

4-22-46

REPOSITORY Argonne - CHR
 COLLECTION A. Brues - Subseries
 BOX No. Box 217 ASH-OT
 FOLDER MED History

CLASSIFICATION CHANGED
 TO: **NOT CLASSIFIED**
 5/15/86 TID-1116
 Authority of: USAEC
 11-24-68 H. J. Braun

MUC-HG-1203
 This document consists of
 6 pages and 0 figs.
 No. 9 of 18 copies.
 Series A.

D-11-1-30092

MEDICAL INDUSTRIAL HAZARDS SECTION

J. J. Nickson, Section Chief

J. E. Rose, Associate Section Chief

REPORT FOR MONTHS MARCH & APRIL, 1946

- | | | |
|-----------|-------------|---------------------|
| 1. L.O.J. | 7. A.H.D. | 13. R.E.Z. |
| 2. J.E.W. | 8. S.L.W. | 14. G.F. |
| 3. K.Z.M. | 9. K.S.C. ✓ | 15. Chi. Tech. File |
| 4. H.J.C. | 10. S.T.C. | 16. J.J.N. (2) |
| 5. L.H.H. | 11. J.E.R. | 17. Clin Cen. File |
| 6. J.G.H. | 12. E.R.R. | |

Please sign and date below before reading this document.

<u>Name</u>	<u>DATE</u>	<u>NAME</u>	<u>DATE</u>
<u>HSCole</u>	<u>MAY --2 1946</u>		

~~_____~~
~~_____~~
~~_____~~

~~SECRET~~

Daily Plutonium Urinary Excretion
MX-200 (continued from MUC-ERR-185)

Days after injection	24-hour volume	% of injected dose excreted
42	1400 ml	.0095
43	330*	.0031
44	850*	.013
45	700*	.012
47	1080	.0064
48	980	.0063
49	450*	.0054
50	550*	.0071
51	1270	.007
57	600*	.0094
58	820*	.011
61	1200	.0083
62	1120	.0094
63	1830	.0071
64	1150	.0099
65	1580	.014
66	1570	.014
67	1000	.011
68	1870	.011
69	1640	.014
70	1150	.0096
72	1700	.0083
73	1420	.010
74	1700	.0083
75	1300	.0081
77	1200	.014
84	800*	.007
93	500*	.0093
94	270*	.006
95	700	.011
97	1130	.012

*Incomplete collection.

Because of the very small volumes of urine collected on some days, these values have been omitted from the table.

~~SECRET~~

~~SECRET~~

II. Sputum Analysis 249-MLH-3520

Sputum specimens have been obtained from individuals working in areas containing atmospheric plutonium as high as 25 times the maximum permissible level. Each of the three specimens obtained contained small amounts of plutonium. One individual showed in one case 1.6 μ c/m and in another case 2.6 μ c/m respectively in approximately 1 cc of sputum. The other individual showed 0.4 μ c/m in the sputum specimen. A rough calculation indicated that working in an area containing 25 times the maximum permissible level for plutonium for one hour and assuming 100% retention, the lung should contain 0.03 ug. Estimation of the amount contained in the lungs from the 2.6 μ c/m sample shows a lung content of 0.14 ug or 18 times that which is allowed for an equal distribution of 0.4 ug in a 70 kilo individual. It appears that as an additional precautionary measure, regular sputum analysis should be made.

It should be pointed out that, according to the inhalation data reported by R. Abrams, only 0.006% of the plutonium in the lungs is absorbed and therefore above-tolerance amounts may be present in this organ and not be detected in the urine.

III. Therapy - Tissue Analysis 365-MLH-3530 (Schubert-Revinson-Reed-Brown)

The effects of various materials on increasing the excretion of plutonium are being studied. BAL injected into Dog 121 (containing Pu and Pb) showed no increase in excretion of either Pu or Pb. The same animal has been injected with 40 mg of zirconium and 12 days later with 80 mg of zirconium. No excretion data have been obtained.

