Unclassified
5-4-18

REF: H-99

[redacted]-DIVISION PROGRESS REPORT

November 20 - December 20, 1953

23

A

53-24

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

A. General Remarks:

None.

B. Personnel:

1. New Hires:

None.

Classification changed to Unclassified
by authority of the [redacted] E.R.D.A.,
Per [redacted] (Date)
By [redacted]
(Signature of person making the change, and date)

2. Terminations:

None.

3. Total Personnel:

SM	39
Military	3
RA	16
SCP	75
Military	1
ASC	26
TOTAL	160

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

A. General Remarks:

1. The Group Office discussed tritium monitoring procedures with TRDL Rad-Safe personnel.

2. Considerable time has been spent on procedures to be followed and protective equipment to be used in the charge of glass fiber filters in the CMR Building exhaust system.

3. H-1 participated in a discussion with AFSWP personnel on emergency procedures to be followed in unusual situations involving weapons and fissionable materials.

4. Several discussions were held with Group CMR-1 in order to develop [redacted]

adequate rad-safe rules to be followed in the operation of Wings 3, 5 and 7 of the CMR Building.

5. Tritium monitoring procedures were discussed with health personnel from Mounds Laboratory.

6. The Group Leader made a trip to Project Whitney to evaluate tritium monitoring problems at that site.

7. Various operational phases of the incinerator were investigated by H-1, with correctional recommendations made where necessary. The first alpha-active materials were burned on December 15, 1953. Very little floor contamination was incurred. Environmental air samples were started on December 18 at Ten Site and on top of O Building in order to detect airborne activity from the incinerator. Air samples taken within the operating area of the incinerator have so far been insignificant.

8. The previously reported survey of the Z Building Cockcroft-Walton machine has lead to further investigation. There is considerable speculation as to whether the energy of the neutrons detected at remote locations should be considered 14 Mev or of lesser energy. P-4 has attempted during this period to integrate the time over which they operate at 5×10^{10} n/sec. Nuclear track plates have been issued and planted within A Building and efforts are being made to obtain a neutron recording device for A Building. P-4 is at present keeping people out of the Z Building shop during operation.

9. The decontamination of HRL was completed by the use of the sand blaster. Two or three minor spots remained adjacent to the walls that read between 1 and 3 mrep/hr. Three coats of Plascite paint were applied. The paint did not completely fill the cracks and it has therefore been recommended that H-4 have linoleum placed over the paint.

10. Tuballoy handling by GMX-4 was investigated by the issue of film badges, contamination checks, etc. Air samples and urines have been negative.

11. The activities of the new group, W-6, were investigated. W-6 is a consulting group to American Car and Foundry and has no laboratory facilities at the present time. Their consultant activities concern radiographic operations by A.C.F.

12. Investigation of the effect of various numbers of wrapping material covering nuclear plates has been initiated in co-operation with P-10. Excessive wrapping may change the calibration.

13. H-6 completed their calibration and autoradiographs of the three Sr^{90} sources destined for use by H-4. An order has been made for three suitable applicators. With a certain amount of reluctance it was thought best to abandon the idea of covering the sources with plastic during storage and exposure. There were good and bad reasons for both ideas. Under any circumstances it will be necessary for H-1 to make periodic swipe tests for possible leakage.

14. A paper inventory was completed on radium sources and turned over to Supply and Property.

15. The responsibility for the issue, control, etc., of Ra, Co^{60}, and Sr^{90} sources is gradually being turned over to James Oakes. The changeover was started on November 30.

16. On December 16, a dummy Phoebe projectile containing tuballoy ricocheted off the target in Area 6 at TA 33 and reversed direction, burning as it traveled into the adjacent canyon. Persons entering the area were issued respirators, etc.

