

LEAD INDUSTRIES ASSOCIATION, INC.

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November 23, 1964

**SUBJECT: HEARINGS ON LEGISLATION
TO BAN THE USE OF LEAD IN
GASOLINE IN CALIFORNIA**

To the Board of Directors and the
Industry Development Committee of the
Lead Industries Association, Inc.:

Attached is a report of our Health and Safety Director, Mr. Don Fowler, of hearings he attended in Los Angeles Monday, November 16, 1964 on the Danielson Bill, which would ban the use of lead and sulfur in all gasoline sold in California.

Because our Health and Safety Program is of such importance and will be discussed at both the forthcoming Industry Development Committee and Board meetings next month, we felt that you should have this information prior to these meetings. Fortunately, these particular hearings were satisfactory from our standpoint and apparently have resulted, at least for the time being, in stopping any such drastic actions as the bill proposed. However, since such legislation recurs periodically, it is essential that our industry be armed at all times with as much factual information on the subject as possible.

Very truly yours,

G. R. + L. Ziffer

Executive Vice President

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Doc.



Look Ahead with Lead

HEARING BEFORE THE ASSEMBLY INTERIM COMMITTEE
ON TRANSPORTATION AND COMMERCE, CALIFORNIA STATE LEGISLATURE
 Held in Room 115, State Building, 211 West First Street, Los Angeles, California
 Monday, November 16, 1964

LEAD ADDITIVES--AB2163--DANIELSON

This report presents a brief outline of testimony before the subject committee. The Danielson Bill has been in and out of committees several times before, and has not yet cleared any committee. It is not going to clear this committee, as our report indicates.

The Danielson Bill would ban the use of lead and sulfur additives in all gasoline sold in California.

Mr. Tom C. Carrell, Chairman, presided.

Mrs. Clara McDonald representing United Patriotic People of the U. S. Inc. --

The witness requested first to insert in the record a copy of a news photo showing smog in Los Angeles. She then went on to ask that poisonous tetraethyl lead and sulfur be removed from gasoline because 10,000 patients were ordered out of the Los Angeles area by their physicians in one year. Furthermore, the witness said that tire companies discharge sulfur all night. She then quoted a Public Health Bulletin which says that up to 45% of the lead is absorbed in the lungs and stays there all your life. She quoted then a Mr. Chandler Phillips who also said that lead is bad for you. Then she remarked that a new refinery was built in London and that in the first year of its operation 25,000 people died.

She next made a statement that the State Health Department should analyze all dead persons for lead phosphate. Apparently her group has written to American Oil Company regarding their non-lead gasoline, and she has a reply from the American Oil Company but didn't have it with her. However, she believes that gasoline similar to their product should be required everywhere.

It is her opinion that removing lead and sulfur from gasoline would make a clean gas, and therefore you wouldn't have to inspect automobiles and require expensive mufflers on California automobiles. It is her opinion that clean gas does not make air pollution. She further said that automobile manufacturers make good products and these products should not be condemned when it isn't their fault.

There was a lot more similar testimony, all of it without documentation. Questioning by the Chairman and others of the committee brought forth very clearly the lack of documentation, and the obvious belief on the part of the witness that what she said was self-evident in its condemnation of lead.

Mr. George H. Fisher representing the Southern California Taxpayers' Council --

Mr. Fisher said their organization knows that smog problems would end if the gasoline were cleaned up by removing lead and sulfur. He was also of the opinion that it was not necessary to ban incinerators in Los Angeles County. It is collusion between the two hundred million dollar trash industry and unnamed others that caused the banning of incinerators.

Hearing Re: Lead Additives--AB2163--Danielsen

There was more of the same from this witness.

Mr. Robert Mints representing BREATHE --

Questioning by the Chairman elicited the fact that this witness is 16 years old and a student at the Burbank High School.

His organization states that to their knowledge lead is poisonous and it should be removed from gasoline.

Mr. E. E. Besselberg representing the Ethyl Corporation --

A copy of Mr. Besselberg's prepared statement is attached to this report. He was asked a great many questions by the Chairman and others about the American Oil Company's non-lead gasoline and its effect on smog formation. Reference was made by this witness to tests performed on leaded and non-leaded gasoline at the Midwest Research Institute which showed that the smog forming potential of gasoline is not affected by the presence or absence of lead.

Dr. Robert A. Kehoe representing the University of Cincinnati, College of Medicine --

A copy of Dr. Kehoe's testimony is included with this report.

