	0.4
No. 14	4.8	0.1
No. 15	3.0	None taken

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Oct. 22, 1953

T. L. SHIPMAN, M. D.
Health Division Leader

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