March 23, 1936

Mr. W. V. C. Bulkeley
Asst. General Manager
Gulf Refining Company
Gulf Building
Pittsburgh, Pa.

Re: Scovill Mfg. Co.
Waterbury, Conn.

Dear Mr. Bulkeley:

Your letters of February 25th and 27th addressed to Mr. J. C. Taylor of the Ethyl Gasoline Corporation have gone without reply since the matter was referred to me at a time when I was compelled to be absent from my office for some weeks. I am sorry for the delay and I trust it will not have caused you undue inconvenience. In as much as this much time has elapsed, and since I do not know whom to address in your New York office, I am replying directly to you.

The lead content of the exhaust gas from motors using leaded gasoline up to the maximal commercial concentration is not sufficient to give rise to the danger of lead poisoning in persons exposed to the exhaust gas. Safety here is dependent upon two factors: (1) The concentration of finely divided lead particles is not unduly high, and in this instance in which only .7 cc of lead per gallon of gasoline is used, the lead concentration would be quite small; (2) exhaust gases are much more dangerous from the point of view of carbon monoxide than they can ever be from the point of view of lead. I am not quite certain as to the carbon monoxide concentration of the exhaust gas from tractors but in the case of automobiles, the carbon monoxide concentration is likely to be about five percent and may be as high as seven or eight percent, or even more under various conditions of operation. If the atmospheric conditions are maintained so as to be endurable to exposed persons, then exhaust gas must be diluted until the carbon monoxide concentration is at least as small as .03 or .04 percent. Concentrations of even this level are definitely unsafe for prolonged exposure so that these concentrations may not be permitted to exist for more than short periods of time in an enclosed place. An amount of ventilation which will provide safety from carbon monoxide exposure will obviate any possibility of significant lead exposure. Thus, if the building which you mention is ventilated so as to be safe from the point of view of carbon monoxide, you need have no fear of the hazards of lead exposure.

Mr. W. V. C. Bulkeley

I think it will be apparent to you that to procure the dilution of exhaust gases which is necessary to provide safety from carbon monoxide requires a very considerable amount of ventilation. Unless such ventilation is provided in a very certain manner, one is entitled to doubt the system of operating gasoline engines within an enclosed place. We have had a very considerable experience in recent years with the conditions which prevail in many repair garages. The ventilation provided in such garages is often conspicuous by its absence, and the accumulation of carbon monoxide is sufficient to provide frequent headaches in the mechanics. These occur in the late afternoon usually as an indication of the steady accumulation of carbon monoxide in the blood of the mechanics. Even under these conditions, however, the lead exposure has not been sufficient to produce evidences of significant lead absorption.

I trust that the above comments will give you the information which you desire and will enable you to reply to the representatives of the Scoville Manufacturing Company. You may consider yourself quite at liberty to make use of any statement which I have made in this letter in phrasing your reply.

Cordially yours,

RAK:is

Robert A. Kehoe, M.D.