

January 13, 1964

Miss Hilda M. Reitzel  
The Library  
Mine Safety Appliances Company  
J. Ryan Memorial Laboratory  
100 North Braddock Avenue  
Pittsburgh, Pennsylvania (15208)

Dear Miss Reitzel:

I am not certain as to the scope of the observations that have been made experimentally or in industrial establishments, with specific relation to lead acetate, and I am not delaying to find out, by the examination of the bibliography available in our library before replying, for there are certain facts and principles which apply to this and to other compounds of lead which tend to make any blanket expression of tolerance unacceptable. None of our figures are strictly applicable except in relation to the conditions that have applied to them as they were observed in industry or in the laboratory. They are rules of thumb, which should not be taken too seriously, except as guides to monitored practice.

With the foregoing statement in mind, I think you may take it that the standard which applies to lead fume (which is mainly lead oxide, probably principally the sesquioxide) is approximately correct, and that it is applicable to the fairly readily absorbable compounds of lead which reach the pulmonary membrane in particulate form.

The thing that has the greatest physiological weight in this matter is the size of the air-borne particle. If (as a compound of lead) it is somewhat less than 1 micron in diameter, it will reach the pulmonary membrane. In a mixture of sizes, many of those greater than 1 micron in diameter will fail to reach the lung, and the larger their size, the smaller will be the proportion that will reach the lung. Those which are caught in the larger air passages and are moved up to the nasopharynx, will be swallowed, or expectorated, and so will have a much poorer chance for absorption.

Lead acetate will be readily absorbed in the lung and will therefore be dangerous in proportion to the relative quantity of air-borne particles that range downward from 1 micron in diameter.

In general the present tolerance has been set up on the basis of experience in the more dangerous occupational conditions, and for that reason it is not grossly unsatisfactory as a rule of thumb. But for this fact, I would have no use for it at all, for it does not define these conditions, and it is indeed a crude affair. We have been obtaining information in relation to much more precise specifications as to compound and size of particle, but much more work and a much longer time will be required if the field is to be covered. Meanwhile, we shall have to be content, for our practices in industrial hygiene,

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with the present standards. The latter have not been improved very much by the inclusion of some statements about certain "insoluble" compounds of lead since there are virtually no quantitative data in support of the latter. I do not say this to be critical, for the effort made in this direction had some justification, but rather to make the point that the whole thing is crude and pragmatic, and the differentiation of this crudity into degrees of crudity smacks a bit, scientifically speaking, of "gilding the lily."

Cordially yours,

RAK:vr

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Robert A. Kehoe, M.D.