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

A. Accident Record:

	Jan. 1 to Dec. 1, 1953	1952
Man-hours Worked	4,888,194	5,985,003
Number of Disabling Injuries	15	18
Number of Days Lost	161	199
Frequency (Accidents per 1,000,000 Man-hours)	3.1	3.0
Severity (Days Lost per 1,000 Man-hours)	0.03	0.03

B. Industrial Accident Experience

1. On or about November 18, [redacted] GMX-3, truck driver - powder inspector, slipped off the running board of a truck at S Site and hurt his right knee. [redacted] first reported to H-2 dispensary on December 1. He was seen again on December 17 and at that time it was recommended that he stay home one day in order to remain off his feet. Lost time: 1 day.

2. On December 8, [redacted], CMR-1 chemist, received a chemical burn to his eye when a small dropping bottle was knocked from a shelf. [redacted] was engaged in packing his equipment and chemicals preparatory to moving to the new CMR Building. As he was packing chemicals he inadvertently knocked the dropping bottle from the shelf. When the bottle fell and hit the sink edge he turned to see what had happened. At that instant a small drop of concentrated sulphuric acid splashed into his right eye. He immediately rinsed his eye with copious amounts of water and then reported to the dispensary. [redacted] was seen by an H-2 doctor on December 8, 9, 10, 11, and 14. A Santa Fe eye specialist saw [redacted] on December 11. [redacted] returned to work December 14. Lost time: 5 days.

C. Fire:

1. There were no fires reported for the period covered by this report.

D. Motor Vehicle Accidents:

	Jan. 1 to Dec. 1, 1953	1952
Miles Driven	1,615,383	1,820,000
Number of Accidents	33	49
Rate (Accidents per 100,000 Miles)	2.06	2.7
Total Cost	$1,349.88	$1,900.00
Accident Cost per 100,000 Miles	$ 84.31	$ 105.00

There were three motor vehicle accidents in which LASL personnel were involved during this period. One accident occurred as a result of excessive speed, one was due to improper backing, and one was due to mechanical failure of the vehicle.

[redacted]

B. General Remarks:

1. Arrangements have been made for the H-1 Group Leader to attend all GMX safety committee inspections to evaluate radiological risks.

2. A conference was held with AFSWP representatives and other H-Division groups to evaluate risks and discuss emergency procedures in connection with transportation of bomb components, both explosive and radioactive.

3. Procedures have been formulated and are in effect for permitting Carco flights over TA 33 except during experimental shot days.

4. A survey of all hoisting devices used by LASL personnel is nearing completion. The data will be used in setting up a schedule for testing these devices as well as for periodic maintenance.

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

A. General Remarks:

1. C. C. Lushbaugh attended the Small Animal Care Panel in Chicago on December 2 and 3, and gave a seminar on radiopathology at the Argonne National Laboratory, Lemont, Ill., on December 8.

B. Biochemistry Section:

1. Gould, Keegan, Kohr, Lotz:

Kenneth Kohr was transferred to the Biophysics Section as of Dec. 1, and Virginia Lotz was transferred to Biochemistry as of the same date. Some time was devoted to moving into the new laboratory at HRL Building.

2. Gould, Keegan, Lotz:

Several experiments have been carried out to determine the quantitative significance of cholesterol synthesis in the aorta, using the flash labeling technique. Rats and chickens were injected with C^{14} - acetate and sacrificed 30 minutes later. In rats, aorta cholesterol S. A. was negligible (2.9 c/m over background), whereas liver cholesterol was over 100,000 c/m in young rats showing that in the normal living animal [redacted] cholesterol in the aorta is

negligible compared to the liver. This is contrary to the conclusions of Chaikoff et al, based on tissue slice studies with rabbit and chicken tissues. Our results on chickens are not yet completed.

3. Gould, Keegan:

A study of the effect of estrogens, thyroid, compound F and cholesterol feeding on chickens is being carried out in collaboration with Stamler in Chicago. Preliminary results show very marked differences but no conclusions are being drawn until more samples have been encountered.

4. Magee:

Investigation of the most suitable material for use in columnar separation of the metabolites of C^{14} caffeine in rat urine was continued. The fractional collection of the flow through a column packed with Whatman No. 1 filter paper homogenized in a Waring blender with the solvent n-butanol saturated with 1N NH_4OH, and mixed with a small amount of Pyrex sand gives three definite peaks, and three much lower and questionable peaks, as measured by aliquot counting. Total recovery of counts in the applied urine was obtained.

