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H-DIVISION PROGRESS REPORT

January 20 - February 20, 1954

REF: H-110

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

A. General Remarks:

None.

B. Personnel (2/1 to 3/1):

1. New Hires:

2/1	ENLOE, Carl A.	H-1	TA Monitoring
2/17	HARRIS, Payne S.	H-4	Radiobiology

2. Terminations:

2/15	RONZIO, Anthony R.	H-4	Organic Chemistry

3. Total Personnel:

SM	45
Military	3
RA	10
SCP	75
Military	1
ASC	27
TOTAL	161

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

A. General:

1. James Lawrence left for the Forward Area for an extended tour of duty on February 14.

2. At 10:00 a.m., on January 27, [redacted] of CMR-1 cut her left hand in CMR Building with a glass container containing plutonium. The incision was washed with green soap at the Los Alamos Medical Center and six stitches were taken. 200 c/m were found in the vicinity of the cut following suturing, with 600 to 1000 c/m on the adjacent areas of the hand. The hand was then bandaged and rubber gloved. Daily urine samples were collected.

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3. On February 3, the Pajarito Godiva assembly went critical. Film badges of the personnel entering the area following the incident did not indicate any overexposure. Removal of components from the framework was made on February 8. Body exposures were 40 mr or less. Heavy alpha contamination was found on the framework and floor. W-2 removed the loose contamination before Shop Department personnel commenced repair work.

4. On February 18, P-2 personnel attempted to remove the Water Boiler condensate solution from the pump house 35 minutes after shutdown. This operation was attempted 3 days earlier than it is usually done and as a result fission product gases were extremely active and air-borne. [redacted], who held a beaker collecting the condensate, failed to release in time and received approximately 16 r of gamma to the wrist. He exhaled gas which read 20 mr/hr on a survey instrument. His nose counts were also high. P-2 expected a deposit of Sr^{90} and urine samples were therefore taken.

5. On two occasions it was reported that Security Inspectors patroling Sigma Building were found to have contamination of their shoes of tolerance levels or less. On one evening the Security Sergeant sealed off Room S-104 and marked up the door. It has since been recommended that they wear booties while in Sigma.

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6. Since arrival of the Rala source at Ten Site on January 23, monitoring activities have greatly increased. Weather permitted a survey of Mortandad Canyon following the dumping of Ten Site solutions. 100 mr/hr was detected at the outlet, 2 ft. from the ground. 3 mr/hr was detected at 500 yds. from the fence.

7. The transfer of the Codiva components from Pajarito Site to Sigma Building was made on February 11. The tolerance time at contact on that date was estimated to be 24 minutes per 2 weeks per man. Initial inspection in Sigma Building was made on February 11 and actual work begun on February 15. So far,

only one person has received his tolerance exposure. Film measurements indicate the contact activity at 8.64 r/hr with a gamma energy of 0.2 mev or greater. A large amount of valuable information has been gathered and tabulated for this operation that will greatly assist future similar work.

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

A. Accident Record:

	Jan. 1, 1954 to Feb. 1, 1954	1953
Man-hours Worked	140,050	5,319,125
Number of Disabling Injuries	1	17
Number of Days Lost Time	4	182
Frequency (Accidents per 1,000,000 Man-hours)	2.3	3.2
Severity (Days Lost per 1,000 Manhours)	0.01	0.03

B. Industrial Accident Experience:

1. On January 21, [redacted] GMX-3, slipped on snow and struck left leg on running board of truck causing thrombophlebitis of left leg. Lost time was 10 days.

2. On February 17, Robert England, J-DC, was electrocuted while adjusting an oscilloscope in the Pacific Proving Grounds.

C. Fire:

1. On February 8, a fire occurred at Anchor Site West when mineral oil heated to 150°C was left unattended and it ignited doing extensive damage to one room. Estimated loss was $3,210.00.

