# H-DIVISION PROGRESS REPORT

July 21, 1962 - August 20, 1962

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## I. GROUP H-1, HEALTH PHYSICS (Dean D. Meyer, Leader)

The confidential RD report (symbol H-304) of Group H-1 has been distributed under separate cover dated September 4, 1962.

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

### A. Accident Record

| | 1/1/62 to 8/1/62 | 1961 |
|---|---|---|
| Manhours Worked | 4,116,094 | 6,460,919 |
| Number of Disabling Injuries | 7 | 16 |
| Number of Days Lost | 242 | 18,233 |
| Frequency (Accidents/1,000,000 Manhours) | 1.7 | 2.5 |
| Severity (Days Lost/1,000,000 Manhours) | 59 | 2,822 |

### B. Industrial Accident Experience

On July 13, 1962, [redacted] SD-5, received a disabling injury when three dural plates (1/4" x 36" x 36"), that were standing on edge on a milling machine fell against his left arm causing a deep laceration. Lost time was 8 days.

### C. Fires

There were no Laboratory fires during this report period.

### D. Motor Vehicle Accidents

| | 1/1/62 to 8/1/62 | 1961 |
|---|---|---|
| Miles Driven | 1,020,305 | 1,706,232 |
| Number of Accidents | 9 | 20 |
| Rate (Accidents/1,000,000 Miles) | 8.7 | 12 |
| Total Cost | $795.00 | $1261.00 |
| Accident Cost/100,000 Miles | $78.00 | $74.00 |

There was one Government vehicle accident involving a Laboratory driver during July. This occurred when a driver backed into a parked vehicle.

## III. GROUP H-5, INDUSTRIAL HYGIENE (Harry P. Schulte, Leader)

### A. Evaluation and Control Work

#### Air Sampling Studies

Air sampling studies were made on beryllium in the Machine Shop and at Group N-2. Swipe samples for surface contamination with beryllium were made at N-2, N-5, W-3 and P-2. No excessive concentrations, either in the air or on the surface, were found on any of these investigations. Air samples were also collected for toluene during mixing, loading and unloading of a scintillation solvent by Group P-3. Carbon tetrachloride samples were collected during redistillation in a hood in the Plastics Section of Sigma Building. No excessive concentrations of either solvent were found. Concentrations of airborne mercury vapor were measured in several locations at TA-46 and in the Cryogenics Building. These readings were made following cleanup work after mercury spills, and all concentrations were below permissible levels.

#### Soil Samples

Eight soil samples were collected in the area of the firing pits used by GMX-8 at Meenie Site. These samples will be analyzed for barium and uranium, which are residues from test firing. Since it is necessary for workmen to clean up the area and rake the ground, producing visible airborne dust, these samples should indicate whether protective measures are necessary.

#### Industrial Hygiene Surveys

Industrial hygiene surveys of group facilities were made in Groups N-4, J-11, J-12, J-16, CMF-9, Cryogenics Building B, and Shop 34. Following the surveys, a memorandum has been forwarded to each of the Group Leaders involved, making necessary recommendations for control of any health hazards noted during the survey.

Ventilation

Ventilation studies and evaluations were made in the following areas: a soldering hood in Shop 4, a filtration unit at Ten Site, a fume hood in CMR Building, the TD Site plating laboratory, the portable exhaust units in Building 31 at TA-46, and the proposed stack design at Ten Site.

Work was continued on the hood survey throughout the Laboratory. Several hundred hoods were checked during this period and reports on their status are in the file. Where unsatisfactory hoods were found, memoranda have been written to the group leader recommending improvements.

Noise

A noise survey with an octave band analysis was carried out in Room 121 at the Omega Site reactor. Suggestions were made for measures to reduce the noise level in the laboratory and office areas. No hazard to hearing is involved in this study, but the level of 70 db is well above standards for laboratory and office work.

Fallout

Levels of fallout in both air and milk remained insignificant during this period.

Respirators

A total of 20 men were fitted for respirators during this period and 12 full face masks and 9 half masks were issued. Two men were trained in the use of emergency equipment.

B. Research and Development

1. Data is being analyzed and summarized for a report on the analysis of tissue samples for plutonium.

2. Technics for collection of rain water and its analysis for polonium have been satisfactorily developed. Work is now underway to

determine the concentration of polonium in rainout. Air samples, which have been collected with high volume samplers, will also be analyzed for polonium in this study.

3. A preliminary toxicological study has been made of lithium fluoride and activated lithium fluoride prepared specifically for radiation dose measurements. Toxicologically, the two materials apparently are identical and a report is in preparation.

4. Due to pressure of other work, studies on the generation of a satisfactory uranine dye aerosol were suspended during this month.