Dr. Kehoe was asked several questions by committee members about the amount of lead that is present in the atmosphere, where the lead comes from, and what the significance of these amounts is. His testimony obviously resolved these questions in the minds of those who asked them.

Mr. John Loyd representing the Small Property Owners League of Los Angeles County --

Mr. Loyd stated that his organization does not want gadgets on cars, and that clean gasoline means clean air. He was questioned quite closely by the Committee Chairman and others as to how to make this clean gasoline and as to what effect it would have on smog. He admitted he had no facts on which to base his opinion, but he also thought there must be many reports in the scientific literature that have bearing on the subject. He thinks the committee should obtain some of these reports.

Mr. Eric Grant representing the Motor Vehicle Air Pollution Control Board --

Mr. Grant pointed out that lead in gasoline is not a factor in the operation of a catalyst device, as their recent tests have shown. However, this fact is not of practical importance since the automobile industry is providing non-catalyst smog control devices for all 1966 vehicles to be sold in California. Mr. Grant's testimony was very favorable to our position, and was quite forthright in mentioning the fact that his Board does not see the necessity for the Danielsen Bill.

Hearing Re: Lead Additives--AB2163--Danialson

page 3

Dr. Marion Hartwell --

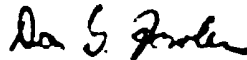
Dr. Hartwell said that he is a physician who has been in private practice in Los Angeles for 25 years and he has advised, and still advises, many of his patients who have respiratory diseases to move from this area.

He says that he knows that the lead in the gasoline provides dirtier air than clean gas would, but he admits he has no data to back up this opinion. He thinks that there must be chemists who could furnish such data. As a physician he knows that lead is not good for you but he does not know if gasoline can produce lead poisoning.

Dr. Hartwell was asked by the committee if he agreed with the previous medical testimony of Dr. Kahoe and he said that he had no evidence to disprove the witness's testimony.

Summary --

The Chairman made a very fine summary, from our point of view, at the end of the session, and pointed out that while we all wanted to have clean air no one had brought forth evidence that "clean gas" would make clean air. As a committee of the California State Legislature they were ready and willing at all times to receive documentation along these lines, but felt that until such facts were made available to them their opinion would have to remain that removing additives from gasoline would not influence smog formation one way or the other.



Don G. Fowler

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Statement of Howard E. Hesselberg, Ethyl Corporation,
to the Assembly Committee on Transportation and Commerce
of the California Legislature, Los Angeles, California
November 16, 1964

I am Howard E. Hesselberg of the Detroit Research Laboratories of Ethyl Corporation. Before I comment on the reasons why lead antiknock compounds are essential components of today's motor fuels, I would like to mention that several prior hearings on a Bill similar to the one under consideration today have been held. In October 1961, the Subcommittee on Air Pollution and Radiation Protection of the Assembly Interim Committee on Public Health heard a great deal of testimony relative to many aspects of this Bill including the relationship of the use of lead antiknock compounds to public health. Testimony at this Hearing established, among other things, that the use of lead antiknock compounds did not constitute a hazard to public health. A Hearing by the present Committee was also held in Sacramento in May 1963 relative to AB 2163. I would like to brief the statements I made at that time.

Since lead antiknock compounds were developed in the early 1920's, their use has become almost universal--both here and abroad. In the United States, about 96% of all motor gasoline now contains lead antiknock compounds which function to raise the antiknock quality of gasoline to the levels necessary for satisfactory operation of today's cars at the lowest possible cost to the consumer.

The present use of antiknock compound results in an average increase in antiknock quality of about 7.5 octane numbers. These seven and one-half octane numbers represent the increase in average antiknock quality that has occurred over the last 11 years. Our estimates indicate that if this increment of quality had not been available to permit the automotive industry to develop the more efficient vehicles now available, today's motoring public would be using at least 10% more gasoline.

The availability of antiknocks, which provide maximum operating flexibility to the refiners plus increased efficiency in the production of gasoline, has resulted in the conservation of about 5 billion barrels of our crude oil reserves over the past 25 years. Of equal importance is the fact that in times of national emergency lead antiknock compounds are of vital necessity in the production of the increased quantities of gasoline of adequate quality for both military and civilian transportation.

The amount of lead antiknock compound used in gasoline varies depending on many factors. Currently, in California the average gasoline contains a little over 2 milliliters per gallon. This is the equivalent of about 1/15 fluid ounce per gallon. This level is very close to the average usage in the United States.