D. Motor Vehicle Accidents:

	Jan. 1, 1954 to Feb. 1, 1954	1953
Miles Driven	140,097	1,732,599
Number of Accidents	2	36
Rate (Accidents per 100,000 Miles)	1.43	2.08
Total Cost	$ 61.28	$1,595.82
Accident Cost per 100,000 Miles	$ 43.70	$ 92.00

Two Laboratory employees were involved in motor vehicle accidents during this report period. Both accidents were skidding accidents. One skidded into another vehicle and the other skidded into a log.

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E. Property Damage:

1. A Ford pickup had its windshield pushed in as a result of over-pressure caused by a scheduled explosion. The vehicle was parked in a shelter about 400 to 500 ft. from the shot, but the windows were closed. The estimated damage was $25.00.

F. General Remarks:

1. Ellis I. Stout, CMR-AS, departed for the Pacific Proving Grounds on January 22 to serve as Assistant Safety Officer for the Scientific Task Group 7.1,

2. The Group Leader arrived at the Pacific Proving Grounds on February 18 in the capacity of Safety Officer for the Scientific Task Group 7.1.

3. A member of H-3 was appointed on the investigation committee by Frank DiLuzio, Field Manager, LAFO, to investigate the fire at Anchor Site West.

4. C. Austin Burch accompanied the body of Robert England from the Pacific Proving Grounds to Albuquerque, New Mexico.

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

A. General Remarks:

F. N. Hayes left for the Pacific Proving Grounds on temporary duty with J-Division and Kenneth Kohr went on loan to Group J-12 to help with their counting problems.

E. C. Anderson took a trip to Washington, D. C. to attend a meeting on scintillators and special meeting called by the Division of Biology and Medicine. While there he consulted with Lt. Col. Jim Brennan on neutron dosimetry and the tissue equivalent ion chamber problem. On his return trip he stopped off in Chicago for consultation with Dr. Jim Arnold on the use of scintillator systems for archeological dating and with Dr. Libby on Project SUNSHINE.

Wright Langham spent four days at the Donner Laboratory and gave five lectures for the staff and one to personnel at Livermore.

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On February 17, P. S. Harris returned to Group H-4 as a civilian staff member of the Radiobiology Section. We feel indeed fortunate to have this competent and highly qualified investigator as a permanent member of the Group.

Carl Peterson of ENG-4 reports considerable success with the control of the dust problem in the laboratories of HRL through changing the water washes on the air supply system.

In a recent conversation with the Group Leader, the Technical Associate Director questioned the very general nature of the Group's monthly progress reports. He expressed a desire for a more specific report of accomplishment with more emphasis on "actual numbers," results and conclusions instead of broad general statements of the work in progress. Although it may not be possible to express the observation of diarrhea in an irradiated monkey as $f(a,b,c---x,y,z) = K$, an attempt will be made this month to present an informative abstract of completed investigations under the heading of "Work Completed." Material will be considered complete when the individual investigator turns in a rough manuscript of a report or publication based on the investigation.

This month's report will serve one of two purposes: 1) it will either draw comment and suggestions from the Director's Office as to the adequateness of the new method of reporting, or 2) it will indicate that the reports are not read by the Technical Associate Director and we can go back with impunity to the old and easier method of preparing the monthly report. We will be happy with either of the above results.

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B. Work Completed:

1. Chronic Toxicity of U^{233} and U^{238}. Delayed Effects in Rats Following a Single Injection (Storer, Langham, Ellinwood).

The delayed effects of a single injection of U^{233} and U^{238} were observed in rats for a period of 50 weeks after injection. The dosages administered

ranged from 1/32 to 1/2 the LD_{50}^{30} dose (U^{233}, 0.03 - 0.5 mg/kg body wt; U^{238}, 0.12 - 2.0 mg/kg body wt). It was concluded that no chronic or delayed toxic sequelae occurred following a single injection of either isotope at the dosage levels given. This conclusion was based on failure to observe any shortening of life span, decrease in weight gain or increase in tumor incidence. There was no radiographic evidence of skeletal damage, no indication of impaired kidney function 16 weeks after injection and no histologic evidence of damage to kidneys and other tissues beyond nine weeks. — S.E.R.D.A.,

