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July 12, 1956

Dr. Charles L. Dunham
Division of Biology and Medicine
Atomic Energy Commission
Washington 25, D. C.

Dear Dr. Dunham:

Dr. Brues has referred your inquiry concerning the $RaSO_4$ inhalation cases to me.

These cases are characterized by an initially low Rn/Total Ra ratio, which approaches that found in the chronic case, .70, after a period of roughly two years (Case G). From Table I of the enclosed reprint it will be noted that the radium in the lung relative to that in the total body diminishes with time. Evidence obtained from Case G at 241 and 264 days, at which time the patient was lying on his side and was scanned from front to back, indicates considerable radium concentration in the sternum and backbone (Fig. 8 in the reprint). From the scanning curves more than 90% of the radium detected when scanning the lung on these dates actually appears to be in the skeleton. This implies that at least part of the radium listed as being "lung radium" in the earlier measurements may actually be in bone. Thus the value of .69 for the Rn/Total Ra ratio in Case G may indicate the absence of radium in the lung, all the body radium being present in the skeleton. If this supposition is true, then the radium deposited in the lung has been eliminated at the end of two years. This does not imply merely a translocation of radium from the lung to bone, as the bulk of radium removed from the lung is excreted.

The radium retention in the lung as a function of time appears to have a slope greater than -1.0, which is somewhat peculiar behavior for radium in vivo. The half life in the lung varies from 25 days, a few days after inhalation, to about 100 days some 300 days after inhalation.

The enclosed table of Case G represents the longest period for which data are presently available (1012 days). It is hoped that the Cincinnati people may be measured again within the next few weeks. If so, then the data may be extended to approximately 5 years.

If we may furnish any other data we would be most pleased to do so.

CONFIRMED TO BE UNCLASSIFIED
AUTHORITY: DOE-DPC
BY E. B. BARNES, DATE:
EB Barnes 4/18/84

Respectfully yours,
Philip F. Gustafson
Philip F. Gustafson
Division of Biological
and Medical Research

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PFG:yv
Enclosure

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DATE ON INHALATION OF RaSO₄ BY HUMANS (G)

<u>Days After Exposure</u>	<u>Body Burden</u>	<u>Rn / Total</u>	<u>Total Excretion*</u>	<u>Excretion As % of Body Burden</u>
3	0.338 µg	0.27	206 x 10 ⁻¹⁰ g Ra	6.1%
13	0.252	0.12	43.9 x 10 ⁻¹⁰	1.74%
35+	0.282	0.18	32.5 x 10 ⁻¹⁰	1.15%
35**	0.200	0.25	32.5 x 10 ⁻¹⁰	1.62%
102	0.097	0.31	7.8 x 10 ⁻¹⁰	0.8%
235	0.042	0.52	2.2 x 10 ⁻¹⁰	0.52%
622	0.023	0.69	0.2 x 10 ⁻¹⁰	0.087%
1012	0.017	0.66	0.13 x 10 ⁻¹⁰	0.077%

*Based on 35 g dry weight of feces and 1250 cc urine per day.

+Based on Rn-gamma ray activity.

**Based on body burden at 3 days minus intervening excretion.