In summary, the use of small concentrations of lead antiknock compounds permits production of the economical gasolines now available. Limitations on their usage would result in: significant increases in the cost of gasoline to the public, unnecessary depletion of our natural crude oil reserves, and impairment of the ability of the oil industry to produce the increased quantities of gasoline required in the event of a national emergency.

H. E. Hesselberg
Ethyl Corporation
Detroit, Michigan

SUMMARY AND EXTENSION OF AN EARLIER STATEMENT REPRESENTING THE
SALIENT FACTS CONCERNING THE POTENTIAL HAZARD TO THE PUBLIC HEALTH ASSOCIATED
WITH THE OCCURRENCE OF LEAD IN THE ATMOSPHERE OF AMERICAN CITIES

by

ROBERT A. KEROE, M. D.

Director of the Department of Preventive Medicine and Industrial Health,
College of Medicine, University of Cincinnati

Tetraethyllead, tetramethyllead and related lead alkyls, in certain formulations of antiknock compounds, are added to gasoline at oil refineries to improve the performance of the internal combustion engine in which gasoline is used as fuel. These compounds are burned with the gasoline in the engine, and their combustion products are discharged from the engine as finely divided inorganic compounds of lead. Some portion of these inorganic compounds condenses out in the exhaust system, and the remainder escapes into the atmosphere from the tail-pipe. All but minute amounts of the organic lead compounds are burned in the engine, so that the quantities of organic lead which reach the atmosphere are practically negligible.

Despite impressions to the contrary, there is a great deal of information on the concentration of lead compounds in the atmosphere and on their relation to public health. During the period of its use, beginning in 1923, experimentally, tetraethyllead has been one of the most comprehensively studied of industrial products, from the standpoint of the public health. This work has been carried out, for the most part, in the Kettering Laboratory in the College of Medicine of the University of Cincinnati, under the financial sponsorship of the manufacturers and distributors of antiknock compounds in the United States of America, through agreements with the Board of Directors of the University. The results of these investigations have been published in scientific and medical journals, or made available in a limited manner to other investigators and public health authorities in reports issued by the Kettering Laboratory.

The results of all of the investigations to date have been consistent in demonstrating that:

1. The lead compounds discharged from the exhausts of automobiles have not created a hazard to the health of the public.
2. The concentrations of lead (from all sources) found generally in the air of American cities are low.
3. The amounts of lead to which the general population are exposed -- from all sources, including foods and beverages -- are below hazardous limits.
4. During the past twenty-odd years, there has been little change, on the part of the "average," adult American, either in his intake and output of lead, or in the amounts of lead retained in his body. Such slight change as has been observed has moved in the direction of a decrease in both intake and output, but it is not certain that this apparent trend is real in the sense of being a representation of a general situation.

-2-

Among the underlying facts which clarify and support these statements, of first importance is the assurance that lead in the atmosphere originates from a number of sources - the combustion of wood, coal and vegetable matter, the lead in the soil, man-made and widely distributed products containing lead, and even lead contained in meteorites. Lead antiknock compounds contribute an appreciable part of the total lead in the atmosphere. Just what part is difficult to estimate, since the methods of measurement achieved a satisfactory degree of accuracy only after the use of leaded gasoline reached widespread proportions.

Second, it is necessary to take into account the presence of lead in the food, water and other beverages consumed by human beings. The quantities of lead taken into the body in this manner greatly exceed the amounts taken in with the air in breathing. While the average of a large number of observations on the human intake of lead in food and drink approximates one-third of a milligram per day, that taken in in the air within the 24-hour period may be as little as one-twentieth of that amount, or as much, perhaps, as one-fourth of it, depending upon where and how one spends the hours of the entire day. (The areas of a city vary, with respect to the lead in the air, and the respiratory volume varies greatly with the size and the activities of the individual.)

When one considers the extent of the absorption of lead into the body, as differentiated from its entry into the alimentary and respiratory tracts, the quantitative relationships are somewhat more significant. Thus, the absorption from the digestive tract is slow and incomplete, somewhat less than 10 per cent of that swallowed, under ordinary conditions, being absorbed. On the other hand, that absorbed from the respiratory tract, under the conditions which exist commonly in the air of cities, may be somewhat less than 20 per cent of that which is inhaled.* In an ordinary day, the average individual in the general population may absorb approximately 30 micrograms (0.03 mg.) of lead from his digestive tract, and somewhat less than a corresponding quantity of lead (of the probable order of 10 micrograms) from the air. It may be seen, therefore, that the lead in the food and beverages is likely to be more important than that which is in the air, in determining the extent of the absorption of lead from day to day by persons in the general population; prolonged observations on human subjects indicate that under the ordinary conditions of life in Cincinnati, the former source is considerably more important than the latter. The evidence also indicates clearly that, under present conditions, the output of lead daily from the body of the average person is so nearly equivalent to the total intake daily, that any accumulation of lead which may occur over a long period of years, or a lifetime, is too small to be detected.

