710276

H-DIVISION PROGRESS REPORT

January 20 - February 20, 1958

Class: H-1 - OUO
H-3 - U
H-5 - C RD
H-6 - OUO
H-7 - U

REF: H-273

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

A. General Remarks

None.

B. Personnel (2/1 - 3/1/58)

1. New Hires

2/3 MELTON, George F. H-1 DP Sites

2. Terminations

None.

3. Total Personnel

SM	64
Military	2
SCP	114
ASC	54
TOTAL	234*

*Includes 9 casuals.

II. GROUP H-1, MONITORING (Dean D. Meyer, Leader)

A. General

1. James Lawrence and Carl Buckland attended an emergency monitoring training course at Idaho Falls on February 12, 13 and 14.

2. Leo Chelius attended a Health Physics meeting at the Savannah River Plant on February 18 and 19.

B. Special Monitoring

1. The cyclotron was down for repair on January 28. Radiation levels were between 3 r/hr to the hands to .7 r/hr to the body. The highest body badge exposure received was .75 rem gamma. Tolerance times were carefully scrutinized by H-1.

2. The 4-hour continuous operation of the Cockcroft-Walton by P-4 was successfully completed. H-1 kept a constant surveillance of the area during working hours. Portions of the hallway and one office of the P-1 wing were made an exclusion area during this run.

3. Rad safe procedures were formulated for the handling of U^{235} loaded graphite followed by radiography at GT Site. A monitor was in constant attendance for the first week and no unusual contamination took place and no person was contaminated; however, gloves read about 800 c/m. The highest air sample was only 4 $d/m/m^3$.

4. There were 19 overtolerance air counts within the CMB-6 areas. Their work load has been extremely heavy these past few weeks. The highest sample recorded was 833 $d/m/m^3$ from the Press Building. This was believed due to the loading of exhaust filters and the exhaust from a vacuum cleaner.

5. A power failure occurred at Omega Canyon, Group P-2, when electricians cut into a power line without prior notification. It was estimated that a minimum of 37 times tolerance for cesium-137 was present in the air. Actually no time was wasted in attempting to get a sample and everyone was evacuated from the area.

6. A Project 400 Health Physics Indoctrination series was established by H-1 for the training of N-Division and American Car and Foundry personnel.

7. We have started issuing, on a limited basis, the new Eastman NTA packet Type B-2, consisting of the Type 2 gamma film and fast neutron film. This will eventually replace the Ilford glass plates which we are now using. Tests have been made on this film by calibrating it to fast neutrons, gamma, and beta. Strange results in mixed radiation have been noted.

8. We have started sending out routine tritium overexposure reports on a newly prepared form.

9. A limited test on the characteristics in response of both film badges and pocket dosimeters to U^{233} was run. Results indicate fairly good agreement between the two.

10. Radiographs for Bayo shielding device were developed. Exposures were made by H-1 to determine whether leakages occur within a newly constructed radiation shield. Chest X-ray cassetts were used.

C. IBM Work

1. The following breakdown on 1957 exposures was completed and submitted:

   a. Alphabetically
   b. Low to high exposures
   c. Alphabetically by Division and Group
   d. Extracted AEC-LASL-Off Site Visitors-Zia exposures Unclassified
   e. Number of individuals between exposure ranges of:

0 -	.10	rem
.11 -	.50	"
.51 -	1.00	"
1.01 -	2.00	"
2.01 -	3.00	"
3.01 -	4.00	"
4.01 -	5.00	"
	>5.00	"

Philip Kemp
Group Leader 5/1/58

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LANL

2. 1956 report:

a. Cards sorted as to respective quarters.
b. 1st, 2nd, and 3rd quarters run through 604 (for dosage totals)
c. 1st and 2nd quarters run through 407 (for listing)
d. 1st and 2nd quarter listing checked and errors corrected (as to Z-number, birthdate, Group, etc.)

