

September 5, 1940

Dr. Thomas Parran, Surgeon General
U. S. Public Health Service
Attention: Dr. L. R. Thompson, Director
National Institute of Health
Washington, D. C.

Dear Doctor Thompson:

I am sending you herewith a "Memorandum on Certain Aspects of the Manufacture and Use of Tetraethyl Lead in Gasoline". I hope this will give you a resume of the situation as I see it, but if it should raise certain questions in your mind about which you would like to have further information, or which you would like to discuss with me, I should be glad to comply with your wishes.

I think I should point out to you that I have not submitted this memorandum to any of the officials of the Ethyl Gasoline Corporation. I hope I have not made any statements in it that are not entirely in accordance with their attitude, and I believe that I have not. On the other hand, this was intended primarily as an expression of my viewpoint for your information and for such use as it might be to you. Obviously I have the authorization of officials of the Ethyl Gasoline Corporation to discuss these matters with you, and they naturally are familiar with my viewpoints. I think you should also know that the medical and hygienic policies of the Corporation have been formulated by me, and have been adopted for action essentially as I have recommended.

It is quite possible that the officials or the legal advisors of the Corporation would prefer that I should not discuss the effects of the recent Supreme Court decision on the activities of the Corporation. On the other hand I would be less than honest if I did not make mention of this matter and of its influence upon the hygienic regime which I and my associates have attempted to set up. I hope that the difficulties which I have anticipated will not materialize, but in as much as I have taken my medical responsibilities rather seriously, I can

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do no less than to give expression to my own opinion and judgment in dealing with these matters.

I can not ask you to regard this communication as strictly confidential. I can only indicate the spirit in which it has been prepared, and express the hope that it will be useful to you and your associates.

Cordially yours,

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Robert A. Kehoe, M.D.

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Memorandum on Certain Hygienic Aspects of the Manufacture
and Use of Tetraethyl Lead in Gasoline

The manufacture of tetraethyl lead and the blending of anti-knock liquids containing tetraethyl lead in the United States have been carried out under patent rights which have given the Ethyl Gasoline Corporation complete control of all operations and full responsibility for all hygienic measures necessary for the safety of workmen. Likewise, the transportation of ETHYL and "Q" Fluids, and the construction and operation of refinery mixing plants, (for mixing these Fluids with gasoline), have been maintained under the supervision of representatives of Ethyl Gasoline Corporation, with the result that all hazards deriving from the toxic properties of tetraethyl lead and its concentrated commercial preparations, have been subjected to a uniform and effective type of control. Moreover, by reason of the supervision which could be exercised by the Ethyl Gasoline Corporation over all phases of commercial activities, the immediate and remote hazards associated with the use of gasoline containing tetraethyl lead have been amenable to periodic study, and to such regulation as seemed advisable (to the Public Health Service and the Medical Director of the Ethyl Gasoline Corporation) for the safety of the general public, as well as the handlers of petroleum products.

In keeping with its responsibilities in producing and marketing a dangerous product, the Ethyl Gasoline Corporation has provided facilities and funds for the continuous study of the hazards

associated with its business, and as information has shown the need for new or improved methods of procedure, it has spared no expense in promoting safety in all its operations. In this connection, it may be well to mention a source of hazard which was not recognized originally but which has been subjected to recent intensive study by the staff of the Kettering Laboratory of Applied Physiology in the University of Cincinnati, at the expense of Ethyl Gasoline Corporation.