In line with the statement above, concerning the quantities of lead which may be inhaled, it appears that the atmosphere of individual American cities may contain, on the average during all seasons, from 1 to 3 micrograms of lead per cubic meter. This range of values contrasts with the concentration of 200 micrograms per cubic meter, which has been accepted in the United States as a satisfactory specification of the safe concentration of lead in the air of industrial establishments. This specification is not applicable to the general atmosphere, because of the intermittency of occupational exposure to lead (approximately 40 hours per week), as opposed to the constancy (in time but not necessarily in severity) of the exposure of the population to the ambient air. Experiments have been underway in the

* Recent investigations have shown that the lead retained in the respiratory tree during the inhalation of air containing approximately 10 micrograms of lead in the form of particles of mean diameter 0.05 micron, amounts to less than 20 per cent of that inhaled.

-3-

Kettering Laboratory for several years to determine, in precise physiological terms, the upper limit of the safe concentration of lead in the air to which the general population may be exposed.

Additional determinations of the lead content of the atmosphere of several cities, including Los Angeles, have been made, jointly, by the U. S. Public Health Service, city and state health agencies in Philadelphia and California, and the Kettering Laboratory. The results of this joint investigation are nearing the point of publication. It is fitting, at this time, only to make the general comment that they confirm the essential truth of the statements made above, and give them broader geographic application within the United States.

The concentration of lead found from day to day in urban atmosphere ranges upward and downward from the levels cited herein as averages. Occasional high values have been found and reported. These, in some instances, have assumed an importance far beyond their true significance. Such results may be expected to occur occasionally in any survey, because of the concurrence of unusual factors and also because of the opportunities for error in sampling and analysis. For practical purposes, the prevailing or average conditions of exposure are the significant ones. To be valid and representative of the facts, sampling must be carried out systematically to meet all kinds of conditions over extended periods of time.

This statement is not concerned with the economic impact of restrictions in the use of antiknock compounds in gasoline upon the oil industry and the motoring public. From the standpoint of the public health, however, it is important to know that such restrictions would not eliminate all of the lead from the atmosphere, and it may not even eliminate the large proportion of it. Periodic and fairly comprehensive investigations of the lead in the atmosphere in Cincinnati have shown that there has been a significant reduction in the lead content since the late 1940's. This is traceable in part to a reduction in airborne lead contributed by the combustion of coal, and in part to changes in the commercial activities and traffic patterns in Cincinnati during that period. This reduction took place despite the progressive increase in vehicular traffic and in the consumption of gasoline. To the extent that this reduction of lead in the air was achieved by the reduction of the combustion products of coal, it has called attention to the significance of this source. It appears that the amounts of lead in the atmosphere of Cincinnati from the combustion of coal, some years ago, were equivalent, at the least, to those derived from the exhausts of automobiles. This fact alone may introduce a somewhat more balanced perspective into the consideration of this matter in relation to the past as well as the future.

The ultimate criterion of safety, in relation to human exposure to lead from any or all sources, is the freedom of the individual from a rate of intake and absorption which will result in the progressive accumulation of lead in his body over a long period of time. The evidence indicates that, under the present general conditions of exposure, outside of the lead industries, no such accumulation occurs. The additional evidence which is being sought through further experimentation is intended to define the threshold point in the over-all exposure to lead in food, beverages, and air, which will result in a barely demonstrable accumulation of lead in the body. By such means, the margin of safety between present conditions and potentially hazardous conditions can be established, and a standard for the future made available.

-4-

Two sets of experiments have been designed, one of which has been completed, in order to obtain the evidence referred to above. These experiments are variants of a general procedure which has been developed in the course of some twenty-five years of systematic investigation of the intake and output of lead by human subjects, under carefully controlled conditions in the Kettering Laboratory.