2. The Biological Effectiveness of Thermal Neutrons in Producing Testicular Atrophy in Mice (Storer, Langham).

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Using testicular atrophy in mice four weeks post-exposure as the biological indicator of radiation effect, the relative effectiveness of thermal column and 250 KVP X radiation were compared. By assuming an RBE of unity for the known gamma contaminants associated with exposure to the thermal neutron flux of the Los Alamos homogeneous reactor it was found that 8×10^9 thermal n/cm^2 produced an effect equivalent to one r of 250 KVP X ray. Depending on assumptions regarding the depth of the testes with regard to the region of peak neutron collision density calculation of the RBE for thermal neutrons gave values of from 1.2 to 2.5 with 1.3 being the best value obtainable from the present study.

3. Biological Effectiveness of 14 Mev neutrons Using Spleen and Thymus Weight Loss in Mice as the Biological Indicator (Harris, Ellinwood):

Fourteen Mev neutrons produced by deuteron bombardment of a tritium target in the Los Alamos Cockcroft-Walton have been compared to 250 KVP X ray by measurement of the weight loss of the spleens and thymuses of CF1 female mice. The results show that 1×10^8 n/cm^2 are equivalent to one r of X ray and that the RBE of the neutrons is 1.6 ± 0.15 if theoretical calculations of rep for a single collision process are used. From these results the RBE of

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7 Mev protons must be between 1 and 2 and the RBE of carbon, nitrogen, and oxygen recoil nuclei must be between zero and five.

C. Work in Progress:

1. Biochemistry Section (Gordon Gould):

a. Effect of Radiation of Lipid Synthesis (Gould, Lotz):

Repetition of the experiment demonstrating the effect of radiation on lipid synthesis in liver has been started. Synthetic rates are being determined at 4 and 24 hours after 2400 r and intestinal as well as hepatic synthesis is being determined.

b. Studies of the Rates of Synthesis of Cholesterol (Gould, Lotz):

An experiment to determine if it is the liver concentration of free or esterified cholesterol that controls the rate of synthesis of free cholesterol in liver was completed. It was found that feeding a 2% cholesterol diet for 2 days increased the liver ester fraction 3 to 4 fold, while it increased plasma and liver free values only very slightly. The rate of synthesis dropped by 93%. Two alternative hypotheses are being considered: 1) increase in liver ester to over 1 mg per gm decreases the rate of synthesis to less than 0.1 of the control rate but further increases in ester concentration have no further effect, or 2) increase in liver free concentration decreases the synthetic rate very sharply, an increase of only 0.05 mg per gm being sufficient to decrease the rate to half.

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c. Factors Controlling Steroid Metabolism (Gould):

A paper on "Sterol Metabolism and Its Control" was prepared for the N.R.C. Symposium to be held on March 22.

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d. Metabolism of C^{14}-Isoniazid in Pyridoxine Deficient Rats (Boone, Maree, Turney):

To date 5 deficient animals and 4 controls were analyzed at 1 hour, 6 deficient and 3 controls at 6 hours, and 2 deficient and 1 control at

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24 hours. Very little difference was noted between the metabolism of isoniazid by the controls and by the deficient animals except that urinary excretion in the deficient animal was delated. Approximately 80-90% of the drug is excreted in the urine in 6 hours if the animal has a normal excretory rate. Essentially all the drug was found in the lungs as has been reported in the mouse. Chromatography of urinary and tissue metabolites is in progress.

e. Metabolism of C^{14}-labeled Caffeine by the Rat (Magee):

Urine containing C^{14}-caffeine was put through a chromatographic column of Whatman cellulose powder, standard grade which had been slurried in n-butanol saturated with 10% ammonium hydroxide. The solvents were butanol ammonia mixtures. Fractions of 80 drops (1.2 cc) were collected, aliquots plated and counted on the CMR gas flow proportional counter. Only one peak appears on the counting curve.

f. Treatment of a Plutonium Exposure Case with CaEDTA (Foreman, Trujillo).