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

A. Accident Record	Jan. 1 to Feb. 1, 1958	1957
Manhours Worked	491,112	6,027,159
Number of Disabling Injuries	0	21
Number of Days Lost	0	1,081
Frequency (Accidents per 1,000,000 Manhours	0	3.5
Severity (Days Lost per 1,000,000 Manhours)	0	179

B. Industrial Accident Experience

The Laboratory went from December 5, 1957, to February 5, 1958, a period of two months, without a disabling injury. During that time Laboratory employees worked a little over a million manhours, the third time in its history that over a million manhours has been worked without a lost time accident.

1. On February 5, [redacted], a stock handler in the metal stock of the main shop, injured the instep of his left foot when a 30-pound piece of round stock rolled off a power saw. He lost 5 days from work.

2. On February 11, [redacted] a GMX-3 machinist at S Site, injured his back while he and two other men were loading a 215-pound sheet of dural into a panel truck. He has not yet returned to work.

C. Fires

No fires occurred during the report period.

D. Motor Vehicle Accidents	Jan. 1 to Feb. 1, 1958	1957
Miles Driven	138,694	1,693,090
Number of Accidents	5	24
Rate (Accidents per 100,000 Miles)	3.6	1.4
Total Cost	$399.00	$1,131.00
Accident Cost per 100,000 Miles	$288.00	$ 67.00

Again, January was a bad month for vehicle accidents with five occurring during the month. Two were attributed to improper backing, two were caused by the driver's failure to adjust to road conditions and one was considered the fault of the other driver who failed to yield the right-of-way. Total damage was estimated at just under $400.00.

E. General

1. A contingent of 450 high school students visited [illegible] the Physics Building and Omega Site on February 11 without a reported incident.

2. Roy Reider and J. Robert Penland attended a meeting of the New Mexico Chapter of the American Society of Safety Engineers held in Santa Fe on Jan. 31.

3. Roy Reider attended a meeting, held at Travis Air Force Base, California, on February 19, on the subject of shipping materials by air to the Eniwetok Proving Grounds.

4. Conferences were held with CMF and Engineering Department people with respect to the design of a new exhaust system for the DP West area.

5. Fire tests were run on plastic duct work. Results were favorable.

6. Firemen admittance procedures for CMB and CMF facilities are being reviewed.

7. A series of talks is being planned for orienting firemen in new developments and activities of the Laboratory so they may be better acquainted with fire problems.

8. Three additional one-hour lectures on Laboratory activities were given to retraining classes of Security Inspectors.

9. Ellis Stout, from CMR, left Los Alamos on February 6 for Eniwetok to serve in a safety capacity on the TG 7.1 staff. J. Robert Penland left Los Alamos on February 18 to join Stout at the Proving Grounds.

IV. GROUP H-5, INDUSTRIAL HYGIENE (Harry F. Schulte, Leader)

A. Evaluation and Control Work

1. Routine Exposures

During this period routine air sampling and investigations were made on exposures to beryllium, cadmium, trinitrotoluene, and mercury. All samples collected showed concentrations below permissible levels. A large number of air samples for beryllium analysis were taken in the Beryllium Machine Shop and other samples were taken in Sigma and Delta Buildings, S Site, DP East and Ten Site. The samples at S Site were collected during sorting of clothes for the laundry. The highest sample showed a concentration of about three-quarters the permissible level for an 8-hour exposure, however, the actual exposure period was only a few minutes. The exposures at DP East and Ten Site resulted from the handling of beryllium oxide. However, since this material was handled in enclosed dry boxes at both sites, no appreciable air concentrations of beryllium resulted.

2. New Materials and Operations

A stack sampling program was initiated in the old T Shop where graphite plates loaded with oralloy are now being machined. The stack sampling is being done to evaluate the effectiveness of the reverse jet filter. Results to date indicate satisfactory performance and the concentrations of oralloy emitted are within safe limits.

A number of samples of normal uranium are being taken for particle size analysis. This is part of a study on particle size that has been continuing for several years. A report on this is now being written and a paper on the subject will be presented in April.

3. Ventilation

Numerous conferences on ventilation problems were held during the month. These involved measurements of air flow and studies of air flow patterns, and recommendations for improvements were made in many cases. Areas involved in ventilation studies included H-7 facilities, H-1's decontamination facility, the Press Building, WA Site, Physics and Radiochemistry Buildings, and DP West. Investigations at DP West and the Radiochemistry Building involved the new hot cells now in the design stage as well as other problems.

