

November 25, 1960

Mr. Erich Schmidt S.
Seccion de Higiene Industrial
Direction de Salud Publica
Ministerio De Sanidad
Caracas, Venezuela

Dear Mr. Schmidt:

I am pleased to have your letter of November 15th, and to reply to it as fully as I can. Before going into your questions, however, let me clarify my professional relationships, insofar as they relate to lead antiknock compounds, so that there may be no doubt in your mind or in that of your governmental associates as to my position in the matter.

I have been the medical and hygienic advisor of the industries concerned with the manufacture of tetraethyl lead in this country and also in England since this material was put into use. Since 1945, when du Pont entered upon the distribution of this compound (prior to that time this Company was manufacturing the product for Ethyl Corporation), I have had no concern with their operations. Also, since about 1948, I have had only a nominal advisory relationship to The Associated Ethyl Company, Ltd, of London. I continued to be the Medical Director of Ethyl Corporation until December 31, 1958, having reached the age of retirement during that year. I have continued in a consultation relationship, largely because of the developments that brought tetramethyl lead into the commercial field.

Quite apart from the relationships indicated above, however, and as the base for my primary professional and scientific work, I have directed this Laboratory and Department, and have guided the general study of the behavior of lead, and the specific investigation of the alkyl lead compounds for many years. This work has been supported by Ethyl Corporation and, to a lesser extent, E.I. du Pont de Nemours and Company. This Laboratory, as you may or may not know, was founded in this University in 1930 to investigate problems brought to it by industrial organizations, and a goodly number of such organizations have been the sponsors of various investigations over the years. Under the administrative authority of the University, we accept funds from industry primarily, and to a lesser extent from public and other private sources, for the conduct of research and professional training in occupational medicine.

I recite these facts only because the question has been raised from time to time, by persons who have had "an axe to grind", as to whether I and my associates are trustworthy investigators, or whether we serve the interests of industry. So much for these matters. I have nothing to conceal and I want my activities to be known and understood.

Now to answer your questions. I shall deal with them in your sequence.

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hazard associated with an increase in the concentration of TEL in gasoline. The problem lies almost wholly in the field of air-pollution, since the real question relates to the extent to which there would be a significant incremental increase in the lead in the atmosphere from the exhausts of motor vehicles. We supplied evidence on this matter to a special committee appointed by the Surgeon General of the U.S. Public Health Service. This evidence is presented fairly fully in the Publication No.712, referred to in your letter, but is presented more extensively in a report which I am sending to you. It was my view that this evidence demonstrated conclusively that no problem existed. I think I should point out, however, that we expect to continue the investigation of the problem in the future, so that we shall be able to observe any changes that may occur and be prepared to deal with them. Moreover, the U.S.P.H.S. has set up a program for gathering information for itself along these lines.

I believe it is fair to say that any possible public risk in this situation is greater in this country than it is likely to be elsewhere, therefore, if it should develop that we are approaching a point of potential danger, this would serve as a warning and a guide to the hygienic authorities elsewhere well in advance of any difficulties. We shall, of course, publish the results of our investigations.

(b) There is no special problem in the regulation of the use of tetramethyl lead. Those which apply to TEL cover TML as well. It is proper to say that because of the greater volatility of TML the precautions advised in the case of TEL should certainly be followed faithfully. That is, there should be no relaxation in the efforts made to prevent or avoid exposure. However, so far as the handling of gasoline containing appropriate concentrations of TML is concerned, there is no special risk. This is precisely the point of our field investigation, and in my view, the negligible character of this hazard has been demonstrated. However, we are carrying out a continuing survey of the operations involved in the commercial distribution of gasoline containing TML, in order to take the time factor into account, and to supply the final proof for what we believe to be true.

(c) The maximum concentration of TML in motor gasoline in the U.S.A., is to be 2.06 ml. per American gallon. This is equivalent in its lead content to that of gasoline containing 3 ml. of TEL per gallon. In view of the fact that TML had never been used previously, and that no commercial experience had been had with it, we believed it wise to limit its use, at least for the present, to this level, rather than to the equivalent of 4 ml. of TEL. Incidentally this is not regulated by any legal provision or by any governmental agency, but rather by the manufacturers and distributors of lead antiknock compounds. In my view this is a better way to handle the matter than by specific laws, but your people may feel quite differently about this. What is done here is that the industry follows the recommendation of its medical advisors, and communicates its decision to the Public Health Service. The latter has no power to regulate, but it can express its opinion informally; such an opinion, of course, is very likely to be heeded as a matter of wise policy. It is also within the province of the Service to recommend appropriate action by the individual

States, where the authority to regulate exists. Should this prove to be needed there is no doubt that the Service would so act.

(d) The lead compounds proposed for use or actually in use in the U.S.A., will consist mainly of TML and TEL, but there will also be some use of a mixture of the analogous compounds composed of these two alkyl radicals in various proportions, as tri-, di-, and mono-methyl in association respectively with mono-, di-, and tri-ethyl radicals, in combination with tetra valent lead. These compounds, as a group, are similar from the toxicologic viewpoint, but they vary from each other in volatility, TML being the most volatile and TEL, the least. In my opinion, they can all be covered by the same regulations, except that I would consider it advisable that the concentrations of tetramethyl lead, trimethyl-monoethyl lead, and di-methyl - di-ethyl lead in gasoline singly or in combination, should not exceed the equivalent, in lead content, of 3 ml. of TEL. The simplest regulation to this effect would be to specify that the total lead content (Pb) of the combined alkyls should not exceed that of gasoline containing 4 ml. of TEL, but that these more volatile components may not exceed that of gasoline containing 3 ml. of TEL.

I do not believe that any regulation should indicate or imply that any other lead alkyls than those listed above can be substituted for TEL.

(e) As it happens, there is no hygienic literature in support of the program which I am advising, except that supplied in the Public Health Service Publication and in the reports of the Laboratory. I am sending three reports of this Laboratory to you. We are conducting an extensive investigation of the long-term effects of the exposure of experimental animals to low concentrations of TML. These are designed to demonstrate to us, indirectly, the nature of the occupational hazard associated with the manufacturing operations. Reports of these investigations will be made available when they have been completed, or when significant facts of practical importance have been disclosed. Nothing that we have learned at present is very different from that which we know about TEL. We have no reason to believe, therefore, that there is anything strange or unusual to fear in substituting TML for TEL in gasoline within the limits of comparable concentrations.

From the aspect of the technical usefulness of TML in certain situations, there is apparently much to be said. If you want information along this line I can obtain it for you. It appears, however, that there is no great likelihood that TML will supersede TEL for general use. Presumably it will be used in the petroleum industry where it will be beneficial, sometimes as a substitute for TEL and sometimes as a supplement to it. I cannot advise you on these matters, but I can obtain such information for you. I have learned enough from the technical people to be convinced that there are sound technologic and economic reasons for the use of TML on a limited scale.

If I can be of any further assistance to you and your associates in dealing with this matter I trust that you will feel free to call upon me.

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