MUSKIE COMMITTEE HEARINGS

Statement of Dr. George F. Kirby,
President of Ethyl Corporation

MR. CHAIRMAN, MEMBERS OF THE COMMITTEE:

I should like first of all to express my appreciation to the Committee for giving me this opportunity to ~~testify~~ appear before the Committee.

As the Senator said, I am with the Ethyl Corporation which introduced into commercial use the gasoline ~~additive known as tetra-ethyl lead, or TEL.~~ containing lead antiknocks which are used in 99% auto gasoline

The subject under discussion today is of vital importance to Ethyl and other producers of lead antiknocks - just as it is to the lead industry, the oil industry and the automotive industry. But it is certainly not a new subject to Ethyl. Public health considerations have been paramount in our business since 1923, and I believe a report as to our experience may be of some interest to the Committee.

The Origin and Widespread Use of Lead Antiknocks

The history of lead antiknocks began just before World War I when the late Charles F. Kettering of General Motors, the inventive genius who contributed so much to the automotive industry, recognized that the low octane quality of gasolines of that day presented a formidable barrier to the development of highly efficient automobile engines.

When octane quality is low, gasoline burns too fast, or explodes spontaneously, and the condition known as "knock" results. Knock wastes energy, causes engine overheating, limits power and performance, ~~increases consumption and~~ can lead to serious engine damage.

Intensive work on the knock problem began in 1916 in Mr. Kettering's laboratory in Dayton, Ohio, when he assigned the research job to young Thomas Midgley, Jr., who became one of the outstanding chemists of his generation. It did not take Midgley and his co-workers long to establish that it was the fuel and not the engine that caused knock. But it was not until 1921 that they discovered the antiknock properties of tetraethyl lead. Less than a teaspoonful in a gallon of gas ~~(1 part lead to 1720 parts gasoline),~~ they found, was sufficient to prevent knock. By 1923 gasoline containing ~~TEL~~ antiknock compound was ready for public sale at a single service station in Dayton. The superiority of this new ~~"Ethyl"~~ gasoline was so evident that the use of lead antiknocks rapidly spread. Today they are used in about 98% of the motor gasoline sold in the United States and in most of that sold in the rest of the world.

Lead antiknocks played a ~~large part~~ vital role in the development of today's highly efficient engines for automobiles, airplanes, tanks, tractors and other transportation equipment. They also assist oil refiners operate with greater flexibility and economy.

They are invaluable in time of war or national emergency (as World War II proved) to give the final lift to high octane military gasoline, and at the same time maintain adequate octane quality for that remaining for civilian use. Finally, lead antiknocks aid in conserving an estimated 185 million barrels of petroleum raw materials each year by making it possible to produce more gasoline from crude oil.

Thus, these chemical compounds clearly constitute one of the most valuable economic tools utilized by American industry.

Public Health Aspects of Lead Antiknocks

In recent months public attention has been focussed on the notion that lead in gasoline is a public health hazard. Sensational reports in the news media have implied that the Public Health Service and industry have neglected this "hazard".

The notion that tetraethyl lead constitutes a health hazard is without medical basis, as Dr. Robert A. Kehoe will demonstrate in a separate statement. The charges of neglect are clearly contrary to the facts, as the record clearly shows.

Let's look at the record for just a moment. It shows that experimental study of tetraethyl lead began in the U. S. Bureau of Mines Experimental Station in Pittsburg in 1923 before leaded gasoline was in commercial use. Shortly thereafter, additional studies commenced at Columbia University and at Ethyl's laboratory in Dayton, by University of Cincinnati personnel in Ethyl facilities and in the Department of Physiology in Cincinnati. Reports on all these studies were made to a conference

convened by the Surgeon General in May, 1925, the proceedings of which were published as Public Health Bulletin No. 158. Immediately thereafter, the Surgeon General appointed a committee of experts to continue the study of leaded gasoline, and its investigation, field survey and findings were published in Public Health Bulletin No. 163, in 1926.

A governmental field survey was made in Great Britain in 1928, and 5 additional field surveys (1925, 1927, 1928, 1931 and 1955) were conducted in the United States by investigators at the University of Cincinnati Medical College (the staff of the Kettering Laboratory after its founding in 1930). From 1930 to ~~1955~~ the present the Kettering ~~research team~~ Laboratory continually explored the metabolism of lead in humans, such as primitive Indian tribes of ~~Central America~~ Mexico living in a natural environment, small groups of workmen in Britain, France and Germany and larger groups of Americans in the general population, ~~living in an industrial environment~~. Monitoring of lead in the atmosphere of American cities was begun by the Kettering Laboratory in 1945, and by the Public Health Service National Air Sampling Network in 19?. In 1950 Ethyl instituted in its Detroit laboratory a comprehensive investigation of the types and quantities of particulate lead compounds discharged in automobile exhaust which provided information on Moveover, in 1957, Ethyl sponsored an extensive smog chamber study by the Midwest Research Institute of Kansas City, Mo. to determine whether leaded gasoline was a factor in producing smog, which proved that it was not. Concurrently other investigators

were continuing broad studies of the role of lead in the human environment. Results of most of this reasearch and investigation were published in medical and technical journals. A bibliography will be filed with the Committee.

