

ETHYL GASOLINE CORPORATION

RESEARCH LABORATORIES

723 EAST MILWAUKEE AVENUE

DETROIT, MICHIGAN

October 14, 1941

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Dr. R. A. Kehoe
College of Medicine
University of Cincinnati
Cincinnati, Ohio

Dear Bob:

I have your letter of October 11 in reference to the present status of the research on iron carbonyl.

Our present program on iron carbonyl at Detroit and San Bernardino is a fairly large one and is designed to throw more light on its effectiveness as an antiknock in different base fuels, the extent to which it increases engine wear and its possibility as an inhibitor of preignition in high compression engines when used in small concentrations with lead tetraethyl in gasoline. Because of the wide range of engines and operating conditions encountered in service, the evaluation of any one of these three phases of the general problem necessitates a large research program.

There is no doubt about the high effectiveness of iron carbonyl with respect to lead at the slower engine speeds where knocking is likely to be most pronounced. The situation with respect to engine wear is not so well defined. Under certain conditions of operation of single cylinder engines, the presence of iron in the fuel leads to quite definite increase in rate of wear whereas in cars on the road the smaller concentrations of iron in which the present interest centers seem to have little effect on wear. The situation with respect to spark plugs is in about the same category. The Battelle Memorial Institute found that zinc soaps tend to reduce the unusual wear attributable to iron when they are added to the gasoline but to date neither our chemical laboratory nor Dr. Gilman at Iowa State has been able to produce a stable organic zinc compound. It appears therefore that the inhibiting effect of zinc can not be brought about on a commercial basis.

In admixture with tetraethyl lead in the proportion of approximately three volumes of iron carbonyl to one of tetraethyl lead, iron carbonyl has completely eliminated preignition in a Chrysler car of abnormally high compression ratio whereas a concentration of tetraethyl lead which gives the same antiknock effect as the mixture invariably causes preignition at low mileage. At the present time car tests are in progress in

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which the volume of iron carbonyl is only one-sixth of that of the tetraethyl lead. If in these proportions the mixture should give the same performance with respect to the absence of preignition, the wear and spark plug problems undoubtedly will disappear. Incidentally, such an effect with respect to preignition would make iron more valuable than as a mere replacement for tetraethyl lead as an antiknock.

It is my own opinion that the health hazard problem in reference to iron carbonyl is not an urgent one but that any fundamental data that can be obtained without too much effort would be very much worth while. It would be unfortunate if we should continue to spend time and money on a large scale in the development of iron carbonyl only to find that the health hazard would preclude its use. It would be equally unfortunate to have a large scale medical program prove the practicability from a health hazard standpoint with later engine research proving the insurmountability of certain problems of utilization.

Sincerely yours

Earl Bartholomew

EB.p
CC: Dr. George Calingaert

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