Tanks used for mixing and storing leaded gasoline give rise to hazardous lead exposure when they are entered for cleaning and repairs. The first evidence of the existence of such exposure was found in 1932, when several men who had been engaged in cleaning a series of tanks developed fleeting symptoms of organic lead poisoning. Precautions for the avoidance of exposure were recommended, and all distributors of leaded gasoline were circularized and informed of the danger and the steps necessary to avoid it. From time to time slight changes were introduced into the precautionary regulations, but they proved to be entirely sound in principle, and when employed they served to prevent any exposure or illness on the part of workmen. Some difficulty was experienced, however, in applying these regulations uniformly throughout the industry, and since the men engaged in this work were not employees of Ethyl Gasoline Corporation, nor subject to its direction, the control of this hazard was far from simple. Cases of poisoning continued to occur from time to time, always the result of failure to follow the precautions and usually because of some weakness in the safety organization of certain oil companies. Altogether there have been about forty-six cases of poisoning of varying degrees of severity, with nine fatalities, from 1932 to the present time (Summer 1940). This is a low rate of incidence, considering the

number of persons involved in this type of work during the past eight years, and it bespeaks fairly general compliance with safety regulations, but lead exposure from this source is avoidable and these cases should not occur. Accordingly a systematic study of the problem was made and as the result of a report recently issued to the industry, from the Kettering Laboratory, an effort is being made to extend the supervisory activities of safety engineers of Ethyl Gasoline Corporation to cover all tank-cleaning activities in the country. Such supervision is supplementary to that provided by the gasoline distributing companies, and is advisory, rather than directive, but its goal is to provide for the presence of a representative of Ethyl Gasoline Corporation whenever a tank used for the storage of leaded gasoline is being cleaned.

The problem of cleaning gasoline storage tanks has merely been sketched but further details will be provided if the Public Health Service wishes them. Our chief purpose in mentioning the matter here, however, is to call attention to the desirability of some type of responsible and coordinated hygienic supervision in this industry. The type of control exercised by Ethyl Gasoline Corporation was made possible originally by its exclusive patent rights, and was implemented by contracts with all distributors of leaded gasoline, including resellers, or as they are more commonly known, jobbers. These mechanisms of control have been weakened to some degree by recent action of the courts, and are soon to be further endangered by the expiration of certain patent rights. It would appear that increasing difficulty may be experienced in maintaining the present satisfactory hygienic situation, and that the Ethyl Gasoline Corporation may find it impossible to guarantee compliance with the regulations

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proposed by the Public Health Service years ago, and accepted for enforcement by Ethyl Gasoline Corporation. The importance of this situation to the Public Health Service is apparent, and since the writer has considered it his duty to keep the Service fully informed as to any developments in this field, it has seemed wise at this time to call attention to what is occurring.

(1) Certain patents, which hitherto have excluded others from participation in the manufacture of tetraethyl lead for anti-knock purposes, will expire at an early date. When they expire it seems probable that other manufacturers of chemicals will attempt to enter this market. Some of these, no doubt, will employ safe methods of manufacture, but competition will tend to encourage the use of cheaper and probably less safe methods. The expense of medical and engineering supervision is not a small factor in the cost of manufacture of tetraethyl lead and ETHYL Fluid, and this, it is feared, would be one of the first items to be reduced. The result is likely to be tragic, as our experience in other parts of the world has shown.

Before the expiration of any patent rights, however, some foretaste of these difficulties is being provided, in that tetraethyl lead is now being manufactured and offered for sale on a small scale in certain parts of the United States. The commercial significance of these manufacturing enterprises does not justify any legal action in defense of its patent rights, on the part of Ethyl Gasoline Corporation. On the other hand, the hygienic aspects of the matter might make such action necessary. The available information on these activities is transmitted herewith for such use as it may be to the Public Health Service. Further information will be forwarded as it is reported.

1. The Technical Chemical Company, of Dallas, Texas is producing tetraethyl lead and selling it to various individuals.

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At least one such customer has been the Octanizer Company of California, referred to below. The Technical Chemical Company has also circularized gasoline refiners, and has offered to build lead plants for them, with a guaranteed production of twenty-five (25) gallons per day, at a cost of approximately \$2500.00. This company was organized by a Mr. W. F. Johnson, who at one time was the principal in the Ethylene Sales Corporation, a producer of anti-knock materials of some type.