Samples of each peak count are being chromatographed on strips to check for complete separation.

5. Boone, Magee, Turney:

Metabolic studies of C^{14} isoniazid in Pyridoxine rats. — A metabolic study of B_6 deficient rats with C^{14} isoniazid was started because of the previously observed relationship between B_6 deficiency and isoniazid. A dose of 10 mgm/kilo of C^{14}-isoniazid was injected prior to placing the animal in the metabolic cages. Carbon dioxide, feces, urine and tissues are being analyzed in the usual manner by direct plating and wet oxidation. To date one control and two deficient animals have been sacrificed and analyzed at the end of 1 and 6 hours. Tentative results show urinary excretion in the controls at the end of 6 hours to be approximately 8[illegible] while that of the deficient animals is between

30-40%. Concentrations in the tissues are as a rule much lower in the deficient animals except for the kidneys and skin. Another series will be repeated at these points and, if necessary, the study will be extended to 12 and 24 hour periods.

6. Sabine:

The effect of varying doses of X radiation on the cholinesterase levels of the erythrocytes of mice on the fourth day post-radiation has been determined over the range from 50 r to 450 r. A definite effect, namely an increase in the cholinesterase value, was observed at 50 r.

Further experimental points have been obtained during the first 40 days following a dose of 300 r.

7. Foreman, Trujillo:

This month we completed the barium-lanthanum study in animals. A detailed metabolic study involving data on urinary and fecal excretion and tissue distribution was done. The data are now being calculated and processed. Preliminary indications are that as was suspected, the body fractionates the barium-lanthanum mixture with the lanthanum initially being taken up by the liver and barium proceeding to the bone.

C. Radiobiology Section:

1. Rothermel, Woodward, Schweitzer, Strang:

Effects of partial body irradiation with massive, rapid doses of X rays. — The effects of head irradiation are being compared with irradiation of the rest of the body and parts of the body of the rat. Physical signs and survival times are being followed. Investigations are under way on the use of a deuteron or proton beam for spot irradiation of the brain.

Effect of dose rate upon the syndrome of very acute radiation sickness. — Work with massive rapid doses of radiation has hitherto been done with dose rates of less than 6000 r/min. The effect of decreasing the time in which a massive dose is given to a fraction of [redacted] The use of a fission neutron

source is being obtained for [redacted]. Calculations of dose from this source have been made by E. C. Anderson and preliminary work is being done with him on biological calibration by means of spleen-thymus weight loss in mice.

Rem value of 14 Mev neutrons in producing 30-day lethality in mice. — Mice were exposed to 14 Mev neutrons from the Cockcroft-Walton machine. Exposures were based on the rem value obtained from the spleen-thymus study run previously (1×10^8 n/cm^2). The rem value for 30-day lethality does not appear to differ much from this figure. The surviving mice from this study are being followed for lens opacities.

Effects on survival times of mice of rem-30-day-lethality-comparable doses of X rays and thermal neutrons. — Survival times of mice after exposure to doses of 5000, 10,000, and 20,000 rem were not significantly different from those of mice exposed to corresponding doses of X rays delivered at the same dose rate; nor were they significantly different from survival times after exposure to the same doses of gamma rays given at a dose rate of 4000 r/min.

2. Boone, Woodward, Rothermel:

Relative effectiveness of thermal neutrons and X rays in overcoming resistance to leukemia transplants in mice. — A leukemia strain has been ordered.

3. Rothermel, Strang, Schweitzer:

Observations on the incidence of lens opacities in mice exposed to X rays and thermal neutrons are continuing.

4. Boone, Turney:

The relationship of pyridoxine to isoniazid as an antimetabolite in the rat. — As described previously, Phases 1 and 2 of the experiment have been completed. Approximately 400 xanthurenic acid determinations were done colorimetrically. Results showed that animals receiving isoniazid when on a B_6 deficient diet were unable to tolerate even small nontoxic doses. Severe convulsions rapidly appeared which could be prevented by adequate doses of B_6.