An individual who has accumulated a body burden of Pu following an accident which involved a laceration with a Pu-contaminated glass edge is being treated. The treatment has consisted of debridement of the wound and administration of CaEDTA intravenously. Considerable enhancement of Pu excretion over pretreatment levels has occurred but it is still too early to judge the efficiency of the treatment with respect to long term benefits.

g. Metabolism of Ba-La Mixture by the Rat (Foreman, Trujillo):

The initial study in animals has been completed and we are now filling in gaps in our data, namely, information on distribution of the elements 6 hours, 1 day and 2 days after administration.

h. Absorption of La^{140} Through the Human Skin (Foreman, Trujillo):

The application of 7 uc of $La^{140}No_3$ mixed in Aquaphor over the entire forearm and hand for a 2 1/2 hour period did not result in any detectable absorption judged by urine assay and by radioactivity measurement of the opposite arm using the "arm counter."

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j. Effect of Radiation of Cholinesterase Content of Mouse Red Blood Cells (Sabine):

Exposure of mice to varying doses of X radiation has been continued and the cholinesterase levels determined on the fourth day. The lowest dose to date is 25 r and at this dose the increase in cholinesterase activity of the red blood cells was 20%, which is equal to the average increase at all doses. A simple analysis data at all doses (25 - 525 r) showed that there is no correlation between dose and effect. It is planned to go to still smaller doses as soon as the 250 KV machine is ready.

Meanwhile, a series of rats has been started, to find out whether it is possible to follow individual animals if taking of samples is adequately spaced. So far this appears to be successful in that heart-puncture with a #27 needle does not cause elevated values a week later, nor does the intracardial injection of India ink, done with a view to "blocking" the reticuloendothelial system.

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2. Biophysics Section (Anderson)

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a. Construction of an Arm Counter Based on Liquid Scintillator Principle (Perrings, Anderson):

The arm counter has been disassembled in order to install the rest of the mercury shield and to mount it on the cart. The wiring of the tubes is therefore being redone in order to eliminate some bad loops in the hope of reducing sensitivity to electric disturbances. The balancing pots will be relocated and the circuit somewhat modified.

b. Fabrication of Au-Pu Beads for Radioactive Particle Studies (Perrings, Anderson):

The Au-Pu button received from CMR is being exposed to Ringer solution at room temperature in an attempt to detect extraction of the Pu. There has been no detectable change in the alpha activity of the button over a period of nine days so far.

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More practice beads were made for Boone.

c. Fabrication of Tissue Equivalent Ion Chambers (J. Larkins):

The mixing Chamber is designed and part submitted to the shops for fabrication. Work has been delayed by the design of a fission chamber for J-11.

d. Measurement of Li-Fast Neutron Cross-section (Anderson, and E. Cleott of W-2):

Assistance is being given to W-2's project to measure the cross-section of Li for fission neutrons. Our tritium counter is well suited to this problem. Preliminary results look reasonable, but so far there has been some contamination with activities other than T.

e. Biological Effects of Very Acu[redacted] Exposure to T (Perrings, Langham, Anderson):

The mouse exposure unit is about half completed. The paper on a theoretical analysis of the hazards of acute exposure to T is essentially completed.

f. Human Gamma Ray Detector (Anderson, Larkins, Perrings):

An estimate of $21,000 has been received from the Shop Department. Tubes, electronics, etc., will bring this to about $30,000. Approval of the project by Darol Froman is being awaited.

g. Installation of 250 KVP X-ray Machine (Worman, L. Larkins):

A large portion of the past month has been utilized in the installation and checking of the new Maxitron X-ray equipment.