5. The first data have been obtained on the comparison of particle sizing technics between the Health and Safety Laboratory in New York, the University of Rochester, and LASL. The Industrial Hygiene Group at Harvard University is also participating in this comparison. A report, comparing the data obtained so far, will be prepared and sent to the various participating laboratories. Additional samples will be analyzed by these groups.

6. Evaluation of the fundamental properties of molecular sieves and silica gel as air sampling media is progressing.

7. Construction work is under way in the shops on a metal tank and stand for the low level alpha spectrometer. It is anticipated that additional information on the design of this instrument will be obtained during the coming month.

8. Studies are continuing on the comparative applications of an individual personal air sampler as compared with fixed sampling devices in Shop 15. The data will be analyzed during the coming month to determine whether the project has been carried forward sufficiently to warrant drawing reliable conclusions.

C. Miscellaneous

A series of Trade Name penetrating oils were checked for toxic constituents for Group CMX-2. Equipment was supplied and the operation

supervised during cleaning of tanks in two areas of Sigma Building. The various hand-operated pumps used on chemical detectors were all calibrated during this period. Stack sampling equipment was fabricated and installed in the new Sigma Building. Several buildings were checked for toxic material contamination prior to disposal.

A safety talk on heavy metals was given before Group P-12.

Mr. Rudolph Jonik of the AEC spent two days with Group H-5 reviewing information obtained during Operation Upshot Knothole. The essential information required in a lawsuit was obtained.

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

### A. Special Problems Section (G. Shlaer)

#### 1. Work in Progress

a. The machine for marking the film badges through an X-ray beam has been completed and the correct exposures are being determined.

b. Calibration of the 555 film in the new badge to a simulated Pu source is in progress.

c. Calibration of the NTA and Fine Grain Positive film in the new film badge to X and gamma rays is in progress.

#### 2. Work Completed

a. The 100 W Zirconium arc and its power supply has been installed in our densitometer and its range is now over density 6.

b. The response of DuPont 555 film in the no filter area of the new badge was measured to X-rays from 8 to 43 kev. The response varied from 0.3 at 8 kev to 16 at 43 kev; the response curve showed discontinuities at the bromine k-edge (13.5 kev) and at the silver k-edge (25.5 kev).

c. The response of DuPont 555 film in the no filter area of the new badge to the beta rays from tuballoy was measured. It

the response of the film under the filtered area of the badge to $Co^{60}$ radiation is taken as 1, the response to tuballoy radiation in the no filter area is 0.3.

d. The response of the DuPont 555 film in the new badge was calibrated to plutonium radiation. The surface dose was measured by J. Lawrence of H-1 with an extrapolation chamber and the badges were exposed in contact with the source. Sensitivities of about 0.9 and 4.0 were obtained under the filter and no filter areas, respectively.

e. As part of the fission foil and threshold detecting system for neutrons, counting equipment formerly used by H-4 to count gold foils has been put into operating condition. This will provide an estimate of the neutrons associated with a criticality accident from foils already planted throughout the laboratory. A recalibration of the equipment will be needed before it will be adequate for experimental or monitoring work. Equipment for counting fission foils is on loan to J-12 but is expected to be returned to H-Division this month.

B. Weather Section (O. W. Stopinski)

1. Work in Progress

a. Work continues on the local climatological study.

b. A study to measure inversions in the local canyons on a continuous basis is continuing.

c. Temperature inversion studies by utilizing wiresonde data is under way at the UHTREX site.

2. Work Completed

a. The instrument shelter for the Ski Area was renovated and installed.

b. Supplemental wind data was forwarded to K-Division for the Uhtrex hazard report.

c. A preliminary hazards study for a 10,000 megawatt reactor was made and forwarded to K. Boyer, J-DO.

C. Environmental Radiation Section (W. R. Kennedy)

1. General (Air sampling results are reported by the calendar month.)

a. During July none of the air alpha particulate samples gave values in excess of $4 \times 10^{-15}$ µc/cc.

b. Beta-gamma activity in air has decreased from the values found in June. The activity in precipitation has increased from the values found in June.

| | Average | Maximum | Minimum | Total |
|---|---|---|---|---|
| Air | 2.84* | 12.56* | 0.89* | - |
| Precip. (4.87") | 5,646** | 20,976** | 1,192** | 175,028** |

*$x10^{-12}$ µc/cc

**$\mu\mu c/M^2$

While activities found were considerably above those for this time last year, no individual result could be identified with world wide reported weapons test activities.

c. The recording community beta-gamma stations and the continuous tape, air particulate monitoring instruments were normal.