Dr. Lushbaugh's [redacted] all the animals for mitotic and pathological studies. Forty-four animals were included in this study.

Phase 4, the C^{14} isoniazid studies in B_6 deficient rats, has been started and the work is being reported under the Biochemistry Section.

Data of Phases 1 and 2 of the experiment are being evaluated and prepared for publication.

Particle size and local radiation studies of the respiratory tract of the rat. -- Practice procedures of the techniques for imbedding spherical gold pellets into rat lungs continue. Post-mortem lung X rays with pathological sections of the beaded areas are being studied.

Studies on the cell surface adsorption of radioactive compounds are being continued.

D. Biophysics Section:

1. Worman, L. Larkins:

Exposures were made for the following:

a. Johnson - 2 sets of plastics exposed at T Site.
b. Sabine - 7 separate mouse exposures made at T Site.
c. Rothermel, Woodward -
   1) Checked various phantom materials to increase scatter and raise dose rate on Picker "100" at HRL.
   2) Exposed mice at T Site 5000, 10,000, and 20,000 r.
   3) High dose rate studies made on rats at T Site. Cephalic and caudal exposures.
d. Boone - 25 radiographs on rat chests and lung masses on Picker "100" at HRL.
e. Worman -
   1) Remeasured mouse exposures on Maxitron 250 at hospital - Same results as obtained previously on mouse exposures.
   2) Worked out method of measuring X-ray beam using Lucite plate glass fluorescence which occurs upon exposure in darkened room.

2. Hayes, Kohr, J. Larkins:

The source-reflector system of the CELSA instrument used to obtain relative pulse height data has been markedly improved. Various reflector geometries and surfaces tried have led to the conclusion that a hemispherical shape and a diffuse reflector [redacted] Co^{60}, Hg^{203}, Pu^{239}, and Pu-Be

have been used as sources.

3. Hayes, Kohr, Schuch:

The Arm Counter has been received for the Shop Department and is being assembled with the necessary electronics, reflective coating and scintillator solution.

4. Hayes, Rogers, Sanders:

The scintillation solute and solvent program involving synthesis, absorption spectroscopy and photomultiplier testing is continuing. The work on emission spectroscopy is awaiting the completion of Jim Perrings' work on the Spectrograph.

5. Anderson:

The human counter is reaching the end of the design stages. As soon as a few remaining difficulties are ironed out, it will be possible to obtain a cost estimate.

Preparations have been made for a mouse spleen-thymus run at Godiva. Polk Anderson and Jim Perrings have constructed the necessary exposure supports and cages.

Calculations have been made for the gold beads for the local lung irradiation experiment. It is proposed to use Pu^{239} and Ni^{63} for the alpha and beta sources respectively. Ni^{63} has a 63 Kev beta with maximum range about 65 microns in tissue matching rather well the 36 micron range of the Pu alpha.

If nonreproducibility of the firefly extracts can be overcome, the ATP method appears to have sufficient inherent sensitivity to permit operation with the LiSb Swiss tube at room temperature. A duplicate electronics set-up has been assembled for Lora Belle Hughes.

6. J. Larkins:

The tissue equivalent ion chamber has been slightly redesigned to permit construction with available equipment. However, the chamber proper will

not be changed, in order that results may be compared with those previously obtained. Most of the parts for the handle assembly have been constructed.

Check prints for the human counter have been received and checked. A few suggestions have been made of changes to simplify construction and insure proper operation.

E. Radiopathology Section:

1. Lushbaugh:

The histological material of the rapid dose studies in monkeys was obtained and boxed after preparation at Randolph Field. The pathological changes are being studied.

2. Hale:

Rapid dose studies on mitosis in the jejunal crypts are being continued.

3. Hughes:

The method of estimating ATP in unknown solutions using firefly lanterns has been standardized for amount of firefly extract, amounts of buffer, amounts of magnesium, pH and total volume. Sensitivity has been good enough to measure 0.01 micrograms per ml but is found to be dependent upon the unknown variables in the extraction process. The possibility of using luminescent bacteria is being investigated.