3. Radiobiology Section (Rothermel)

a. Rate of Weight Loss of the Mouse Spleen and Thymus Following Neutron Exposure (Woodward, Rothermel, Schweitzer, Strang, Sanders):

Groups of randomized mice were exposed to 300 r of X rays and 300 rem of mixed thermal column radiations. Animals were sacrificed on days

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1, 2, 3, 5, 9, and 21 and spleens and thymuses weighed. No significant difference appeared between neutron and X ray groups. Spleen-thymus weights in both groups fell almost to the same minimum value on day 1 and stayed at a minimum through day 5. It appears from these data that the third day after irradiation is just as practicable for determining spleen-thymus weights as the fifth day. Three day sacrifice will extend the dose range of this biological indicator by permitting sacrifice prior to normal death times after higher doses.

b. Effect of Neutron Exposure on Fe^{59} Uptake by Red Blood Cells of the Rat (Rothermel, Schweitzer, Strang):

Several biological systems are being prepared for RBE determinations on fast neutrons. One of these is Fe^{59} uptake by red blood cells. The method used by Furchner and Lotz is being employed. Fe^{59} uptake has been measured on 12 normal rats. A second preliminary study is now under way, using X irradiated rats (given doses of from 50 r to 250 r) and controls. When the technique has been mastered, a full X ray study will be undertaken as a base line for neutron irradiation.

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c. Attempts at Therapy of the Intestinal Effects of Irradiation (Woodward, Rothermel, Schweitzer):

The 3 - 4 day death of irradiated animals has been ascribed to the intestine and has been produced by irradiating the intestine alone. Diarrhea is a pronounced manifestation in these animals. The role played by fluid and electrolyte loss in this death is being investigated by treatment with a variety of fluids -- saline, glucose in saline, glucose in water, Ringers lactate. Physiological saline solution appears to be the most important electrolyte, increasing survival by 20% after 1200 r.

d. Cataractogenic Effects of Neutrons (Rothermel, Strang, Schweitzer):

Monthly observations are still being made.

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e. Effect of Radiation on Antibody Production [redacted]

Hemolysin Antibody Production after X and Neutron Irradiation. - Hemolysin antibody production reaches a maximum in 5 - 7 days. After X irradiation titers are being followed for correlation with radiation dose and times after irradiation. As pile time becomes available antibody titers will be followed after thermal neutron exposure.

f. Determination of an RBE with the Use of AKm Leukemia in CF_1 Mice (Boone, Turney, Rothermel, Woodward):

A preliminary study with X rays, using 30 mice to a point and a total of 150 CF_1 mice, indicates that at 400 r exposure there are 100% takes; at 300 r, approx. 90%; at 200 r, approx. 60%; at 100 r, approx. 30%. There is a normal take in the control CF_1 mice of approximately 20%. Analysis of the date, corrected for control takes at 13 and 16 days post-irradiation, shows a sigmoid type of response. Preparations are under way for a combined X-ray and neutron study.

g. Particulate Radiation Studies in the Respiratory Tract of the Rat (Boone, Turney):

The injection of gold pellets into rat lungs is continuing. Aseptic techniques are now being used because the Sprague-Dawley rats seem to be very susceptible to pulmonary infections. Post-mortem lung tissues examination so far indicates no reaction to the gold in younger animals. CMR-4 has made one attempt at the gold-plutonium alloy in which [redacted] a rather loose combination of the metals which may or may not be entirely satisfactory with regard to tissue reaction.

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4. Organic Chemistry (Langham)

The past month has been spent working on the Interscience book and on re-equipping the organic chemistry section's microanalytical setup.

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5. Radiopathology Section (Lushbaugh)

a. Pathological Changes in Rats and Monkeys Following Massive Doses of Radiation (Lushbaugh):

Slides are now prepared from the high dose experiments performed last summer. These are being studied for signs of pathological effects.

b. Effect of High Doses of Radiation on Mitoses (Lushbaugh, Hale):

Sections are in process of being prepared and studied.

c. Relationship of Growth and Luminescence of Luminescent Bacteria (Lushbaugh, Hughes):

The luminescent phenomena of certain types of bacteria may be used to measure adenosine triphosphatase activity. The bacteria are being studied to determine the possibility of relating their luminescence to changes in ATPase following radiation.

d. Effect of Radiation on the Maturing Ovum of the Rat (Spalding):

A paper on the effect of radiation on the rat ovary and in particular upon the maturation of the ova is now being prepared for publication. Materials and hormones are being obtained to extend these studies to include the role of the pituitary in the effect of radiation on ovary function.

e. Use of the Root of the English Broad Bean as a Biological Indicator of Radiation Effect (Spalding):

Effect of radiation on the rate of root growth of the English broad bean was used years ago as a biological dosimeter by L. H. Gray. This technique is being developed so it can be used in this laboratory.