A few samples of rabbit urine (rabbit injected with lead and later with thorium by Dr. Schwartz) have been analysed for lead before and after the injection of thorium. The lead analysis revealed that a marked rise in the lead content of the urine was coincident with the injection of the thorium. This result tends to lend weight to the metal therapy principle.

A method for the determination of zirconium in urine is being developed.

Personnel Monitoring: 1323 films were developed during the month ending the 10th of April. Sixteen over-exposures were noted. Six of these represented possible over-exposure of the hands. Ten represented possible over-exposure of the body. In the latter group two were window and shield readings greater than 0.4 r for the week. The remaining readings were window readings only. It may be stated here that window readings represent beta or soft gamma radiation. Shield readings representing exposure to x or gamma radiation.

~~SECRET~~

1368 pocket meters were read during the past month. A total of ten readings greater than 100 mr for any one wearing were represented. This represents 0.3 percent of the total number of readings.

Accidents: During the past month the situation with regard to potential exposure to alpha active substances has deteriorated markedly in the New Chemistry area. This, for the most part, is due to the large quantity of alpha active substances currently being worked in this building. A secondary factor has been the urgency of requests for large amounts, relatively speaking, of americium and curium. This has resulted in a higher number of above tolerance air samples in the filtered air section of New Chemistry in the past few weeks than have been obtained in all the prior history of this laboratory. A considerable number of individuals have at least been potentially exposed to air presumably containing amounts of alpha activity in excess of the maximum permissible level.

In addition approximately six individuals have come to the attention of the Health Division who have had wounds or cuts on the hands in which the question of radioactive contamination arose. These individuals were also from the New Chemistry area. The gravity of this problem was naturally increased by the presence of large quantities of radioactive substances.

Finally, on April 16, 1946 in room 30, New Chemistry a spill occurred involving approximately 1-2 grams of plutonium. The accident apparently occurred because this quantity of plutonium was left over night in an alkaline silver solution. This solution exploded probably once during the course of the night and again the following morning when it was picked up by one of the staff of the Chemistry Division. This resulted in gross contamination of one of the hoods of this room. Unfortunately the material escaped from the hood with the result that other parts of the room became contaminated. The room, of course, was immediately sealed off, no one being permitted to enter it unless wearing protective devices. A detailed account of the air surveys will not be given at this time. The 37 air counts done in the four days following the accident show clearly that the amount of material in air is primarily a function of the amount of work being done in the room. The highest air count obtained is fifty times the maximum permissible level. The lowest count obtained on an overnight sample is 4.4 percent of the maximum permissible level.

The decontamination of the room has, of course, presented the most serious problem which has yet confronted the decontamination squad. No known over-exposure of personnel has as yet occurred because of the protective devices used. At least one individual has suffered an acid burn of the hand while engaged in this work. All individuals possibly exposed in this room are being followed by the plutonium determination group of the Medical Hazards Section. Naturally all members of the decontamination squad who are concerned with the cleanup process will

~~SECRET~~

~~SECRET~~

~~SECRET~~

have similar determinations.

The entire situation in the filtered air section of New Chemistry has been discussed with Messrs. Daniels, Manning and Stewart. As a result of these discussions increased care in handling large amounts of alpha active substances has been recommended. In addition, this office has recommended the immediate installation of adequate facilities for handling large quantities of short lived alpha active materials. It is hoped that the highest priority will be assigned to this installation.

Work on the P.P.R. continues. The immediate value of the papers on detection of plutonium in the worker may be somewhat diminished because of necessity of separating the methods used in isolating plutonium from the results of such studies. It is hoped but not anticipated that the writing will subsequently be completed this month.

Operation Crossroads: Mr. Rose has devoted most of his free time to the development, in cooperation with members of the Biology and Instrument Sections, of new techniques for the determination of the neutron and gamma flux.

J. J. Nickson, M.D.

~~SECRET~~

~~contains information affecting the national defense within the meaning of the Espionage Laws, Title 18, U.S.C., Sec. 793 and 794, and the transmission or revelation of its contents in any manner to an unauthorized person is prohibited by law.~~