B. Research and Development

1. Progress was made on the evaluation of the Venturi air cleaning system at TA-48. Tests were made on the efficiency of the system for cleaning acid gases and mists during a simulated digestion run with nonradioactive filter papers. A preliminary standard operational procedure has been completed and will be followed until after the system has been used under actual operating conditions. As a result of further experiments a final operational procedure will be prepared.

2. Nitrogen dioxide is now being used as a test gas to measure variations in concentration within the dust chamber. Preliminary tests have been made but it is expected that additional tests will be run during the next period. A solvent vaporizer unit has been constructed for setting up known concentrations of solvents within the chamber.

3. Work is continuing on the use of ion exchange methods for determining beryllium in urine samples. The feasibility of using beryllium-7 as a tracer in this work is now being investigated. Ion exchange methods are also being used for the isolation of uranium. Samples for enriched uranium determination are now being measured by both ion exchange and the presently standard extraction procedure. After a large number of such samples have been run it will be possible to compare the two methods quantitatively.

4. The work on the determination of thallium has now been completed and a report is being prepared which will be presented at a meeting in April.

5. Eighty men from DP West and Sigma Building were given instructions and respirator training during the month. Feasibility tests are also being done with the modified Air Force mask and evaluation tests are being made with full-scale -

Philip Kang

Alice Richter 5/1/58

face masks. Very interesting information regarding the percentage of persons capable of being fitted perfectly with respirators and other similar equipment are being obtained in this study.

6. Preliminary discussions were held with Group N-6 regarding requirements for air sampling during N-Division tests at the Nevada Test Site. It seems apparent that considerable development work will be needed to obtain some of the specialized samples that may be required during these tests. This work will probably become increasingly important during the coming months.

C. Miscellaneous

There was an accidental exposure to phosgene during heating of freshly made crucibles containing small amounts of carbon tetrachloride in Sigma Building. The possibility of the formation of phosgene had been anticipated and indicating crayons had been used to estimate such concentrations. One man was kept under observation following the incident but no ill effects resulted. The indicating crayons showed that the concentration of phosgene was between 1 and 10 ppm. Another accident in Sigma Building involved the exposure of lead when a die in the press broke. Urine analyses were run on the four men involved and it was found that no significant amount of lead had been absorbed.

Indicating samplers are being run during the preparation of arsine by Group CMF-2. This group has also made small amounts of phosphine which is extremely toxic. An attempt is being made to develop a satisfactory indicator for this material also.

An investigation was made of potential hazards to a man that must enter and traverse the length of a 2-ft diameter gun barrel that is 50 ft long. Tests were made for carbon monoxide following a shot with this gun but no detectable amounts were found. A chemical cartridge respirator has been provided for this man. A blower has also been installed for ventilation of the air tank located on top of the barrel into which a man must enter for daily inspection.

An industrial hygiene survey was made of Group N-1 facilities and a report on this survey is now being prepared.

At the request of the Zia Company, Group H-5 is preparing to make an air pollution study of the new housing area adjacent to the airport. Complaints of smoke and ashes from the dump have been received from residents in this area. Standard air pollution survey equipment used in studies in large cities will be employed to permit a comparison with conditions encountered elsewhere.

One member of the Group attended a meeting at the Rocky Flats Plant of the Dow Chemical Company at which fire and health hazards from plutonium were discussed.

Group H-5 served as host to a very large number of high school students on February 11. Exhibits of many phases of the Group's activities were prepared and displayed. Particular interest was shown by the students in the work being done on respirators and the dust chamber used for this purpose proved to be of particular interest.

Six Navy personnel have been assigned to the Group for training in urine analysis procedures prior to leaving for Eniwetok.