4. Spalding, Lushbaugh, Hale:

Beta ray burns in sheep. -- This experimental study was distributed through AEC, Division of Biology and Medicine as a preliminary report.

Through the kindness of Groups H-6 and H-1 three new beta ray sources were obtained so that this work could be extended.

5. Spalding:

The effects of X irradiation upon the primitive germ cell as the intact rat ovum continue to be studied.

[redacted]

6. Spalding, Hale, Lushbaugh, Woodward:

LD_{50} of intrauterine versus new born rats. — The operative and radiation techniques have now been standardized. The first attempt to determine survival rates after radiation was thwarted by failure of the mother rats to care for their young. This difficulty is being overcome by the use of rats chosen for being good mothers.

7. Hale, Lushbaugh, Woodward:

The application of in vivo Acridine dyes to radiopathology continues under study.

8. Spalding, Hale, Lushbaugh, Langham:

A box in which the environment of many growing bean roots can be rigidly controlled was constructed.

9. Wellnitz, Smith, Lushbaugh:

Pathology service was continued by the section producing histological sections, radioautographs, photomicrographs and post mortem examinations for others. Special techniques for preparing plant mitoses for study are being investigated.

10. Lushbaugh, Spalding, Hale, with Boone and Turney:

Gross and microscopic pathology along with mitotic counts of the thymus and lymph nodes are being studied of rats fed synthetic diets deficient in vitamin B_6.

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

A. General Remarks:

Activities of Group H-5 were again quite varied and reflect changes in the work program of the Los Alamos Scientific Laboratory. There was a very considerable increase of work with tritium, a decrease in the work with lithium, and some decrease in beryllium work.

[redacted]

1. Tritium: [redacted]

The number of urine samples analysed for tritium content reached an all time high during the month. This is causing some problems which can be solved only by very careful scheduling of sampling times. The portable manifold for tritium determinations in the field is now nearing completion. The first runs on the newly built apparatus for setting up known concentrations of tritium were made late in the month. This apparatus is being used to calibrate and study the so-called "sniffer", an instrument for measuring tritium concentrations in air.

2. Uranium:

Collection of air samples at HT Shop continued and most of the samples collected were below the permissible concentrations for normal uranium. However, these values are sufficiently close to the permissible concentrations so that a more thorough study is being made to permit making recommendations for the improvement of ventilation and housekeeping. Studies are continuing on the vacuum cleaning system in TU Building since the effluent discharge on the roof contains an appreciable amount of uranium oxide. Experiments are being continued in this laboratory in an attempt to find a means of coating the filter bags to improve their efficiency.

CMR-13 has begun work on uranium in Wing 1 of the new CMR Building. Ventilation is somewhat limited in this wing since it was not designed for this type of work. Studies on cut-off saws, which this group plans to use, have shown the need for local exhaust ventilation and this ventilation equipment is now being installed.

A report was prepared summarising air and urine sample results on workers in the "25" area of Sigma Building. The report also made recommendations for improved ventilation and this is now being installed. The radiometric method for the determination of enriched uranium in urine is still unsatisfactory as a routine procedure. The fluorometric method, modified to permit concentration of the sample

before determination has been giving promising results. However, such a method does not distinguish between the various uranium isotopes.

3. Beryllium:

A large number of air samples from the Beryllium Shop and from the exhaust stack were run this month. All of the results were below permissible levels indicating good operation of the ventilation and filter system. No samples were collected in CMR Division, although the samplers were kept in readiness in CMR Building for use in case of an accident. A report is now in preparation summarizing the air sampling results on beryllium operations in CMR Building during the past year; a similar report on V Shop during the past four years is also being prepared. Group P-7 is beginning experimental work on beryllium foils and this operation will be followed closely during the next several months.

4. Lithium:

Relatively few samples for lithium were collected during the month because most of the heavy work on this material has been completed. However, considerable work was done in connection with the detectors incorporated in the lithium hydride. This work consisted of surveillance of inspection and other operations where lithium hydride parts containing arsenic are being handled. Supplied air masks have been used in Sigma Building for preparation work. However, such special equipment was not required in M-1 Building because of the excellent local exhaust system in use there. In addition to the hazard from arsenic and arsine, potential hazards also exist from the use of germanium, thallium and other detectors. A comprehensive report is being prepared describing the health precautions necessary for the various lithium operations.