(1) Briefly, as to the first of these experiments, two healthy men were kept under close observation, under strictly parallel conditions, over the period of many months. After a preliminary period sufficient to include the major climatic (seasonal) changes in Cincinnati (hot, cold and temperate seasons), during which each subject collected, daily, for analysis for lead, all feces and urine, and duplicate samples of all food and beverages consumed, the two subjects were introduced into two parallel respiratory chambers, and subjected, for definite periods of time, to identical (as nearly as possible) conditions of temperature, humidity, rate of flow of air, and quality and concentration of lead in the air (0.15 mg. Pb, as the sesquioxide, dispersed as minute particles of the mean diameter of 0.05 micron, ranging up to 0.2 micron in diameter). The purpose, here, was to determine the effect of duration of exposure upon the physiological processes involved in the absorption, excretion and retention of lead in the body, so as to be able to appraise the significance of continuous versus intermittent exposure to lead in the air (so as to be able, eventually, to determine the weight of this factor in the differentiation of the effects of occupational from general environmental exposure (in the atmosphere of the community) to airborne lead). Since it was virtually impossible to conduct this experiment continuously with human subjects, reliance was put in the experimental device of comparing the effects of a series of shorter periods of exposure and of extrapolating from these data to the end-point in time. Thus the men were subjected to exposure, to the conditions described, for 3 hours per day on every other day for several months, then to 6 hours, 9 hours and 12 hours per day on every other day for corresponding periods of several months. By this means several points on a curve were established, and the curve extended to 24 hours per day on every day.

The results of this experiment were extremely gratifying, in that the two subjects reacted nearly identically, and a smoothly graduated increase in the absorption and retention of lead (as shown most effectively by the concentration of lead in the blood), paved the way for a straight-line extrapolation of the findings to the level of continuous exposure. It is of interest to reckon with the evidence, derived from these observations, that a dangerous level of lead absorption would have been arrived at in less than 2 years by the two subjects, under the conditions of continuous exposure to a concentration of lead in the air that has been found to be safe, indefinitely, under occupational conditions involving approximately 40 hours of exposure per week. The strikingly different effects of continuous versus intermittent exposure to air-borne lead, may be stated somewhat too precisely, but otherwise realistically, as the outcome of this experiment, as follows: Under comparable environmental conditions, with respect to the specific compound of lead and the dispersion of particles in the air, a man can work indefinitely (presumably for a working lifetime) for 40 hours per week in an atmosphere containing 0.15 mg. of lead per cubic meter; whereas the same man, attempting to live continuously in such an atmosphere, will have absorbed an amount of lead sufficient to induce lead intoxication in somewhat more than 1 year.

(2) The next experiment, now in progress, was intended to determine the highest concentration of lead in the atmosphere which, when breathed continuously, would fall just short of inducing a measurable, progressive accumulation of lead in the body of the normal healthy human subject. For practical purposes, since a

-5-

totally negative result would provide no numerical representation of the quality of air in this respect, the experiment was designed to detect the least concentration capable of inducing a barely detectable effect upon the absorption, excretion and retention of lead. Again, two experimental subjects, after the appropriate preliminary observations, were introduced into parallel respiratory chambers in which they were subjected to the inhalation of air containing 10 micrograms of lead (as the same compound in the same state of subdivision as that indicated above) per cubic meter of air. (This concentration was selected as the starting point, to be increased step-wise as might prove to be necessary, in the belief that no positive result would be induced.) The subjects were to spend a period of several months in a regimen involving exposure for 3 hours per day on alternate days, after which, over corresponding periods of months, they were to be subjected, successively, to the same conditions for 6, 9 and 12 hours, respectively, on every other day.

This experiment is now in the latter part of the stage of 9 hours per day on alternate days, without having adduced any evidence of an effect upon the intake and output of either of the two subjects. It will continue on with the 12-hour per day stage. If by that time no metabolic response can be discerned, the concentration of lead in the air of the chambers will be increased and the cycle of increasing hours of exposure will be resumed. The experiment will be carried to its intended and logical conclusion.

Date: November 13, 1964

NEWSCLIPPING FROM THE "LOS ANGELES HERALD-EXAMINER"
OF NOVEMBER 15, 1964

'CLEAN' GAS AND END SMOG, WITNESSES SAY

Two witnesses told a State Assembly Committee on Transportation today that the answer to smog is not air pollution control devices but "clean" gasoline.

The committee, headed by Assemblyman Tom Carrell, (D-San Fernando), heard this contention from Mrs. Clara McDonald, legislative representative for United Patriotic People, and George E. Fisher, director of the South Gate California Taxpayers.

They called for the elimination of lead and sulphur gasoline additives in the refineries.

"Your troubles are over," Mrs. McDonald said, "if you clean up the gasoline at the refineries. They create the situation. They have not cleaned up the sulphur."

The committee is meeting in the Old State Building here to hear a score of witnesses including oil men, smog officials, police department spokesman and representatives of citizens' groups on a proposed bill to eliminate additives.