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H. D. Bruner, M. D., Chief  
Medical Research Branch, DBM

MEETING AT "H" STREET BUILDING TO AGREE ON A FIGURE FOR "SAFE"  
LEVELS OF URANIUM IN THE URINE - AUGUST 14, 1959.

SYMBOL: BMM:HDB

Dr. Beard opened the meeting by stating the problem in terms of the 0523-0524-0525 Manual Chapters which he wrote. He said they were written with Pu<sup>239</sup> in mind and that the figures on excretion-body burden-air concentration were such that the reporting figures were correct within a factor of 2 or so.

The problem now is in connection with uranium as it has become acute in all production activities. He claimed that a figure had to be provided for legal purposes regardless of whether it subsequently is proved right, wrong, or terribly wrong. The law is satisfied with evidence that the best possible information, opinion and intent had been applied to the problem. So he wanted a systematic statement to satisfy the manual chapter requirements.

He tried to get an opening statement of opinion and information from each person, but arguments and discussions kept breaking out.

Everyone agreed with J. Quigley (Fernald) that urine samples give data on transient exposures for the most part and are used to pick up failures in industrial hygiene practices rather than to estimate exposure risk. Still some of the uranium in the urine samples represents excretion from deposits in the body resulting from prior exposures. The depot-excretion fraction seems to be comparatively small, however, so that he came out with the flat statement that the hazard from natural uranium (and up to 5% enrichment) was chemical toxicity. I was shocked to learn later that many of his urine samples are "grab" samples taken any time of the day or night, samples from which the uranium datum is expressed in micrograms or counts per unit volume. Others do this also and in some cases compute a 24-hour output from the concentration in one of these "grabbed" specimens. This is awfully poor science.

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Mont Mason (Mallinckrodt) said that the spot urine sample is not meaningful for body burden even with soluble uranium compounds and even less so for Fl or oxide compounds. He felt that natural uranium should be exempt from reporting.

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Repeatedly during the day various people would restate their conviction that a urine sample could in no way be related to body burden. H. Henry (Carbide) modified this slightly by saying that it might be possible to find this urine-body burden relation if all transient exposures were eliminated and we were dealing with the flat part of the curve, indicating a true depot effect. (It would probably differ, however, depending on what salt was depoted, where and for how long the process had gone on, age, sex, etc.--point of research if we can measure whole body burden independently.-HDB) Henry believes we get into a radiation problem at 2% enrichment. Fish (ORNL) did not contribute much.

F. Western (DBM) discussed the concept of body burden in terms of a 180-day time factor for equilibrium, but he was challenged on the correctness of this concept, particularly where radiation was involved in the daily transient rises which accompanied the attainment of some equilibrium, by Harris (HASL). Brodsky (L&R) took issue with this later also.

Neuman (UR) pointed out the residence time of the uranium in the kidney was too short for the concept of a body burden to be applied, and this was true for other tissues; further, where it could be applied the half-times were different for different tissues and for different compounds with the result that any concept of burden might be postulated if one wished. Dr. Western admitted that the 180-day period was purely arbitrary, having been selected for administrative reasons. Mr. Harris returned to the fact that the high transient levels of excretion will completely mask out the depot excretions, so why bother with urine. Also, it was agreed that the uranium concentration will fluctuate by a factor of 5 to 7 times in successive samples of urine.

Everyone agreed that the chemical and radiometric methods and procedures were O.K. and specific and that the specific activity of air samples can be measured.

Both Dr. Holoday (USPHS) and Neuman requested that a committee be formed to see about following up on the present uranium burden cases; two apparently have died recently. This committee would also advise on the urine/body burden index figure. Dr. Western pointed out that that was what this committee was for, but I detected no great enthusiasm for service.

After lunch, Dr. Western recapitulated and then asked what item should be reportable and at what level. Dr. Quigley said that he wanted no part of a "magic number" because for a long time (15 years) they have had natural uranium in the urines of their workers without any signs

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of toxicity or medical trouble. If forced to, however, he would say 180 ug of natural uranium/liter of a Monday morning urine sample-- the first voiding after the arisal void. This brought a lot of comments and discussion of when and how to collect, the effect on the work force, special pay, number of samples, etc. The gist of it was that there was no standard method for collection at present, as convenience and work schedules were the prime determinants.

Dr. Quigley also reported that people exposed to 70 d/m in air do not show urine contamination in excess of the above 180 ug/l which is equivalent to 230 d/m/liter (250 ug/day and 350 d/m/day assuming 1500 ml/day output). At 70 d/m people ordinarily show about 30 ug/liter on Monday a.m. samples. This was followed by several computations intended to relate air to urine to MAC. No one was happy with this.

The idea discussed most was to collect a sample of urine 24 to 48 hours after being away from the dusty environment and using this to indicate what the equilibrium depot value would be if the worker were off the job long enough for all the transient stuff to be excreted; it was recognized that the extrapolation was from the steep part of an exponential curve, but they seemed to be willing to do this. The idea of standardizing this was brought up because the conscientious group would be penalized, while the sloppy one might not; this led to the idea of their getting trapped in the part 20, and they all backed off.

Newman suggested that what should be reportable was "excessive exposure" data, not body burdens. This was acceptable, and they finally agreed to: Three valid samples are to be obtained at intervals of at least one week and after 24 hours off the job within a 6-month period. For reporting purposes the values will average 350 d/m/day or its equivalent.

At this point I said that I would have to take exception because the water and metal clearances were not parallel. All agreed that this was so, and Quigley spoke strongly in favor of a 24-hour sample (which I would agree to), but no one had any stomach for trying to get the workers or the plant operators to do this.

It was 5:30 by this time so Dr. Western asked them to take this statement with them and think it over. No definite future plans were made, so we left by the same door we went in.

One thing we can do is to direct Rose, Marinelli, Cofort, K. Z. Morgan, and Anderson to work on this problem of whole body counting of uranium. About 130 ug of uranium in the chest can be detected by present studies.

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