II. A company (or perhaps an individual), headed by Mr. I. C. Nourse persuaded the Perry Petroleum Company of Denver, Colorado, to provide funds for building a small plant for the production of a new anti-knock material, at their refinery. It subsequently developed that tetraethyl lead was the basis of the supposedly new agent, and it is probable that the plant is not operating at this time. However, Mr. Nourse is reliably reported as having stated that he had been engaged to build several other plants for similar purposes, in the middle west.

III. The Octanizer Company of California, located apparently in Los Angeles, is a sales organization which distributes an injector to be attached to the manifold of internal combustion engines, and supplies an anti-knock fluid for use in the injector. Originally, iron-carbonyl, manufactured somewhere in southwestern United States, was employed, but more recently tetraethyl lead, supplied by the Technical Chemical Company of Dallas, Texas, has been used. The Octanizer Company has sought to obtain ETHYL Fluid from Ethyl Gasoline Corporation for use in their equipment. This, of course, was refused by the latter. At least one large purchaser of gasoline, the Blue Diamond Lines in Los Angeles, has used injection equipment and anti-knock fluid supplied by the Octanizer Company. The

danger of handling concentrated mixtures of tetraethyl lead in this fashion was pointed out to the Service Department of Blue Diamond Lines, by a representative of Ethyl Gasoline Corporation. How adequately this was done, and with what results is not known.

The activities referred to above are obviously of little importance commercially, and of limited significance, hygienically. Few people will be involved, and for the present there is little outlet for the product. As an indication of what may occur later, however, they are highly significant.

2. As the result of a recent decision of the U. S. Supreme Court, and the interpretation of this decision by the Department of Justice, it has been necessary for the Ethyl Gasoline Corporation to modify its contracts with its customers, and to discontinue its contracts with the resellers of leaded gasoline. The effect of this is undoubtedly to weaken the authority previously exercised by Ethyl Gasoline Corporation in enforcing the hygienic measures recommended by the Public Health Service as well as those of its own Medical Department. That such an effect was not intended or desired and was merely incidental in a decision aimed at other practices, is beside the point. The fact is that Ethyl Gasoline Corporation must deal directly or indirectly with the resellers of leaded gasoline in an attempt to effect certain desirable and necessary precautions. There is little doubt that it will be able to do so successfully, to a very large extent, by persuasion and through the dissemination of information, for that has been its method of procedure in the past. Its efforts would be considerably strengthened, however, if it could advise and instruct as a matter of right, rather than wholly by consent. This is particularly true in view of the impression produced in some circles by the recent court action that the

Corporation had been employing wholly unnecessary hygienic restrictions as an excuse for undue interference with the commercial activities of its customers and their retail distributors. The effect of this impression may be to create such opposition among certain retail distributors to all suggestions of Ethyl Gasoline Corporation as to nullify its efforts toward hygienic guidance.

From an hygienic point of view, there are certain things which the Corporation hopes to accomplish by carefully directed efforts to advise the petroleum industry and to obtain its voluntary and intelligent cooperation, - namely, (1) complete compliance with its instructions for cleaning gasoline storage tanks, (2) fulfillment of the proposed regulations of the Public Health Service with respect to the coloration of gasoline and the use of warning signs on dispensing pumps and gasoline containers. If it is found that these are not being controlled adequately, the facts will be reported to the Public Health Service. It must be recognized, however, that the Corporation no longer has the authority to compel compliance with these precautionary measures, and that it cannot be held responsible beyond its power to act.

A third important hygienic provision, that of maintaining the concentration of lead in gasoline within the limits now agreed upon with the Public Health Service, will be maintained automatically, through the supervisory control of mixing operations which the Corporation will continue to exercise so long as it is the sole manufacturer and distributor of anti-knock fluids containing tetraethyl lead. All mixing plants are built and operated by gasoline refiners under the direction and supervision of safety engineers of the Ethyl

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Gasoline Corporation, and there is no problem here at the present time. What will occur after the expiration of patents under which the Corporation now operates, remains to be seen. The Public Health Service will be informed of any developments which seem to threaten the present satisfactory control of this problem.

Signed: Robert A. Kenoe, M.D.

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