

October 31st, 1934.

DEPARTMENT OF THE INTERIOR.

MEMORANDUM for the Press to be Released October 31st.

In connection with the unusual circumstances attending the death of certain individuals employed in conducting experimental work with tetraethyl lead in the Bayway Laboratories of the Standard Oil Company of New Jersey, the Department of the Interior, through the Bureau of Mines, calls attention to the difference between tetraethyl lead and Ethyl Gasoline. These two products, which are quite different, would seem to have become confused in the minds of the public as the result of these accounts of this unusual accident. Considerable publicity has been given to the statement that the product causing the poisoning of these persons was Ethyl Gasoline, the product as sold to automobile owners. This is erroneous the Department points out, as the operation of the Bayway Laboratories refers to the process of manufacture of the concentrated tetraethyl lead. This product is not sold to automobile drivers except when tremendously diluted with gasoline. Tetraethyl lead is not in itself an engine fuel and is only used in greatly diluted form, commonly less than one part of tetraethyl lead to one thousand parts of gasoline by volume.

One of the outstanding problems confronting automotive engineers in

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attempting to construct motors of greater economy is that of eliminating the so-called "knock" from the operation of the engine. It has been demonstrated that this "knock" can be controlled by the addition of small quantities of certain fluids. These materials make it possible to use satisfactorily a lower grade of gasoline and to use engines of a more economical type. The value, in fuel conservation of both increasing the portion of crude oil marketable as motor fuel and also permitting the designing of more efficient engines, was obvious to the Bureau of Mines. Their attention was called to the possibility of health hazards in addition to those of carbon monoxide from exhaust gases. As a result the investigation of these products was undertaken. The laboratory work was conducted by the Department of Interior at the Pittsburgh Station of the Bureau of Mines under the direct supervision of its Technical staff.

One of the most commonly used anti-knock compounds is known as tetraethyl lead. This is added to gasoline in quantity of less than one part of tetraethyl lead in one thousand parts of gasoline by volume and this mixture sold on the market as Ethyl Gasoline.

The problems of the health hazard due to the use of tetraethyl lead may be divided into three parts.

1. The hazard in the manufacturing and handling of the concentrated tetraethyl lead. This hazard occurs in the manufacturing plant.
2. The possible hazard in handling the Ethyl Gasoline (one part of tetraethyl lead

to one thousand parts of gasoline. This possible hazard may affect those handling Ethyl Gasoline.

3. The possible hazard due to the exhaust gases from automobiles using Ethyl Gasoline. This possible hazard concerns the entire public.

The scope of the work undertaken by the Bureau of Mines included an investigation of all possible hazards as outlined in the above. The first two parts, namely that of the danger in the manufacture and handling of the concentrated tetra-ethyl lead and the possible risk in handling the Ethyl Gasoline as sold to the automobile driver, are now being investigated. Sufficient data has not been obtained to draw conclusions to date. As soon as this investigation has been completed the results will be made public.

The last part of the above outlined problems, namely the possible hazard due to the exhaust gases from automobiles using Ethyl Gasoline as ordinarily sold has been carried on for more than ten months.

The plan of investigation was that of exposing various types of animals (pigeons, guinea pigs, rabbits, dogs and monkeys, over 100 in all) to a definite concentration of exhaust gas from an engine using Ethyl Gasoline. The concentration of exhaust gas in air used was that which, when coming from the average automobile would be four parts carbon monoxide in ten thousand parts of air; this concentra-

tion would be allowable for but a period of one hour exposure from the standpoint of carbon monoxide. (The concentration of exhaust gas in air used was such as to exceed that known to exist in ordinary traffic of a city street.) The carburetor was adjusted so that the carbon monoxide content of the exhaust gas from the engine used was less than one-half that found in the average automobile exhaust gases.

The animals were divided into three representative groups. The first two groups were exposed for periods of three and six hours respectively and the third group not exposed but used as controls. The animals were thus daily exposed for three and six hours over a total period of approximately eight months to a known concentration of exhaust gas. These exposures were such that the lead content of the air breathed by the animals was similar to that which would result when exhaust gases of an average automobile using Ethyl Gasoline are diluted so as to contain about four parts of carbon monoxide to ten thousand parts of air (the permissible exposure for one hour from the standpoint of carbon monoxide poisoning). This was a considerably higher concentration of exhaust gas than would ordinarily occur.

The animals were observed throughout the entire test period for symptoms of lead poisoning, as colic, paralysis, loss of appetite and loss of weight. Also, a careful examination of the blood was made for characteristic signs of lead poisoning. At various times animals were killed and the entire tissues examined for

effects of lead and analyzed for stored-up lead.

After a period of approximately eight months daily exposure to the above conditions there was no indication of lead poisoning. The animals continued to grow and mature at a normal rate. One of the dogs gave birth to five puppies. These were continued on test with the mother and in the course of the test matured normally. The absence of lead poisoning may be due to the small amount of lead present in the exhaust gas air mixture. Furthermore, observations made on man showed that most of the lead in exhaust gases coming from Ethyl Gasoline when inhaled is again exhaled.

The investigation carried out indicates the danger of sufficient lead accumulation in the streets through the discharging of scale from automobile motors to be seemingly remote.

The investigation of the possible hazards of lead poisoning from exhaust gases is being continued at the Pittsburgh Station of the Bureau of Mines, together with the first two phases of this study.