

bcc: Mr. T. A. Boyd  
Dr. H. A. Beatty  
Mr. J. A. Costello  
Mr. J. B. Macauley  
Mr. B. B. Turner  
Dr. R. A. Kehoe ✓

May 19, 1953

File: 30.2010 50  
160.28

Dr. Edwin W. Shand  
560 Dewalt Drive  
Pittsburgh 34, Pennsylvania

Dear Dr. Shand:

Mr. T. A. Boyd of the Research Laboratories Division of General Motors Corporation has sent to us a copy of your letter of May 6 addressed to him in reference to the possibility of recovering lead and bromine exhausted from automotive vehicles.

Our own analyses in connection with the matter have led to the conclusion which is so succinctly stated in the first paragraph of your letter.

The 4000 pounds of lead and of bromine which you have calculated as the amounts discharged annually by vehicles passing through the Holland Tunnel in New York are equivalent to about 11 pounds each 24 hours. Its recovery would require treatment of all the air for ventilation by a process that would effect 100% separation. I suspect that the equipment might be comparable in magnitude to that employed commercially at the present time for separation of bromine from sea water.

It appears that your calculations concerning the even distribution over the continental United States of the lead discharged from automobiles is in error by one digit. Assuming that 1,212,000 tons of pig lead are consumed annually in the United States and that 10% finds its way into tetraethyllead, the total for the latter use is 121,200 tons. Assuming that the area of continental United States is 3,026,789 square miles, a uniform distribution of the lead would result in 80 pounds per square mile or 2 ounces per acre.

Actually, because of movement of the air over the earth's surface including the oceans, the amount of metal deposited on the land in the United States is undoubtedly only a small fraction of that calculated above. Some of this, as you point out, eventually is washed into the oceans.

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Equipment to be installed on motor vehicles for recovery of exhausted lead products has been considered but not found to be practical. Some of the compounds are discharged in the vapor state and others as solids having a range of particle size. Exhaust products are corrosive and, under conditions of high power output, are quite hot. Although the volume of exhaust gas is small at low car speeds, it is quite large at high speeds. Because of these conditions, equipment for recovery of lead would have to be of large size and be made of materials having a high degree of resistance to hot and cold corrosion. The weight of nickel and chromium in the equipment would be much greater than that of the salvaged lead. Space is not available in cars for such an installation. Even if it were, the cost of the equipment per pound of lead recovered would be extremely high.

There are very large deposits of lead in the United States which are considered to be submarginal in relation to the present price of the metal and to methods of its recovery, however, the working of these deposits would be much more practical than an attempt to recover lead exhausted into the air. The oceans contain an almost unlimited amount of bromine and are by far the most economical source of this element.

Like other manufacturers, we are always interested in possible alternative sources of raw materials and appreciate your taking the time to make the calculations which were included in your letter to Mr. Boyd.

Very truly yours

ES:dr

(signed) Earl Bartholomew

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