

In the past few years experience has again emphasized the need for continuing ^{the} precautions in the cleaning of tanks that have contained leaded gasoline, particularly those that have been used for blending. It was pointed out to you last year, and you are undoubtedly aware that ^{despite} the innocent and ^{relatively} harmless character of contact with leaded gasoline as the material is distributed in commerce from the point of view of lead absorption, there exists a definite hazard in so far as the cleaning and repairing of storage tanks is concerned. We have been concerning ourselves with the study of this problem for the past two years, our study having been so arranged as to include detailed observations on some 300 refineries and mixing locations in the United States and some 2500 to 3000 tanks. Our study is not yet complete and we are consequently not in a position to offer a final solution or explanation of the origin of the hazard. It became apparent, however, very early in our study that by far the largest proportion of lead which found its way into refinery blending and storage tanks had its origin from the litharge used in treating. In some instances this litharge contamination resulted in very ^{large amounts} ~~high~~ results ^{practically} for lead in tank sludge. In all instances of tanks located at refineries where litharge treating was practised, there was definite evidence of litharge carry-over into blending and storage tanks. This litharge contamination was so great in most instances that quite a problem was created in measuring the increment of lead which may have been added from the Ethyl Fluid. Some idea of the relative importance of these two factors may be gotten from consideration of the mean value for lead in sludge from tanks located at

refineries where litharge treating is carried out and for those tanks which have not been used for blending and which were not located at situations where litharge was used. In the litharge-contaminated tanks the mean value was in the neighborhood of 5%, with some results running as high as 20% lead in sludge. In the other group, the mean value was ~~well~~ below 1%. It is apparent, therefore, that in the past we have tended to underestimate the importance of litharge contamination of tanks and that a significant potential hazard exists in many situations. We may consider the above hazard a more or less normal or inevitable consequence of the employment of litharge in treating of gasoline. There is however another hazard of irregular and infrequent occurrence which in all likelihood gives rise to a hazard disproportionately great when tanks are entered for cleaning. I refer to the improper mixing of Ethyl Fluid with gasoline. Ethyl Fluid which is improperly mixed with gasoline or which is piped directly into tanks may by virtue of its higher specific gravity stratify or settle to the bottom of tanks. This danger is particularly great in tanks which normally carry a water bottom, in that the Ethyl Fluid may lie for long periods of time excluded from air beneath the water level. In the past practises of this type were not as uncommon as they are today and there is much reason to believe that one of the great dangers which may be encountered in tank cleaning will be eliminated after all of the older tanks to which lead may have been added in one of the above methods will have been cleaned.

We are not yet prepared to report on the possible exposure

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which may come about in tanks which have been used for blending and storing leaded gasoline, exposure which may conceivably arise from the slow decomposition of tetraethyl lead in the mixed gasoline or from the frequent carry-over of small amounts of sludge entrained with the Ethyl Fluid. At the present time therefore, in view of the many potential dangers encountered in cleaning gasoline tanks, most important, ^{that is} petroleum vapor, the presence of varying amounts of lead residues from litharge and the possible occurrence of lead compounds remaining from previous improper blending methods, that the use of air-line respirators and protective clothing should be considered standard safety equipment in tank cleaning procedures.

With the often inadequate knowledge of the history of the tank in so far as blending procedures are concerned, and uncertainty as to the lead content of the sludge from litharge carry-over, real safety can be achieved only by strict adherence ^{to} ~~and~~ procedures similar to those laid down by the American Petroleum Institute and the principal oil companies, as well as the added safeguards recommended by the purveyors of Ethyl Fluid. Complete understanding of these procedures, the reason for their existence, their rational and the most effective means for carrying them out should be part of the safety instructions of each workman who may be engaged in tank cleaning.

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