5. Plutonium:

An air sampling program has been organized and equipment assembled for operation during the demolition of D Building. However, this demolition has been postponed until February 1, 1954. This will involve a sampling program

covering the technical areas and some parts of the community. A similar, but more limited sampling program is being set up immediately to assess potential air pollution from the incinerator.

6. Radioautography:

The use of Kodalith film for making positive prints of fallout radioautographs has yielded excellent results and a well defined plot has been obtained of spot size versus activity. Using this plot, fallout radioautographs from previous Nevada operations are being studied to obtain data on individual particle activity.

7. Photomicrography:

Two members of the Group have been working with the photomicrography equipment in an attempt to secure good photographs of particles on cascade impactor slides. This has been successful on the first two stages but considerable difficulty has been experienced with the small particles on the last two stages due to the interference of the resin. Interesting photomicrographs of lithium hydride dust have also been made.

8. Castle Operation:

The equipment required for the modest air sampling program of Task Unit 7 was assembled, calibrated and packed. Standard operating procedures were written up on each type of equipment. The individual responsible for the operation of this program spent several days with the Test Operations Section familiarizing himself with the equipment and calculations involved.

9. Hydrogen:

At the request of W Division a member of the Laboratory Section investigated possible collection methods for the determination of hydrogen in air in concentrations approaching the explosive limit. A successful method was worked out although it is not known whether the material will stand up on the long storage conditions required by W Division. The variables affecting the test were

investigated and a report giving these results submitted to W Division.

10. TNT:

An explosion proof motor driving a Gast Pump has been set up for air sampling at S Site powder inspection line. With this equipment it is possible to get daily samples on both the day and night shift. A new vacuum cleaner for use on TNT dust which was recently installed at S Site is being tested to determine the efficiency of its filter system. This study will continue during next month. The analytical procedure for the determination of TNT in air has been reviewed thoroughly and much of the original work has been repeated and checked in this laboratory. As a result, several changes are being introduced which will improve the reliability of the method.

11. Cyanides:

The work on cyanogen being conducted by GMX-2 has been moved from Two Mile Mesa to TA-9. At the request of GMX-2, the new setup was inspected before operation began. The hazards from this material are well controlled under the new system, but the possibility of running continuous air sampler with color indicating filter paper is being investigated.

An explosion occurred in the plating laboratory at TD Site during an operation involving the stripping of gold plate. This operation which involves the use of hydrogen peroxide at elevated temperatures is quite hazardous and will be modified. The explosion sprayed the operator with sodium cyanide but no serious injury resulted.

12. Mercury:

A survey was made at W Site during the tra nsfer of mercury contaminated with plutonium from a vacuum system. Mercury exposures were well below permissible levels as were urine samples collected from the operators. Group P-8 is inaugurating an experiment involving the use of small quantities of soluble and volatile mercury compounds. The laboratory where this is being done was inspected

and was found to be well ventilated and to have adequate safeguards for this work.

13. Carbon Tetrachloride:

The new system in use in the Shop Building at TA 3 for the control of carbon tetrachloride use is proving quite successful and is resulting in a gradual decrease in the use of this material. Other locations where carbon tetrachloride is used for cleaning have been visited in order to follow up on recommendations made.

14. Miscellaneous Exposures:

Other substances investigated this month included machining sodium iodide in the Shop Department, screening ammonium nitrate at Kappa Site, solvent work with benzene at TA-9, calcium fluoride in Sigma Building, and boric acid at S Site.

15. Ventilation:

Hoods have been studied at W Site and in the new Shop Building. Recommendations have been made for the improvement of the former and for the removal of the canopy hoods at the Shop Building. The spray paint booth in the Shop Building was checked and found to be adequate. Work is still in progress on the welding hoods. A color code file on all hoods at Los Alamos is being set up, the main purpose of which is to insure regular inspection of these hoods. A literature survey on the design and operation of chemical fume hoods is being made. This is a preliminary step toward preparation of a report on this subject.

