

ETHYL GASOLINE CORPORATION

CHEMICAL RESEARCH LABORATORY

7600 WEST EIGHT MILE ROAD

DETROIT, MICHIGAN

May 25, 1940

Dr. Robert A. Kehoe
College of Medicine
University of Cincinnati
Eden Avenue
Cincinnati, Ohio

Dear Dr. Kehoe:

Your letter of May 13 to Dr. Edgar, with respect to study of lead in the dust and atmosphere, has been referred to this laboratory and will be brought to Dr. Calingaert's attention on his return June 3.

I am sorry to say that a search of our files and questioning of the various people in the different laboratories here has failed to provide much in the way of information in this connection. The following points may be of more or less value:

1. Mr. Heron says that Dr. Edgar has information regarding work done some time ago by the Bureau of Standards to make a Cottrell precipitation of the exhaust gas, which failed to remove more than a small fraction of the lead content.
2. The Engineering Laboratory reports that in an automobile engine using 2 cc. TEL per gallon, 12% of the lead is removed in the lubricating oil; with 3 cc., 8% is so removed.
3. The carbon monoxide content of exhaust gas under normal conditions is about 1.5-2%.
4. Information is available as to the composition of the aqueous condensate from the exhaust pipe. However, the amount of such condensate in automobile operation is nil except under special conditions of cold weather and idling.
5. Information is available as to the composition of the solid deposits in the engine, etc. However, it is believed that the amount of such deposits formed in and blown out of the exhaust pipe is, relatively speaking, negligible compared with the total throughput of lead.
6. Although no data are available, our guess is that the relative proportions of lead bromide and lead chloride in the exhaust gas are about the same as the proportions of bromide and chloride in the fuel.

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7. The boiling points of lead bromide and chloride are, respectively, 916°C. and 950°C. Both, of course, are soluble in water. We calculate that the vapor pressure of lead bromide at room temperature is of the order of 10^{-18} mm., probably correct within a factor of 100. A rough calculation from this figure shows that it is quite impossible for the salt to be disbursed as a true vapor by evaporation into the air; therefore, it must precipitate, and settle out sooner or later as a dust.
8. We do not see much likelihood of being able to identify the lead salts as such in a mixture of dust taken from the air or surface of the ground. However, an indirect analysis for the water soluble lead salts should be obtainable by extraction of such dusts with a limited quantity of water in the complete absence of oxygen and carbon dioxide.
9. It has been suggested that analysis of the water from sewers and drain pipes, immediately following a rainfall, would be in order.
10. It has been suggested that effective removal of all metals, salts and acids from engine exhaust gas will be obtained most easily by passing gas directly through a scrubber packed with suitable material, such as glass cotton wet with water.
11. It is believed to be very doubtful whether any tetraethyllead ever is present in exhaust gas, even at the time of starting the engine, since the temperature reached on compression should be quite sufficient to decompose the TEL.

Very sincerely yours,



Harold A. Beatty

HAB:AMC

cc: Dr. G. Edgar

Dr. G. Calingaert