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

A. General Remarks:

During this period the work of the Industrial Hygiene Group was extremely varied with many new materials being encountered. Also, continued progress was made on the research and development work mentioned in last month's report.

B. Test Operations:

At the request of J-11, filter paper used for cloud sampling was submitted to the A. D. Little Company for efficiency tests. The data was received and evaluated in comparison with other papers tested for the Group; a report was prepared and submitted to J-11.

There has been continued interest in many of the supplementary studies being made of fallout material. In order to make the data obtained to date more available, a report is now being prepared which will summarize the progress in the various fields.

Sampling operations were continued on eight experiments being conducted by Group H-6 regarding the effect of soil and other materials on fallout. The data obtained are useful to Group H-6 in their study and also provide a means of testing and evaluating sampling equipment.

Sampling for normal background concentrations of beta emitters has been initiated as a prelude to a continuous program of air sampling to be conducted here during the overseas test operation. Such a study has been conducted during all previous test operations. Personnel involved in a similar study by the Sandia Corporation visited the Group and an agreement was reached on standardizing most phases of this work. Assistance will be given to the Sandia personnel on special samples, if needed.

A seminar was presented before the Health Division on the fallout results at the Nevada Proving Grounds during the last operation there. A member of the Group participated in conferences in Washington in which fallout results of past test series were discussed and standards adopted for exposures for future test operations.

C. Particle Size Work:

A detailed survey of the literature on particle size analysis was made. Equipment for making such analyses under the conditions encountered by the

Industrial Hygiene Group at Los Alamos simply does not exist at present. An attempt is being made here to improve existing equipment for this purpose. Two test samplers have been constructed for this work and are now being tested. Results to date on these samplers indicate that the inherent difficulties of existing equipment have not been overcome.

D. Bayo Shot:

Members of the Test Operations Section participated in the Bayo Canyon experiment of February 12 to the extent of measuring fallout at points of habitation to the north and east of the firing area. Results obtained were all negative.

E. Beryllium:

The Beryllium Shop was in operation during the entire month and a total of 183 air samples were collected in the shop and in the filter room. It was necessary to install a new hood on a milling machine and this hood was obtained from a similar machine in Building 96. All air samples collected were below the maximum permissible concentration. In CMR Building, numerous samples were collected around miscellaneous operations involving beryllium compounds. All such samples also indicated safe concentrations. Group GMX-7 which is beginning work with small amounts of beryllium requested assistance in handling the health-problem. An air sampling program has been set up and will be carried on during this work.

F. Uranium:

Tests made during the operation of the furnace at TU Building revealed that fumes were escaping into the room because of the low draft on the furnace. The difficulty was traced to a restriction in the ventilation system which is now being corrected. In HT Shop the work load increased sharply and unexpectedly. High urine concentrations of uranium were found and a program of daily collection and analysis of urine samples was started. The air sampling program which had

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been terminated was again started during the latter part of this period. As a result of this activity, the shop foreman asked a member of the Group to give a talk to all the men in the shop, explaining the reasons for the increased sampling activity. This was done and was very well received by the men.

The report on the work carried out last month at the Frankford Arsenal was completed and submitted to CMR-6 for inclusion in their report. Work on the method for the determination of enriched uranium in urine was intensified and apparently all methods for solvent extraction have been tested and found unsatisfactory. Other procedures are now being investigated.