Group H-5 has been assisting Group H-1 and ENG-4 in dealing with the serious problem created by clogging of the capillary air washers in the new CMR Building. This problem had not yet been resolved at the close of this report period.

16. Miscellaneous Activities:

Three members of the Group discussed air sampling problems and sampling

media with a representative of Group J-11. One member of the Group presented a talk on tritium excretion at the Health Division Seminar. Another member of the Group discussed fallout from the Upshot-Knothole Operation before the Laboratory Staff Member Meeting. The report on the "Monitoring of Cow's Milk for Fresh Fission Products Following an Atomic Detonation" was published as LA-1597. The first portion of a planned compilation of all analytical procedures used in the laboratory were published during this period. Seven methods have been published and other will follow in succeeding months..

The Group was visited by Mr. Devlin of the Naval Radiological Defense Laboratory, by Mr. Bradley and Dr. Anthony of Mound Laboratory, and Mr. Max Erb of Erb and Gray Optical Company.

17. Statistical Summary:

a. Air samples collected or field tests made for:

Alpha active material (incinerator runs)	2
Arsine (detector)	8
Beryllium	80
Boron	2
Lithium hydride	14
Lithium hydride (cascade impactor)	1
Mercury (rooms)	2
Normal uranium	4
TNT	19

b. Sanitation:

Water samples collected	41

c. Plans approved 2

d. Analyses completed:

Air

Barium	1
Boron	2
Beryllium	186
Lithium	8
Uranium	18

Biological (urine)

Mercury	4
Plutonium	65
Polonium	30

Strontium [redacted]	2
Tritium	376
Uranium (fluorometric)	76
Uranium (radiometric)	8

Miscellaneous:

Tritium in blood	1
Tritium in coffee	1
Tritium in sputum	1
Tritium in water	15

VI. GROUP H-6, RADIOLOGIC PHYSICS (Thomas N. White):

A. General Remarks:

Several discussions were held with Hal Plank concerning means of checking the response of rad-safety instruments to 75 Kev photons.

In connection with certain problems of neutron dosimetry in animal experiments, the use of the Monte Carlo method on the IBM Model 701 Computer is being investigated. This line was suggested by Maj. Payne Harris.

B. Special Problems Section (S. Shlaer and H. I. Israel):

1. General:

a. [redacted] was on sick leave throughout the period covered by this report.

2. Work in Progress:

a. A modified form of the Integron is being developed. Construction of a prototype has begun. The modified instrument will consist of two units. One, containing the ion chamber and associated electronic circuits, is to be made small enough so that it can be worn on the person of the user underneath any protective covering that may be worn. The second unit will contain the meter indicating dose received as well as containing the needed power supply. The two units will be cable-connected.

b. Investigation is being made into the feasibility of replacing nuclear track plate with nuclear track film for neutron film dosimeter work. In

connection with this program, a study of effect of various developing procedures is being made in order to find the procedure most suitable for the development of nuclear track film by H-1.

c. Experiments are being carried out on Eastman type K film with respect to the effect of varying development time and varying developer concentration. It is hoped to obtain results that will yield a film badge that will cover a greater range of exposure than at present without going beyond the capabilities of the present densitometric equipment. Results thus far indicate that, with proper processing, exposures from 10 mr to 10 r can be made to give densities of 0.02 to 3.67.

In addition, it is hoped to find a developer dilution that will not only yield the results just given, but also one that will be suitable for the processing of the nuclear track films mentioned above.

d. A report is being prepared on the results obtained in the work on the effects of thermal neutrons on cadmium-shielded film.

3. Work Completed:

a. Calibration of six Sr^{90} sources has been completed. A source holder for these sources has been made as well as a housing in which to store source and holder.

b. Drying racks for nuclear track films were designed.

C. Meteorology Section (Maj. Geo. J. Newgarden, 3rd. OIC):

1. Personnel:

a. Major Newgarden has been on annual leave since 15 December.