2. Laboratory

a. Waste from CM Building was routinely assayed for excessive alpha activity. All batches were released to H-7 for disposal.

b. Drinking water and chilled cooling water from CM Building and DP West were spot sampled and assayed for plutonium.

| Source | Pu, d/m/cc |
|---|---|
| CM Drinking Water | None Detected (N.D.) |
| CM Chilled Cooling Water | N.D. |
| DP West Drinking Water | N.D. |
| DP West Chilled Cooling Water | max. 15 d/m/cc (down by a factor of 9 from last month.) |

c. Thirteen samples of water from various sources were assayed for plutonium, uranium and gross beta activity. No plutonium was detected. Uranium values were normal for this area (less than 25 µgm/l). Gross beta activity was somewhat high for Turkey Creek (the Canyon just north of DP Site) giving 550 d/m/l.

Three surface water spring sources were resampled and assayed for plutonium, two having had positive values during July, the third being lost. Results of all three were no plutonium upon reassay.

V. GROUP H-7, INDUSTRIAL WASTE (C. W. Christenson, Group Leader)

A. Engineering Section

1. Plant Operation

a. TA-45, Tech Area. Operations have been generally routine except for a requirement to keep the holding tanks at Bldg. SM-700 empty for several days in order to permit LASL to complete installation of a suction line for the pumps directing flow to the new plant in TA-50. Some overtime operation at TA-45 was necessary.

Sixty gallons of chromic acid waste were received on August 14, 1962. The waste will be treated with sulfur dioxide prior to normal treatment and discharge.

Radioactivity of wastes discharged from HRL Building and remaining occupied areas in TA-1 continues to be low.

b. TA-21, DP West. Effluent quality has been satisfactory throughout the period reported and no recirculation has been required.

Four liters of sulfuric acid containing 5 grams of $U^{235}$ and 8 liters of KOH were received and retained for batch treatment at a later date.

Experimental work with cotton plug filters has indicated variable but relatively low turbidities in the sand filter effluents.

Progress on work orders for equipment installation and modification has been very slow.

c. TA-35, Ten Site. Spent regenerant from an earlier run was treated. Supernatant liquid was discharged to the flocculator and the sludge to holding tanks. Results of treatment were very good. The sludge represented only about 11.0% of total spent regenerant volume and contained practically all of the radiostrontium removed from the ion exchange columns by regeneration.

The columns were regenerated again and have been returned to service. Nearly all waste received during the period has been treated and discharged. A very high percentage of the total waste storage volume of the tank farm is available for receipt and storage of wastes. Plant operation may be delayed indefinitely, if necessary.

d. TA-50, Central Treatment Plant. The consulting engineers reported plant construction to be 93% complete as of August 17, 1962, although a considerable amount of plumbing is incomplete. We hope to start a plant shakedown run in September.

Installation of the pump suction lines at Bldg. SM-700 represents the last major construction item in the LACI portion of the TA-50 project. This installation should be completed within a week.

e. TA-1, Delta Bldg - Ceramic Sponge Kiln and Equipment. A shipment of about 250 pounds of a modified type of sponge was received from Coors and two soak and dry runs, using the new sponges and unspiked aluminum nitrate solution were completed. The new sponges absorb relatively large amounts of the test solution and apparently vitrify at relatively low kiln temperatures. Determinations of the efficiency of containment of radioactivity must, of course, await the use of spiked solutions.

B. Laboratory Section

1. U.S.G.S. Soil and Water Sampling Program. Data from the past ten years of the U.S.G.S. sampling program have been compiled

and summarized. Some 2,000 water samples obtained from 100 different points have been analyzed chemically and radiologically. At present, there is no evidence of an increasing concentration of either type constituent at any sampling point.

The soil sampling program has included Acid, Pueblo, and Mortandad Canyons. Activities have remained within the area of discharge with some migration both horizontally and vertically. Unexplainable variations in data obtained from serial sampling of the same location indicate the need of a critical review of sampling procedures.

2. Ceramic Sponge Studies. A new sponge mixture, 123-DB, was received from Coors and has been evaluated. Waste uptake is good, however the sponges do not fire satisfactorily. There is indication of surface sorption of aluminum salts with low penetration. As a result, the center of the shape bubbles and the sphere cracks and spalls. Coors will investigate changes in the sponge mixture in order to solve this problem.

Engineering has been requested to redesign the soaking and drying equipment so that it can be moved to TA-50 with improved operation.

3. Effect of Turco 4513 on Ion Exchange Removal of $Sr^{90}$. Turco 4513 has been added to Ten Site wastes in concentrations of 0, 50, and 200 ppm. Over 1,000 column volumes of the respective wastes have been passed through Nalcite HCR resin columns. There was no apparent effect of the detergent on $Sr^{90}$ removals, hence Turco 4513 may be used at Ten Site as a decontaminating agent.

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