

July 30, 1963

Dr. Rupert Scott, Chief Medical Officer  
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Shell Centre  
London, S./E.1.  
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Dear Doctor Scott:

It was pleasant to hear from you for any reason, and I am glad to give you as good answers to your questions as I can. Since I shall be in London (and environs) in September from the 7th to the 14th, en route to the International Congress on Industrial Health in Madrid, any further aspect of this matter might be discussed more fully then. If this turns out to be useful and feasible, you might let Ray Bevan know your wishes, for I shall, as usual maintain contact with him while I am in London.

The matter of the contamination of the inside surfaces of road tankers with lead, as the result of the transportation of leaded gasoline, is an old problem, which has not been understood fully by many people. The question as to whether and by what means these can be cleaned has been put to us frequently and for the same reason. It applied first to rail tank cars, and I have never been able to see how these - of the common type used in this country - could be cleaned thoroughly. Nevertheless, after a certain type of cleaning (whether good or bad, is as difficult to determine as it is to maintain in a uniform manner) these at times have been used to transport fish oils and various other (relatively crude) cargoes. No serious consequences have resulted. This has not altered my view of the undesirability of this practice, but it can be taken for what it is worth as evidence that there is little risk. (It is not worth very much.)

A second situation has concerned itself with road tankers of special construction to be used for transporting gasoline in one direction and grain in the opposite. We have given some aid and advice in more than one situation of this type, and there is no doubt, in my mind, that this is feasible if sufficient care can be taken to insure reasonably satisfactory cleaning. The idea of using stainless steel tanks for this purpose has been advanced and followed, apparently with satisfactory results.

The problem is not what your question suggests, in that it is not tetraethyllead or tetramethyllead which one fears as a contaminant, but rather the decomposition products - solid crystalline, mostly triethyl (or trimethyl) compounds of lead. The tetraethyllead or tetramethyllead will not separate out of gasoline (in which they are dissolved). Actually it is difficult to separate either of

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these dissolved compounds from gasoline. However, these compounds, especially tetraethyllead, decompose slowly and as they do so the crystalline decomposition products, which are less soluble in gasoline, separate out on the lateral and bottom surfaces to which they tend to adhere. On a surface on which rust is forming these crystalline compounds collect and become part of the rusty scale. They occur in low concentration (usually a few hundredths of one per cent) in the rust, but if the surface of the tank is large the total quantity is appreciable and the contamination of the contents of such a tank (especially liquid contents) may be significant.

On the surface of stainless steel the situation is different. Such surfaces if made smooth at the start do not corrode so as to become pitted or roughened. Very little material deposits on them in a single trip, and if they are cleaned properly and regularly, they will not yield much contamination to their contents. The whole problem here is one of proper cleaning, and if this can be attended to reliably, there should be no difficulty. The steps of the cleaning process are relatively simple. First, all gasoline must be removed (the lead dissolved in the gasoline will be removed with the gasoline which is drained out; only if the gasoline is vaporized will any residue of lead be left behind). Every effort, therefore, should be made to design such tanks so that they can be emptied completely, without residual gasoline. When this has been done the residual vapor can be removed by filling the tank with water, thus displacing the gasoline vapor, or by steaming. The steaming, however, will not remove the lead deposited on the inside surface of the tank. This can be removed by washing - preferably pressure hosing - with water until all residue in the tank has been removed.

It would be wise first to clean one of these road tanks that had been in use, at a point where the cleaning can be supervised and investigated, thoroughly. By this means one can determine what procedure is required to secure a satisfactory result, and then put this procedure into use wherever it is required. As I have indicated, this can be done. The question to be raised in practice is "will it be done, and properly?" Where this question can be answered in the affirmative it is alright to proceed. Where it cannot be so answered, the effort should not be made.

With respect to plastics, the problem is not whether there will be deposits on them, but whether they will absorb the lead alkyls. Natural rubber will absorb tetraethyllead, and I have no doubt that certain plastics will do so also. Some on the other hand, will not. I do not have the information concerning a variety of plastic materials at hand, but I shall inquire about them and pass along to you such information as I can obtain. All I can say at the moment is that one must determine the facts in each case. A fair number of observations were made years ago in the Detroit Laboratory of Ethyl Corporation in order to obtain the information required to enable them to select suitably impervious fabrics for use in gloves and other protective garments - aprons, boots, complete suits, etc. I shall find out what, if anything, has been done since to extend these observations. Meanwhile, if I

July 30, 1963

were you, I would not advise the use of any plastic coating until it has been tested for its ability to absorb and retain ( or to resist penetration) tetraethyllead and tetramethyllead.

With respect to the risk to personnel involved in cleaning the road tankers (or other tanks) by the methods which I have outlined, it should not be necessary, it seems to me, for men to enter these tanks. Certainly no one should do so without the complete respiratory protection provided by air-line (pressure) masks. Otherwise, it is necessary only to avoid excessive exposure to the vapor of gasoline, and if this is done satisfactorily there should be no other problem. Obviously these tanks should not be entered (when free of gasoline vapors) for scraping, polishing or any type of repair or maintenance, without complete respiratory protection, unless they are known to be clean and free of surface contamination with the decomposition products of tetraethyllead or tetramethyllead.

I hope this letter will serve your purposes and enable you to discuss this matter with your people and bring it to an appropriate conclusion.

With kindest regards.

Sincerely yours,

Robert A. Kehoe, M. D.

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