D. Statistical Summary

1. Air samples collected or field tests made for:

Beryllium, air	147	
Beryllium, swipes	19	
Cadmium	13	
Mercury (labs)	2	
TNT	17	
Enriched Uranium, stack	11	
Normal Uranium, cascade impactor	34	
Normal Uranium, Millipore filters		22

2. Plans approved 4

3. Sanitation

Water samples collected	42

4. Analyses completed

Air

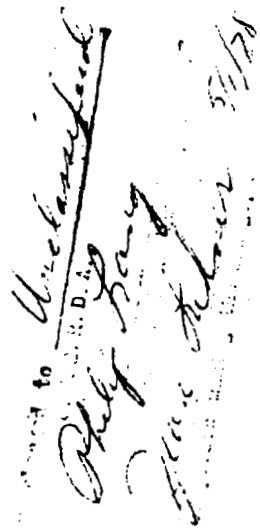
Acid mists	16
Beryllium	192
Cadmium	26
Oxides of nitrogen	17
TNT	20

Biological (urine)

Americium	7
Lead	7
Mercury	5
Plutonium	192
Radium	1
Thallium	5
Trichloroacetic acid	4
Tritium	154
Uranium (fluotometric)	93
Uranium (radiometric)	35

Miscellaneous

Beryllium in swipes	22
Plutonium in feces	4



V. GROUP H-6, RADIOLOGICAL PHYSICS (Harvey I. Israel, Leader)

A. Special Problems

1. General

S. Shlaer attended the meetings of the Biophysical Society held at MIT February 5-7, inclusive.

2. Work in Progress

a. Work is continuing on the 704 program to calculate the high energy neutron reflection by the Monte Carlo method.

b. The new calibration of the Model 100-B prototype shows it still to be nonlinear. Further work is proceeding to remedy the situation.

c. Work is continuing in the attempt to fabricate thin wall ion chambers for the Model 100-B survey instrument. At present a mold is being fabricated to attempt centrifugal casting of the chamber in Epoxy resins.

d. A preliminary design of the fluorescent foil holder and the primary beam catcher has been made.

3. Work Completed

a. The dimensions of a free air ion chamber capable of measuring roentgens up to 300 kev in energy has been given to SD-2 to make shop drawings.

b. The calculations for optimum fluorescent foil thickness and primary beam filtration have been completed. CMB-6 has been requested to fabricate the foils and filters.

c. At the request of GMX-1 a thickness gauge using alpha particles was set up to determine the uniformity of 1/4 mil polyethylene sheet. The method is based on the straggling of the alphas after passing through absorbers. Here the number of alphas transmitted is a very steep function of absorber thickness. Adequate sensitivity can be achieved with either a scintillation detector or an ion chamber detector.

B. Meteorology Section (Orin Stopinski)

1. Work in Progress

a. Los Alamos Climatological Data

1) Work on data reduction has continued.

2) Wind summaries on a monthly basis are being prepared. A summary for the current month is released to D-Division for publication in the weekly bulletin.

b. Machine Forecasting

Work on statistical forecasting for the Pacific has been continued with the assistance of T-1 personnel. Latest results for 35, 40 and 45 thousand

feet indicate that significant gains over persistence forecasts for 6 and 12 hrs can be made for these levels. Indications are that such forecasting techniques will be available for use in the early stages of HARDTACK.

2. Work Completed

a. Bayo Canyon

Support for Bayo Canyon activities was provided on the following dates: Jan. 30, Feb. 13, Feb. 14 and Feb. 19.

b. NTS Activities

Section personnel conferred with USWB, K-Division and J-Division personnel relative to weather support for N-and K-Divisions activities at NTS.

C. Nuclear Field Test Section (W. R. Kennedy)

1. General

The Nevada Planning Board Dose Subcommittee met February 20. Dosages allocated to communities will conform with badged doses read by the USPHS monitoring program. Dose allocation for areas other than those badged will be made from fallout maps constructed by Program 37, and by the USWB for those detonations which were not worked by Program 37. All these items of information will be forwarded to A. V. Shelton, UCRL, and will be published by the Subcommittee, to be completed by the end of March.

