

MEMORANDUM ON THE USE OF TETRAETHYL LEAD

BY Braden Copper Company

The use of tetraethyl lead for purposes other than as a motor fuel might not, at first thought, be regarded as a matter of consequence to Ethyl Gasoline Corporation. As a matter of fact, however, such usage under improper or hazardous conditions, or in such a manner as to result in cases of poisoning cannot fail to react unfavorably upon the business of Ethyl Gasoline Corporation, and also upon its reputation and good will, if the conditions resulting in the misuse of the product were known and subscribed to by the Corporation. Accordingly it becomes necessary to scrutinize carefully, from an hygienic viewpoint, the means and purposes concerned in the use of the material, to see, first, whether or not there are uncontrollable dangers, second, whether or not the necessary precautions for safety are taken if such are feasible, and, third, to determine whether or not the risks are justified by the technological advantages which are anticipated.

1. Toxicological Considerations.

A. The admixture of tetraethyl lead with a solvent, such as kerosene or Diesel oil, induces risks which obviously would require handling by means similar in principle and in detail to those employed in mixing Ethyl Fluid with gasoline. Details of necessary instructions and precautions are available elsewhere (See Regulations of Medical Department)

and need not be discussed here. Proper precautions could, of course, be taken but it would be incumbent upon the Ethyl Gasoline Corporation to see that they were actually and effectively used, if the material were made available on its responsibility.

B. The handling of a solution of tetraethyl lead in oil, or other solvents, involves two definite risks which vary in magnitude with the concentration of the solution, namely, lead absorption through the skin as the result of contact, and lead absorption by inhalation of vapors rising from the solution. Concentrations of 10 to 30 % of tetraethyl lead in such a solvent will provide serious hazards which are entirely uncontrollable except as the solution be handled in an entirely closed system, and one which would not require break-down and repair. Skin contact with such material would be prohibitively dangerous, and the hazard from inhalation at leaks and other points of entrance and exit would be acutely grave. Lower concentrations would impose somewhat lesser risks but there is no reason to believe that these would be reduced to negligible proportions until concentrations approaching those employed in commercial gasoline were reached. Certainly no concentration higher than 0.1 % should be used under conditions that require or permit of skin contact with the solution, or with equipment (pumps, pipe lines etc) contaminated by the solution. It must not be assumed that an oil containing from 25 to 50 cc of tetraethyl lead ^{per gallon} can be safely handled. This solution is from 8 to 16 times as concentrated as the highest permitted in automobile

fuels. Safety in the use of such a solution would depend entirely upon the manner of its handling and use. It is apparent, therefore, that the details of the projected use of the material are required before any basis for judgment as to the magnitude of the hazards is provided.

2. Practical Considerations.

As a means of reaching a conclusion as to the feasibility of the proposed operations, from an hygienic viewpoint, the following details should be investigated thoroughly.

A. In what type of container is the solution of tetraethyl lead to be supplied to the purchaser, and what means will be employed to identify the product so as not to permit its inadvertent use for other purposes?

B. By what means is the container to be emptied and to have its contents introduced into the pulp?

C. What routine and inescapable precautions can be and will be imposed to provide protection against exposure by skin contact and inhalation, as the solution is conveyed from the container into the pulp, and as carrying lines, pumps, and tanks are repaired or otherwise maintained?

D. What is the eventual diluent of the oil solution in the flotation process? Water?

E. Into what portion of the flotation products does the tetraethyl lead go? Is it found in the filter press? In the tailings? In the wash water? Or to some degree in all? If so, to what degree?

F. To what extent are workmen exposed to these different products of the process?

G. What is the final disposition of the tetraethyl lead? Does it go into the furnace to be decomposed thereby to inorganic lead compounds? Does it go into a sediment lake or settling basin? If so, what opportunity exists for it to collect in considerable amount in a place from which it will eventually be removed by workmen in cleaning up wastes? Does it go directly with waste water to a lake or stream, and if so to what use is this water supply put, and what is the eventually anticipated concentration of lead in such water supply?

3. Recommendation

It is suggested that a detailed description of the process be obtained and subjected to critical study. If such a description seems to show that the risks postulated in the foregoing paragraphs do not exist, the Corporation may be in position to permit the use of its product. If questions of hazard still remain after a study of operating procedures, such questions might well be submitted to the Medical Department for further consideration and advice.

Signed:

Robert A. Kelm
Medical Director