

June 15, 1943

PERSONAL AND CONFIDENTIAL

Mr. E. O. Jones,  
Ethyl Corporation,  
Chrysler Building,  
New York City.

Dear Mr. Jones:

I am sending you herewith three copies of a memorandum giving the information which I obtained at the time of my trip to the Lake Erie Chemical Company in Cleveland, together with my recommendations. It seems probable that other persons in the New York Office will wish to see this memorandum, especially Mr. Schaefer of the Manufacturing Department, and probably Mr. Gonzalez. In any case I am sending all of the copies to you because of the confidential character of some of the information. This should be dealt with as similar matters of military consequence are handled.

I dare say it will be necessary to inform Dr. Edelman as to whether he can purchase the tetraethyl lead in liter cans. If it is decided that this can be done, he should be so informed and then instructed to place an order for the necessary materials.

Ample space is available for the storage of the entire quantity of tetraethyl lead referred to in the memorandum.

I believe this covers the subject, but if there are any further questions, I shall do my best to answer them.

Very truly yours,

Robert A. Kehoe, M. D.

RAK ef

Enc.

KE 0013748

June 15, 1943

Dr. L. E. Edelman,  
Director of Research,  
Lake Erie Chemical Company,  
2200 Scranton Road,  
Cleveland, Ohio.

Dear Dr. Edelman:

In accordance with our conversation of last Thursday, I am sending you by express a package containing six bottles for the collection of samples of urine from three of you who will be concerned in the work which we discussed. I am sending you herewith instructions for the collection of the samples. Please use every possible precaution to prevent the contamination of these samples. Since we are dealing with micro quantities of both lead and arsenic, you will realize the necessity for these precautions.

I should be glad if you would collect approximately 100 ml of urine in each container. Each of you can obtain such a sample on two different occasions. If you wish to do it, both samples can be collected on the same day, but I want two samples from each man in order to check the variability. We shall do lead and arsenic determinations on each sample.

I have put through my recommendations with reference to the manner in which tetraethyl lead should be sent to you. It may not be possible to follow my recommendations, but in any case you will hear from the New York Office and will receive instructions on how to put in your order. When you have received your stock and have actually got your work under way, please let me know for I shall want to send you additional containers for samples of urine at intervals of about ten days. Moreover, if it happens that the lead has to be sent to you in a drum, I shall want to send you some additional instructions. I shall be informed on that subject as soon as you will.

I am sending you herewith a set of instructions for handling tetraethyl lead in your laboratory. You will probably receive additional instructions from the Manufacturing Department, with reference to the manner of cleaning and returning the liter cans. If there is any other information which you require, do not hesitate to let me know. I have written to find out one or two things about the thermal decomposition of tetraethyl lead, and I am passing this information along to you when I receive it. This is in answer to your question which

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Dr. L. E. Edelman - (2) - June 15, 1943

I was unable to answer directly.

Very truly yours,

Robert A. Kehoe, M. D.

RAK ef

Enc.

RE 0013750

*per J. J. Jones*

CONFIDENTIAL

Memorandum on Use of Tetraethyl Lead

by the

Lake Erie Chemical Company

Reference is made to Mr. Jones' letter of May 14, 1943 to Mr. Kaley, concerning his (Jones) visit to Cleveland to visit the subject Company. On May 12, in line with the statement in Mr. Jones' letter, a letter was received from Dr. L. E. Edelman, Director of Research of Lake Erie Chemical Company, explaining briefly their need for tetraethyl lead in connection with the manufacture of an agent for the Chemical Warfare Service. It was decided that a trip to the plant was necessary to determine a number of pertinent facts, and on June 10, such a visit was made.

The present plan of Lake Erie Chemical Company is to make approximately 450 pounds of ethyl arsenious dichloride ( $C_2H_5AsCl_2$ ) over a period of about 30 days at the rate of about 15 pounds per day. It is proposed that this be done by reacting tetraethyl lead with arsenic trichloride on a laboratory scale. The lead compound, diluted with carbon tetrachloride and cooled, is treated with arsenic trichloride a little at a time, the contents of the flask being cooled continuously in order to control the reaction. Preliminary experiments have indicated that this procedure is satisfactory and that the lead compound is completely used up in the presence of an excess of the arsenic trichloride. The latter will be tested further to establish the fact with certainty.

It may be that greater quantities of the material will have to be made later, but that eventuality is not under present consideration. The manufacturing operation will be carried out in a laboratory

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that appears to be adequate for the purpose, by trained personnel who appear to be wholly competent. All the work, including that of cleaning up glassware and the laboratory hood in which the work is to be carried out, will be done by from two to three men, all of whom are trained chemists. Each batch will probably consist of one liter of tetraethyl lead, the diluent carbon tetrachloride, and arsenic trichloride in slight excess. It is proposed to use a round, 5 L. pyrex flask with three connections (one to a dropping funnel, one to a condenser, and one to a thermometer), the whole surrounded by a metal container for the cooling bath sufficient in size to hold the entire contents of the pyrex flask (if it should break). The equipment is set up in a chemical hood with adequate ventilation.

The facilities of the laboratory, in which other very dangerous chemicals have been handled, include an emergency shower of an effective type, adequate canister masks, protective aprons and rubber gloves of good quality. There is also in an adjoining room, a well ventilated storage cabinet that can be kept locked. This is ample for the storage of the quantities of tetraethyl lead required at this time.

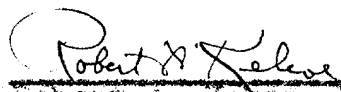
The request was made for instructions for cleaning glassware and other apparatus for advice in preventing spillage and other accidents that might cause exposure. Every evidence was given of willingness and ability to follow instructions.

For these reasons it is believed that there will be little or no trouble in connection with this work. Instructions will be provided in the usual manner. Also it was agreed that the extent of the control of the exposure could easily be checked by periodic analyses of samples of urine from the men. Arrangements have been made to make

such analyses in the Kettering Laboratory of Applied Physiology.

In order to facilitate safety in this work, and to help in the avoidance of unnecessary handling of tetraethyl lead, it is recommended that the latter be provided in liter cans, these to be preserved and returned to the Manufacturing Department of the Ethyl Corporation. Instructions for cleaning and returning the cans should be given by the Manufacturing Department. If the tetraethyl lead can be supplied in this manner, it is believed that there will be no need for adding dye to it for purposes of further safety. On the basis of the estimate given of material needed, approximately 50 liters of tetraethyl lead will be required. It is recognized that this may be troublesome for the Manufacturing Department, and that cans are at a premium. Nevertheless it is believed that this is justified if it is at all feasible to do it, since the dangers of working with tetraethyl lead under the existing conditions in this laboratory will thereby be largely eliminated. By this means the can of tetraethyl lead can be used as the unit for the reaction, the can being then rinsed out and set aside for return. Since the lead will be used up entirely in the reaction there is no reason for supposing that contact with or exposure to tetraethyl lead will occur at any time. With the ordinary care to avoid accidents and to control the reaction, there should be no trouble whatever in carrying out this work. The handling of tetraethyl lead in a drum or drums, on the other hand, will be an exceedingly troublesome laboratory operation, requiring special apparatus and precautions.

Signed:

  
Robert A. Ashco, M. D.,  
Medical Director

June 15, 1943

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