June 7, 1933.

Captain E. L. Bergquist,
Station Hosptial,
Air Corps Advanced Flying School,
Kelly Field, Texas.

Dear Captain Bergquist:

I have your letter of June 3rd and will endeavor to answer your questions to the best of my ability.

1. ETHYL FLUID contains tetraethyl lead and an organic halide (in the avaition fluid the halide is ethylene-di-bromid, and the proportion of tetraethyl lead to ethylene-di-bromid is that theoretically required for complete combination to form lead bromid). In the combustion, it is believed that the tetraethyl lead burns to lead oxide and the halide to acid, these two then combining to form lead halide. This material is largely volatilized out of the cylinder itself and is partially deposited in the exhaust system and partially blows out with the exhaust gases.

2. There is no evidence that there is any material difference in the chemical reactions in the fuel between automobile motors and airplane motors.

3. Tetraethyl lead is extremely easily oxidized and I do not believe that there is any possibility that unburned tetraethyl lead can come out of the cylinders.

4. The experimental determination of the quantity of lead in exhaust gases is extremely difficult since, at least, a part of the lead is then in a very finely divided solid state which permits it to pass through most scrubbing systems. An electrical precipitator of the Cottrell type would probably be most effective.

I am sending you, under separate cover, a report of the Bureau of Mines in which some work was done on this problem and also a report of the British Investigating Committee in which the problem is discussed.

The concensus of opinion appears to be that if exhaust gas is diluted to the point where poisoning from carbon monoxide does not occur, the lead concentration is well below the limit believed to produce any physiological effects

June 7, 1933.

Capt. E. L. Bergquist
Kelly Field, Texas

The problem of the relation of tetraethyl lead to the public health question has been exhaustively studied by Dr. R. A. Kehoe of the College of Medicine, University of Cincinnati and I would suggest that you write to him if you have further specific questions.

Very truly yours,

Graham Edgar.

GE/LRJ

Copy to Dr. Kehoe