2. Operations:

a. A request for a climate summary of NPG by J-3 for use of UCRL was completed. This consisted mainly of a wind and temperature summary for the Control Point at NPG, requiring a check of approximately 20,000 observations.

b. Lt. Col. Wyatt visited the Section 11 December to co-ordinate

weather matters with the Test Director and the Weather Section.

c. The Section provided meteorological consultation to H-5 in regard to the stationing of monitors for the monitoring of stack gases from the incinerator.

d. The Zia Company was given information concerning the type of wind equipment to be used in their tests relative to the establishment of a wind generator on the Jemez Mountains.

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

1. Castle:

a. A report on early failures of clips used to hold film badges due to corrosion prompted confirmatory tests of the clips here. Accelerated salt water tests conducted by CMR-6 gave clip failures in three hours. Cadmium plating of the clips before tests extended their life to beyond one hundred hours. Accordingly, 5000 clips about to be shipped overseas were "barrel plated" with cadmium before shipment.

b. An emergency capability for urine analysis in case of suspected tritium exposure will exist in the Rad-Safe Unit, TU-7, overseas. The method was checked out by the two members of the Section, plus two additional members of TU-7. All necessary equipment and chemicals will be in the radiochemical trailer, belonging to TU-7, together with spare equipment in case of breakage.

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

a. Routine analysis for plutonium of the waste retention tanks in the CMR-Building was made. The maximum value found was 3000 d/m/l, with an average value of 300 d/m/l.

b. Drinking water and circulating water from D Building, DP West and CMR Building were analyzed for plutonium. All results were negative with the following exceptions:

DP West Circulating Water - Equipment Room 3 - 800 d/m/l
DP West Circulating Water - Equipment Room 4 - 960 d/m/l

Both are well below the chronic mpc of 3300 d/m/l. The high levels reported last month may have been due to a crack in a ceramic lined process line passing through the equipment room. This line break was discovered shortly after the sampling done last month.

c. Assay results on soil samples taken during November:

		Pu		U
		Soil	Grass (ash)	Soil
	Pueblo Canyon			
)	1. Upstream from where waste enters canyon	2. d/m/gm	1.6 d/m/gm	—
	2. " " "	1.8	3.2	0.151 ug/gm
	3. " " "	294.	1,940.	—
On Project	4.	110.	442.	0.19
	5.	102.	—	—
	6.	23.	—	0.066
	7.	24.	290.	—
	8.	27.	720.	0.110
	9.	22.	180.	—
	10.	16.	84.	0.046
(East of Proj.) (	11. Project Boundary Fence (E.)	7.	76.	—
	12.	7.	42.	0.020
	13.	6.	14.	—
	14. Project highway crosses canyon	6.	5.	.024
	15. At Totavi	5.	20.	—
	16. At Otowi Ranch	4.	4.	2.30
	Los Alamos Canyon			
)	1. In line with west fence TA-1	1.6		
	2.	1.8		
	3.	2.0		
	4. East fence of Omega Site	1.6		
	5.	2.0		
	6.	1.0		
	7.	1.2		
	8.	0.8		
oj.) (On Project	9. Project boundary fence (E.)	0.6		
	10.	0.8		

Classification changed to Unclassified
By authority of the U.S.E.R.D.A.,
Per Sandoval
(Person authorizing change in classification) (Date)
By [illegible] Fehner 6/8/76
(Signature of person making the change, and date)

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Note: All west of junction with Pueblo Canyon.

Uranium analyses were done by H-5 on samples prepared by us.

Analyses for plutonium on the Pueblo Canyon samples were also made by the AEC Waste Treatment Laboratory. They use the cupferron-chloreform extraction, whereas we are using the bismuth-phosphate extraction method. The results were of the same order of magnitude, but have raised some doubt in our minds as to whether the present method of stripping the soil is removing all the activity. A series of samples will be run on the same sample to determine the relative efficiency of nitric acid, hydrochloric acid and aqua regia.

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

Jan. 21, 1954

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

Classification changed to [illegible]
by authority of [illegible] A.E.R.D.A.,
Per [illegible]
(Person authorized to sign classification) (Date)
By [illegible]
(Signature of person making the change, and date)

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