

September 28, 1960

Air Mail

K. Akatsuka, M.D.  
c/o Tokyo Medical College  
412, 1-chome, Higashi Okubo  
Shinjyuku-ku, Tokyo, Japan

Dear Doctor Akatsuka:

Mr. C. D. Carter of Ethyl Corporation has passed along to me your recent request for a report of our "original investigation on TML itself or on its mixture on sale." In response to this request, I am sending a copy of a report which is a brief summary of work done in this Laboratory some years ago on a series of Lead Alkyls. This will not provide you with all you may wish to know about TML, and it will give you no information on the product which is being distributed as a mixture of TML with other materials to provide an antiknock compound for addition to gasoline.

We are engaged in a fairly comprehensive program of investigation of the toxicological characteristics of TML, in which we are concerned, not with its immediate toxicity as revealed by its administration by various routes in the body, but with the much more important facts concerning its fate in the organism under varying conditions and over varying periods of time. This information will be needed ultimately, although it is not absolutely required now to enable the material to be used properly and safely for its intended purpose. Such long-term alterations of the procedure and program of medical supervision and industrial hygiene in the manufacturing and blending operations, as may ultimately be required will come out of this work. Meanwhile, we think it satisfactory to rely upon the medical and hygienic controls that have been applied to TEL, reinforced by the alertness of the medical and hygienic personnel to observe anything of unusual character in the situation.

We have not issued a report of the investigations that are now in progress, and we do not expect to issue these in any formal manner, bit by bit, as the work is being done. Such work takes time and it must be checked and rechecked in a critical manner before being reported in detail. I trust that you and all others who are interested will be patient, and will recognize that the issuance of bits and pieces of information will not help much on the performance of the day's work. On the contrary, they might be misconstrued and so cause confusion.

The essential matters to be considered are these:-

(1) TML is analogous to TEL in its toxicological characteristics.

(a) It is, however, much more volatile than TEL, and, therefore, it will be found in higher concentration in the atmosphere than will TEL under comparable methods of handling. This volatility may affect the manufacturing operations and those concerned with mixing the product with gasoline. The precautions taken in the case of TEL will need to be applied with care and persistence in dealing with TML, for failure to abide by the precautions with meticulous care will result in a greater exposure when TML is being handled than would be the case if only TEL were being handled.

(b) TML is absorbed through the skin much more slowly than is TEL. If, therefore, the precautions against contact with TEL or with concentrated solutions or mixtures of TEL or other media are extended to TML, the result will certainly be satisfactory.

(2) All in all, the hygienic problem in connection with the handling of these materials is that of the avoidance of their absorption. This we know how to do in all of the areas of industry. We lack precise specifications as to the concentration of TML in air that is entirely safe for men who work through the usual industrial hours per week. This is the type of information that requires time for its provision. Meanwhile, respiratory exposure is to be avoided as fully as possible.

(3) It has been accepted as a stern necessity that gasoline containing lead alkyls must be safe for general handling in the manner that is characteristic of modern commerce, from the aspect of exposure to lead. This, therefore, was the problem which had to be investigated in a strictly practical manner before TML could be approved (medically and hygienically) for commercial use. This was the one question that had to be answered. This has been done and the facts have been made available in a formal report of The Kettering Laboratory. There is no reason to doubt that gasoline containing TML can be handled in ordinary commercial operations without actual risk, from the aspect of the absorption of lead. With this question answered, it is believed that the other questions of industrial medicine and hygiene can be left to be answered in due course, as the prolonged investigation required to elucidate the physiologic mechanisms is prosecuted.

Cordially yours,

Robert A. Kehoe, M. D.

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Enclosure

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