

September 8, 1954

Mr. A. J. Baldwin
Mr. L. R. Fleck
Ethyl Corporation
100 Park Avenue
New York City 17

Gentlemen:

I send you herewith copies (extra copies to Mr. Fleck) of the analytical findings on the hose lines sent some time ago. (The results were sidetracked through some vagary of the vacation period.)

The further copies can be dealt with as you may desire.

Your critical consideration of the data and the interpretation are invited.

It is possible that we may wish to carry these observations further. I have asked Mr. Cholak to study the effects of passing air through a segment of this hose, then to clean it with dilute acid and water (on the inside) and to repeat the observations. After that we shall see what, if anything, might be done further.

Cordially yours,

Robert A. Kehoe, M. D.

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INTERPRETATION AND COMMENT

The samples were so chosen and analysed as to portray, if possible, (1) the influence of external contamination of the hose with tetraethyl lead; (2) the extent of the penetration of tetraethyl lead into and through the rubber, thereby giving rise to contamination of the interior surface (and air passing through); (3) the extent of the contamination of the inside of the hose at the point of the break in its structure; and (4) the extent of deposits of particulate lead (decomposition products of tetraethyl lead and/or other possible compounds of lead in particulate form) on the outside and the inside of the hose. That is, if sufficient differences in the quantities of tetraethyl lead and its decomposition products and of inorganic lead could be found at various points represented by the samples, it might be possible to discover the nature and origin of the contamination, whether by penetration of tetraethyl lead through the intact rubber or by the entrance of sludge and/or other foreign material into the lumen through the break in the wall of the hose.

The following conclusions appear to be justified:

1. It does not appear that the interior of this hose line was contaminated with organic lead to any very much greater extent at the break than at the other point. Such contamination as occurred appears, therefore, to have been the result of the penetration of organic lead through the rubber structure of the hose.

2. The contamination of the inside of the line with organic lead was greater than that on the outside, this fact tending to support the conclusion arrived at in (1) above, and indicating that the cleansing of the outside of the

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hose from time to time had reduced the external contamination.

3. The meaning of the results on inorganic lead is not clearly evident, since the amount of inorganic lead in newly manufactured hose is unknown. It is probably a significant amount, and it may not be much less than the lowest analytical value obtained, i. e. 15.9 mg. per foot of hose. The highest value obtained on the outer part of the hose is probably an expression of the uneven external contamination of various outer parts of the hose line. The essential uniformity of the results obtained by the analysis of the two inner samples indicates that the break in this hose was not a factor in its internal contamination. One might make the guess that the inorganic lead found in the inner portion of the hose is the combined result of some initial quantity of lead which entered into the original composition of the hose, plus some quantity of the decomposition products of tetraethyl lead which penetrated through the rubber wall of the hose, plus some considerably greater source of lead deposits on the internal surface of the hose.

On the whole, it is scarcely credible that a hose line containing the quantities of volatile lead found by these analyses, could continue to yield from its inner surface to the air stream flowing through it, such quantities of lead as to contaminate the air to any significant extent.

It is believed that if such a hose line as this were cleaned in the ordinary manner, by being washed inside and out with a stream of water, and then dried out by a stream of air, it would not give rise to a significant amount of contamination of the air flowing through it at normal velocity. This is to say that, in our opinion, a significant degree of contamination of the air in such a hose line would be an expression of foreign material

from some source in one or another length of hose, rather than from the penetration of tetraethyl lead from the sludge through the wall of the hose.

Some further observation will be made to test this opinion.

It seems likely that hose lines should be inspected carefully, cleaned inside when necessary, and discarded when they begin to go to pieces. Further comment will be forthcoming on this procedure when the further observations have been completed.

Signed:

Robert A. Kehoe
Robert A. Kehoe, M. D.

September 3, 1954

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