2. Laboratory

a. Routine analyses were made of CM Building waste, drinking water and cooling water. Similar analyses were made of cooling and drinking water at DP West Site. Rain and rinse samples were checked for fallout activity. No significant activity was detected in fallout samples this month.

b. Various methods of Sr^{90} analyses are being tried on soil and water samples. Some of the soil in the Ten Site drainage area may contain approximately 600 d/m/gm Sr^{90}. Samples were extracted with HNO_3 and the daughter Y^{90} extracted with TTA. A system is being tried, using electro-dialysis of the soil to strip the alkali metals, then putting them on a Dowex 50 column, and stripping the Y^{90} selectively from the column. If it works, large numbers of samples can be handled simultaneously with minimal attention.

c. Studies continue with fused glass pellets from close in fallout at NTS. Results to date indicate the glasses are quite resistant to normal weathering action.

d. Efforts to decontaminate gold bearing solution continue. Lanthanum fluoride is an efficient scavenger, Ag cl is being tried, and efforts will be made to use ferric hydroxide. However, considerable gold can go down with the ferric hydroxide unless care is exercised.

VI. INDUSTRIAL WASTE, (C. W. Christenson, Leader)

A. Plant Operation and Research

1. TA-45, Tech Area

Flow to TA-45 has remained consistently high throughout the period. Week end flows have been averaging about 25,000 gallons as compared to normal week end flows of 10 - 15,000 gallons. No definite source of the increased flow has been located although ENG-4 has been checking for the past two weeks.

Considerable difficulty has been experienced with the sludge pumps due to clogging of lines and valves by stones and cement chips. The probable source of this material is cement accidentally dropped into the settling tanks when existing 4-inch lines were replaced by 6-inch lines some time ago. An attempt was made to flush the sludge line with high pressure water in order to remove any remaining material of this kind. Whether or not the line was adequately cleaned has not yet been determined.

It has been very difficult in the recent past to draw satisfactory sludge from the sludge holding tank because of the very high density (due to large amounts of sand) of the sludge it now contains. As a result sludge drawn from high levels is extremely thin while sludge from lower levels is so thick that sludge lines and pumps very quickly clog. In order to keep the sludge in a more homogeneous condition we have experimented with a portable air lift pump for agitation. It has proved to be very satisfactory and will probable be replaced with a permanent unit of similar type.

About 260 gallons of cyanide waste and 60 gallons of a highly mineralized waste containing a "uranium sludge" were received and treated during the period. Because of objectionable odors encountered a standard procedure for treating such waste in the future was developed. The principal features of the procedure are:

a. Obtaining more complete information on source and composition of such wastes.

b. Limitation on maximum volume of waste to be treated at a time.

c. Isolation of waste in one holding tank until analyzed and approved for discharge.

Effluent activity has been uniformly satisfactory with respect to plutonium and uranium content although in several instances relatively high effluent gross alpha counts were obtained which could not be accounted for by plutonium and uranium radio analyses.

2. TA-21, DP West

Flow to the DP West plant was generally normal after unusually low flows the preceding month. Raw feed counts covered a normal range for the plant. Effluent activity was satisfactory except for that of about 40,000 gallons which were recirculated. Available analyses indicate that 50% or more of effluent activity was due to uranium.

An unusual operating problem was encountered during the first week of February in that a very voluminous sludge was produced on treatment. The settling tank was completely full and a reduced operating rate was necessary in order to prevent filter stoppage. It was later determined that raffinate from Bldg. 3 was responsible for excessive sludge production. In the future this waste will be segregated and treated separately.

The caustic sampler has been repaired to the extent that it will operate. However, the gears are so badly worn that replacement will be necessary for permanent repair. The gears are on order.

The vacuum filter is operating satisfactorily and is keeping up with sludge production. However, laboratory work on conditioning sludge, especially batch sludge, is to be continued. Batch sludge has been particularly difficult to filter and has been responsible for reduced filter rates when mixed with sludge produced during routine operation.

A great deal of nonroutine work is required in operation of the DP West plant and it is, therefore, difficult for a replacement coming in "cold" to satisfactorily replace the usual operator during vacations, illness and similar occasions. For that reason a "Plant Operating Manual" to cover such work in required detail is in preparation.

