cc: Dr. R. A. Kehoe

Memorandum to: March 17, 1944

Dr. George Calingaert.

Subject: EVAPORATION OF LEADED FUELS

The general problem is the determination of the toxicity hazard in areas where an unusual amount of leaded fuel is spilled. For example, definite hazard exists in places where leaded gasoline is filled into cans and drums. At any given temperature, and assuming equilibrium conditions, it is possible to compute approximately the distribution of lead and the amount of air necessary for the vaporization of any fraction vaporized of the gasoline. However, there is no way of evaluating how close actual conditions approach equilibrium and there appears to be no data on the subject.

The following experimental set-up is suggested for obtaining a quantitative measure of the effect of various factors on the approach to equilibrium. Two pure liquids considerably different in volatility, such as pentane and toluene, are suggested for the test. The apparatus should consist of a fairly large chamber, say of about a cubic foot in volume, containing a shallow vessel for the test liquid, in the bottom. Air should be introduced so as to simulate natural conditions of ventilation, with suitable shielding of the liquid from direct air currents. The air is most conveniently metered on the input side and passed through a cold trap on the output side, in order to provide a convenient method for measuring the fuel vaporized. In later possible extensions to leaded fuels, the distribution of lead in the cuts could be compared with former equilibrium values.

Several combinations of different conditions will be necessary before the effect of the various factors can be elucidated. For both pure liquids, two temperatures, 0° and 40°C., are suggested for the preliminary investigation; also three air rates, corresponding to poor, average, and very good ventilation practice. Probably the most important factor will be the design of the chamber, so several types of baffling should be tried.

With this information available as a guide, the direction or necessity of further experimentation should be readily determinable.

George W. Thomson

George W. Thomson

T:C