G. Tritium:

The work on the calibration of the various tritium sniffers using known concentrations of tritium water has been completed and a preliminary report prepared. An attempt will be made to complete this study by making similar calibrations using tritium in gaseous form. However, there are numerous technical difficulties to be overcome in preparing known concentrations in this form.

Three members of the Sandia Corporation concerned with tritium problems visited the Group to obtain information on analytical methods. At a later date, training will be given to one of these persons in the actual technique of analysis.

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H. Lead:

A program of lead analysis on urine samples collected from foundry workers has been started again. A series of daily samples were run in preparation for extensive foundry work involving pouring of approximately three tons of lead. Group CMR-13 is using small quantities of lead for heat treating operations and an inspection revealed that local exhaust ventilation was necessary. Plans have been drawn up for this by CMR-AE and have been approved by Group H-5.

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I. Toluene:

Air sampling for toluene was done at S Site in laboratory S-460. While concentrations found were somewhat below permissible levels, recommendations are being made for a modification of the canopy hoods to provide more effective control.

Large quantities of toluene were used at DP West in a mixing operation and air samples were collected. Because of the excellent general ventilation, concentrations were below permissible levels.

J. Miscellaneous Exposures:

A large number of miscellaneous exposures were investigated. Most of these involved air sampling and in a number of them excessive exposures were indicated. Control measures were recommended where necessary and in all cases these are now being installed or adopted. Such exposures included pumice dust at the guard station at S Site, iron carbonyl at DP West, calcium fluoride in Sigma Building, trichloroethylene and tetrabromoethane at DP West, methyl acrylate at S Site, strontium by CMR-5 and neptunium by P-12.

K. Incinerator:

Three runs on contaminated trash were made by the incinerator. Air samples were collected at various points in the air cleaning system and it was found that the cleaning efficiency was extremely poor. An investigation seems to indicate that this poor efficiency is due to the nature of the aerosol now being produced under conditions of poor combustion. Further sampling of the air stream will not be conducted by this Group unless there is a change in the incinerator or its operation.

However, the Group will continue to operate air samplers at Ten Site, CMR Building, TA-1, HRL and the South Mesa access road during all incinerator runs which are now made weekly.

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L. Ventilation:

A type of wind tunnel has been set up in the subbasement of HRL for the calibration of velometers and other devices for measuring air flow. This unit has been calibrated with a Pitot tube and is now in use. In addition to the calibration of the Group's own equipment, two velometers were calibrated for the Engineering Department and two for CMR Division.

A conference was held with CMR-AE personnel and the CMR-1 Group Leader regarding the problem of dust in incoming air in the new CMR Building. Sampling equipment has been loaned to CMR-AE Group for a further study of this problem.

Recommendations have been made and preliminary plans approved for the installation of slot exhausts on the acid-dip tanks in the Sheet Metal Shop. The hoods recommended for the control of trichloroethylene, nitrogen oxides and chromic acid in GMX-9 facilities have been installed and found adequate. The canopy hoods in the new Physics Building have been inspected and recommendations are being made for their modification. The hood which had been previously recommended for welding and soldering operations in Building S-202 has been installed and was tested and found adequate. Recommendations have been made for the enclosure and isolation of the grinding operations in this building which are producing a nuisance dust and causing excessive machine wear.

In J-2 Building, the perchloric acid hoods were checked and balanced at the request of J-11 in preparation for forthcoming operations. A total of 49 hoods have been surveyed and tested for air flow in TA-1 and the various GMX Sites. A number of these were found to have inadequate air flow rates and have now been improved. The detailed hood evaluation study has been nearly completed and a report will be written shortly.

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(Person authorizing change in classification) (Date)

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M. Miscellaneous:

Work is continuing on the compilation of analytical methods used by the Laboratory Section of the Industrial Hygiene Group. A number of copies of

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individual methods have been distributed to interested persons outside the Laboratory. Requests have also been received from several sources for a complete set of these methods when the compilation is completed.

Work has begun by the Laboratory Section on a new method for the determination of the alpha active transuranium elements.

