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CONTACT REPORT

Company : Socony Mobil Oil Co., Inc. April 20, 1959

Location : Kettering Laboratories of Applied Physiology
University of Cincinnati
Cincinnati, Ohio

Date : March 24, 1959

Report by : M. A. Remondino

Present : Mr. D. P. Heath - Socony Mobil Oil Co., Inc.
Mr. C. J. DiPerna "
Mr. A. C. Pabst "

R. A. Kehoe, M. D. - Ethyl Corp., Medical Department
Karl Kitzmiller, M. D. "
Dr. A. W. Horton "
Mr. Jacob Cholak "

Mr. R. K. Scales - Ethyl Corporation
Mr. H. E. Hesselberg "
Mr. M. A. Remondino "

Tetramethyllead

Reference is made to a February 23, 1959 contact report documenting a February 6, 1959 visit to the Socony, Paulsboro Laboratories by Dr. Kehoe, R. K. Scales, W. J. Rusher and M. A. Remondino to discuss the subject of lead alkyls and tetramethyllead. Reference is further made to a March 13, 1959 letter, from J. F. Socolofsky, Socony Mobil Laboratories, to R. K. Scales, expressing a desire by Socony Mobil to undertake a cooperative program with us. The program would be an experiment in which tetramethyllead in gasoline would be used in a miniature gasoline handling operation, so that the human subjects could be studied for toxicological effects of tetramethyllead. The experiment would be very closely supervised by personnel from the Kettering Laboratories and appropriate samples of body excretion would be taken at a frequency high enough to permit immediate detection of any changes in lead absorption. The Kettering Laboratories would perform the analytical work on the specimens. Socony is willing to provide such skills and facilities as are not readily available to Ethyl for this experiment. The meeting on the 24th of March at the Kettering Laboratories was called for the purpose of discussing details of the cooperative program. Dr. Kehoe arranged to have present those of his associates who would be concerned with this program and who would see that the program is carried out even in Dr. Kehoe's absence.

Don Heath started the meeting by stating that they would like to undertake the program notwithstanding previous statements by Dr. Kehoe of pessimism about commercialization of tetramethyllead because of toxicological and hygienic problems. Heath stated that to them the economic potential was great enough to warrant additional research work in the event that it might be found that TML is suitable for use in gasoline. Don stated that he had been assigned the responsibility of coordinating Socony Mobil's part in the program, that the Socony

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the Kettering Laboratories and Ethyl, and that Cosmo DiPerna would be the Project Engineer on the program.

Dick Scales reiterated for the benefit of Socony Mobil people that the Ethyl Corporation was not pushing or otherwise promoting any activity concerning use of TML in motor gasoline. He further stated that the activity at Detroit and Baton Rouge concerning manufacture and use of TML and the mixed alkyls stems to a large extent from interest of several oil companies in this field.

For the benefit of his associates, Dr. Kehoe reviewed briefly the proposed program from a medical standpoint. He then gave his views about the selection of a miniature gasoline handling operation. He thought there should be a group of people handling gasoline in normal fashion. Determinations of lead-in-air and observations of the personnel and samples of excretion from them should be made for a period of time using gasoline containing tetraethyllead. He emphasized the need for good baseline data, and that the gasoline should be handled in normal fashion, and that no attempt should be made to magnify the problem. Following the baseline studies, the experiment will continue with tetramethyllead in the gasoline. He did not know what length of time or extent of exposure would be needed before conclusions could be drawn. He stated that if there is a measurable amount of lead absorption, TML would be ruled out. If there is no measurable absorption, we can then go to a larger scale, but close medical supervision would be required.

Kehoe suggested that the Socony Laboratories might want to conduct some laboratory tests similar to the experiments conducted in Detroit and San Bernardino, so that Socony might get some experience on lead-in-air determinations, and learn more about the factors which affect the concentration of lead-in-air. Laboratory tests could include filling open containers, work on carburetors, filling tank trucks and filling passenger car tanks. Such a laboratory program would also give them experience in the use of the lead-in-air equipment, particularly using tetramethyllead which makes lead determinations more difficult.

It was stated that Kettering Laboratories will determine what will be done after the location has been selected for the miniature operation. One of the possible areas is the refinery garage at Paulsboro where they service 40 or 50 vehicles. The fleet includes passenger cars, trucks and Towmotor lift trucks. These vehicles are fueled at the garage, and the overhaul work on them is performed in the same place. Fuel for the garage vehicles can be blended in the Research Laboratory blending area where they can perform drum blending operations. Samples of this fuel could be sent to the knock test lab for knock test and other inspection tests. The same fuel along with other experimental fuels would be rated in passenger cars, both on the dynamometer and on the road. Dr. Kehoe suggested that all personnel coming in contact with the gasoline containing TML should be placed under observation.