3. TA-35, Ten Site

Two runs were completed at Ten Site during which a total of 70,300 gallons was treated. A primary objective operation during the period has been to reduce radiation hazard to operating and maintenance personnel. By a combination of chemical pretreatment, dilution, natural decay, decontamination, repair of leaking equipment and rapid treatment and disposal of spent regenerant the area of severe contamination has been sharply reduced. Radiation intensity is now low to moderate (10 - 50 mr/hr) in nearly all operating areas except the vicinity of Tank #5. Tank #5 is receiving waste from the main plant and radiation at the sampling manhole is 3000 - 5000 mr/hr. Activity of raw waste under treatment (about 6000 - 8000 c/m/ml) is very low by comparison to that of waste which has been necessary to treat in the recent past.

Philip Long

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Work on installation and wiring of the motor for the sump pump in Tank #4 has been started and should be complete in a few days. Completion of this job will considerably improve flexibility of plant operation.

Modification of plumbing on the neutralization unit at J-11 is complete and only adjustment and correction of the proportioning valve to control equipment remains to be done for automatic operation. In the meantime, pH control has been maintained by manual operation.

During this period a decision was made that all liquid industrial waste disposal systems will be charged as plant equipment. The result is that the Engineering Department now assumes control and maintenance of all the equipment not used for research and development purposes. This should make for a more desirable operation of these facilities from the budgetary viewpoint.

B. Laboratory Section

1. Project Green Thumb

An abstract reporting the results obtained with Sr^{90} uptake by plants from soils was submitted to the American Chemical Society and has been accepted for presentation at the annual meeting in San Francisco. The paper is presently being completed.

2. Routine Laboratory

The laboratory section is cooperating with USGS in a study of Los Alamos Well #6. Sodium analyses are being run on samples which were collected at one hour intervals in an attempt to determine regularity of variation with respect to chemical composition of the water supply.

Six soil samples from Mortandad Canyon have been assayed for gross alpha, gross beta, gross gamma and radiostrontium. With the exception of the outfall sample, the radiostrontium appears to be Sr^{90}. At about 1/4 mile from the outfall site about 5.9% of the gross beta is attributable to radiostrontium; the radionuclide appears to be well fixed to the soil.

Analysis of laundry raw weekly composite samples indicate normal operation and discharge.

3. Tuff Core Studies

A determination of the ion exchange capacity of tuff for calcium, strontium, cesium, and plutonium has been initiated. The exchange capacity is being determined by passage of the element at a concentration of 100 parts per million plus a spike of the respective radionuclide through a tuff core. The exchange capacity can be calculated from a foreknowledge of the concentration applied to the point of saturation. It is believed the information will be important to an understanding of radionuclide fixation by tuff.

Leaching studies using barium and aluminum are being continued. Barium appears to be the most effective single leach in the removal of strontium; it has little effect on the removal of cesium or plutonium.

Certain of the cores which had previously been treated with a single or mixed spike were dried and impregnated with plastic. The impregnated cores were sectioned and the surfaces polished with a sander. Autoradiographs were taken by placing film on the smooth surface of the core. This technique facilitated a more nearly accurate location of the point of activity where hot spots were encountered. It is hoped that the hot spot may be resected and an identification made of the material associated with adsorption of activity. In the above manner resolution of the hot spots has been greatly increased.

C. Laundry Section

On January 14 a bar sealer was received and installed in the respirator room shortly thereafter. It is foot-pedal operated, leaving the operator's hands free to hold the plastic bags containing respirators.

Since respirators are very often stored on open shelves before use, it was decided between Groups H-5 and H-7 that each respirator, after decontamination, would be sealed in a plastic bag. This service will provide respirators to all operating personnel in a more sanitary and dustfree condition.

During the month eight personnel who must use respirators daily in the laundry were sent through the H-5 test chamber in HRL Building. The results were recorded and the personnel were supplied with the respirator best suited to each.

As part of routine maintenance, it was discovered that six of the oldest dryers had worn out hinge pins which interfered with the operation of the doors. By eliminating the door switch interlock and substituting a later model hinge bracket, a simple repair could be made. For this purpose it was decided to use the facilities of the H-Division shop. Polk Anderson measured the parts and will make the new brackets and will also install them when completed.

March 13, 1958

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

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

[redacted] to Unclassified
U. S. A. E. R. D. A.
Philip Kang
[redacted] Jane Fisher 7/1/77
[redacted] of person making the change, etc.