The Group Leaders of H-1, H-3 and H-5 made a tour of W Site and discussed potential hazards with the Section Leaders there.

Miss Myrtle Greenfield, Director of Laboratories and Mr. Carl Jensen, industrial hygienist of the New Mexico State Department of Health, visited the Group and were shown a number of dry boxes in actual operation. The State Health Department is contemplating purchase of such equipment for handling biologically active materials.

A talk was given before the H-1 monitors on methods and techniques of air sampling. The annual report on activities of the Industrial Hygiene Group during 1953 was prepared.

New materials expected to be used by Group GMX-2 as TNT additives include: mercaptobenzothiazole, tetraethylthiuramdisulfide, piperidinium pentamethylene-dithiocarbonate, benzothiazyldisulfide, diorthotolylguanidine salt of dicatechol borate.

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N. Statistical Summary:

1. Air samples collected or field tests made for:

Alpha activity (incinerator)	36
Atmospheric dust (incinerator)	8
Beryllium	197
Boron	6
Mercury (labs)	2
Pumice dust	3
Radio-lanthanum (Bayo)	3
TOluene	18

2. Sanitation:

Water samples collected	53

3. Plans approved 3

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4. Analyses Completed:

Air	
Beryllium	208
Carbon Tetrachloride	3
Biological (urine)	
Lead	8
Plutonium	122
Polonium	17
Strontium^{90}	6
Tritium	[illegible]
Uranium (fluorometric)	248
Uranium (radiometric)	19
Miscellaneous	
Tritium in water	8

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

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

1. General:

a. Edwin Bemis attended, in Washington, D. C., a conference on neutron dosimetry and a symposium on scintillation counters during the period January 25 - 29.

2. Work in Progress:

a. Construction of the modified version of the integral has been completed. The response of the instrument to radium radiation and to the K X-rays from tantalum, platinum, lead and uranium has been determined. After the energy response measurements were made, some changes in construction seemed advisable. When these are completed, it is expected that the energy response will be within ten per cent of being flat over the energy range for which the instrument is to be used.

b. The fluorescence sensitometer to be used with a 150 KVP X-ray machine has been constructed. It is now being employed in the extension to higher energies of previously reported work done with a 50 KVP X-ray machine. This

[redacted]

study is now being carried out in the cobalt room of HRL with a 150 KVP X-ray machine which has been obtained, on loan, from GMX-1.

c. Study of the effect of high intensity thermal radiation on soil surfaces continues.

d. Work has been started on the determination of a suitable location in the neighborhood of HRL for a calibration building. An unshielded source has been placed at several possible sites and the effect of radiation detecting equipment in HRL has been noted. Plans are being made for the exposure of a 300 curie cobalt source in the cobalt room of HRL and for the determination of the contribution of this source to the inte[illegible] possible sites.

e. The work on the calibration of neutron films continues. Polyethylene radiators have been added to the film and exposures made.

3. Work Completed:

a. Determination of the surface dose rate from a lucite applicator containing a Sr^{90} source was made for H-4.

b. Calibration of a source was done for P-1.

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

1. Operations:

a. To assist Carco in maintaining its flight schedule and improve its flight service to and from Los Alamos, the Weather Section initiated, at Carco's request, a program which requires weather observations to be made three times daily, 0835, 1130 and 1550, and a 24-hour flight forecast to be prepared.

b. The speed of the weather teletype was increased from 60 to 75 CPM on 22 January. The new speed will now permit 25% more weather data to be transmitted by teletype.

c. Furnished AEC Engineering wind rose data for proposed airstrip at White Rock.

[redacted]

d. Furnished Mr. Princell, Engineering Branch, climate data for 1947 - 1954 for Los Alamos. Mr. Princell was primarily interested in snow fall for construction purposes.

e. Supported experimental test at TA-33 on 10 February.

f. Supported Bayo operation on 11 February.

March 22, 1954

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

clA - H-Div. Files (following circulation to H-Div. Group Leaders).

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