Jack Cholak has been designated to visit the actual site of the operation to determine its suitability for the purposes needed by the Kettering Laboratory. Art Pabst indicated he would like to go also. Dr. Kehoe favored the Paulsboro location because of convenience, to some extent size, and the fact that Socony maintains two Doctors of Medicine at Paulsboro. The Socony doctors could oversee the sampling of urine and assist in making some of the observations during the baseline part of the experiment. Eventually, much of this could be done by doctors at Paulsboro, although the Kettering Laboratories would want to issue instructions and check back once in awhile.

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It was decided that Don Heath would look over several specific operations as possible sites for the experiment, and it is hoped that in two or three weeks the site could be selected. Another meeting would be held at the site for last minute details. Representatives from the Kettering Laboratories and Detroit would be present at this meeting. It was thought advisable that the experiment should run into or through the summer. Don Heath promised to advise in the near future estimated requirements for TML.

Dr. Kehoe pointed out another item they wanted to do during the baseline portion of the experiment is to study closely the operation of each subject, to learn exactly what he does, how he does it, etc. This is to be done prior to the change to tetramethyllead.

On being asked what length of time will be needed to produce a change in the human subjects, if there will be one, Dr. Kehoe expressed the opinion it will show up rather quickly, say two months, or perhaps just a few weeks.

The following relates to the medical aspects of lead in gasoline.

Dr. Kehoe thinks that as long as lead is in organic form, it is more easily excreted, and it is much less toxic. It is his thought lead compounds become more toxic when they start to decompose from the organic form, thus releasing ionized lead. He stated that in this program, if there is enough exposure to show up in excretion, they would have to take a very close look.

In our manufacturing operations 0.10 mg of Pb per liter of urine is the limit. The lower this value is, the better. The following table shows the result of a survey made on filling station employees and garage mechanics.

Distribution of Subjects

<u>Pb Conc.</u> <u>mg/l Urine</u>	<u>Filling Station</u> <u>Attendants, Number</u>	<u>Garage</u> <u>Mechanics Number</u>
.02	74	39
.03	33	33
.04	13	29
.05	5	21
.06	3	16
.07	-	4
.08	1	1
.09	-	2
.10	-	1
Over .10	-	3
Total Subjects	129	149
Mean	0.027 $\pm$ 0.011	0.040 $\pm$ 0.020

The above results show up after years in the respective activities. The normal level of lead in the urine is .027 with distribution among subjects about the same as that for filling station people. An example was cited of Indians living

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It was pointed out that the garage mechanic obtains a considerable amount of lead in his system because of his activity with welding, soldering, working with combustion chamber deposits, with paints and lacquers, etc.

Dr. Kehoe also stated that a single individual can vary on a day-to-day basis similar to the distribution pattern for filling station attendants. A person will not, on a day-to-day basis, maintain a steady concentration of lead in the urine.

Dr. Kehoe gave references to data obtained in other surveys as follows. The book published by the Kettering Laboratories of Applied Physiology entitled "Lead Studies". Article appearing in Journal of Industrial Hygiene Volume 16, Page 100, 1934. Article in the Journal of Industrial Hygiene and Toxicology, Volume 18, page 42, 1936.

It was pointed out that organic lead does not stay in the blood. Kehoe also stated that the lead content of the blood of the subjects in the above table is about the same as in the urine.

Dr. Kehoe was asked his opinion of clinical observations versus the analytical approach. He stated that clinical observations are crude relative to the analytical approach. First they are very slow and secondly, they are less precise. A considerable amount of time and effort has been spent on the development of analytical methods and these produce accurate results.

In answer to a question, Dr. Kehoe stated that if all of the companies in the United States were to go to tetramethyllead, we would have to go back and follow up in the same way as we did with tetraethyllead. This would take some years of close observation, but it could be done during commercial sales.

On being asked about spilling tetramethyllead and requirements for decontamination, Dr. Kehoe stated that the Kettering Laboratories have done very little work on spills involving tetramethyllead. He will get in touch with H. Ball, Manager of Safety in New York on this so that Hank can get some work done on this matter. Baton Rouge is already doing some work on decontamination of TML spills.

Several of the visitors, including the writer, were taken on a tour of the Kettering Laboratories.

M. A. Remondino
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cc: Mr. H. J. Gibson
Mr. D. M. Guy
Mr. H. E. Hesselberg
Dr. R. A. Kehoe
Dr. G. F. Kirby
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