In 1959, an Advisory Committee appointed by the Surgeon General to study a proposed increase in the maximum concentration of TEL in motor gasoline published a report indicating that the proposal would not increase the hazard to public health from air pollution, but suggested that a joint PHS - industry survey of lead in the atmosphere be conducted promptly. (PHS Pub. No. 712, 1959).

In response to this suggestion, the Surgeon General appointed a Working Group from industry, universities and State and Federal Governments to make a comprehensive survey of lead in the atmosphere ~~of Cincinnati, Los Angeles and Philadelphia~~, and of lead in the blood and urine of selected population groups in the ~~same cities.~~ This survey was conducted over the period of a year, and the results were incorporated into a comprehensive report published in January, 1965. (PHS Publication No. 999-AP-12).

On December 13-15, 1965, the Public Health Service held ~~its~~ a technical Symposium on Environmental Lead Contamination consisting of prepared statements and general discussions by representatives of Government, industry and the universities.

In late 1965, the World Health Organization published data indicating that there has been no ~~change~~ in lead levels in the blood and urine of humans in 15 countries over the past 3 decades.

We believe that a fair and unbiased review of all these medical and scientific data demonstrates that:

1. ~~Tetraethyl~~ lead has been ~~one~~ of the most comprehensively studied products, from the standpoint of public health, in modern times.

2. Government and industry have ~~cooperated in sponsoring~~ a broad program of basic and applied research on lead in the environment for 40 years, ~~and~~ industry has ~~voluntarily observed~~ stringent ~~safety~~ regulations ~~promulgated with the advice and consent of the Public Health Service~~. This joint research program on lead will be ~~expanded and intensified in the immediate future so as to be certain to maintain an adequate margin of safety at all times~~.

3. Lead in ~~air~~ from all sources ~~to which the public is exposed~~ does not ~~presently~~ constitute a health hazard.

4. Lead discharged from automobile exhaust does not contribute to smog.

5. The ~~1965 Public Health Service~~ survey of 3 urban communities, coupled with other Public Health Service findings, shows no significant increase ~~over the past five years~~ in lead concentrations in urban air. Relating these recent Public Health Service

data to comparably valid data obtained fifteen years earlier indicates no change over this longer period.

6. ~~Other~~ Medical studies have shown no increase in the blood lead levels of the population over the past twenty years or more, despite a substantial increase in the use of lead antiknock ~~consumption~~ and automobile population during this period.

7. The only real ~~point of disagreement~~ question among the experts is whether there exists, or can be discovered by additional research, any medical basis for forecasting a health hazard at some future date resulting from increased ~~consumption~~ use of leaded gasoline.

Our company has spent over $9 million in the past 15 years alone in research on air pollution and public health aspects of leaded gasolines. We expect to continue and ~~intensify~~ develop this research. ~~While~~ We expect that further research will confirm the findings of the past 40 years, Ethyl Corporation welcomes additional research by responsible parties designed to obtain complete scientific knowledge ~~as to the role~~ of lead in the human environment.

Controls on Lead ~~Consumption~~ Usage

While it is apparent that there is no ~~present~~ medical or scientific basis for controls on the ~~consumption~~ usage of lead, it is ~~evident~~ that research programs in this area should be accompanied by a competent, thorough and hard-headed analysis of what it would cost to institute such controls and what the practical consequences would be.

At the invitation of the Public Health Service, Ethyl representatives made a presentation at the December Seminar on the economics of production of leaded vs. non-leaded gasolines. We have made an extensive study of this subject, and discussed our work with a wide cross-section of petroleum refiners representing about two-thirds of the refining capacity of the United States. This study shows that production of unleaded fuels approaching the quality of today's fuels would:

(1) Require an initial investment of about $3,000,000,000.

(2) Require 185,000,000 barrels per year additional petroleum raw material.

(3) Require a 30% increase in the manufactured cost of gasoline for efficient, large, modern refineries.

(4) Eliminate many small and independent refiners.

(5) Be detrimental to national defense.

(6) Cause severe dislocations to the oil industry.

(7) Result in gasolines which approach do not equal the high quality of today's leaded fuels.

A copy of our report to the Seminar, detailing and supporting the conclusions summarized above will be filed with the Committee.

The facts indicate that any efforts to control air pollution problems by means of drastic changes in present day motor fuels will have substantial adverse effects on our national economy and our national defense. As a result, we have been directing

our research efforts toward controlling automobile exhaust emissions by ~~mechanical devices~~ engine modifications. This, of course, is the approach taken by the California legislature and by the Congress in the 1965 amendments to the Clean Air Act.

Undesirable exhaust emissions by automobiles come from 4 sources: tail pipe, carburetor, fuel tank and crankcase. Crankcase emissions are already being successfully controlled by a simple device that recycles and burns them. Engine modifications reducing tailpipe emissions of unburned hydrocarbons and carbon monoxide ~~by~~ to meet the Federal Standards ~~one-half~~ will be in production on all new U. S. automobiles by the 1968 model year. Even better control devises are being studied.

At the meeting of the Society of Automotive Engineers held in January, we announced that Ethyl's automotive laboratory had successfully tested new designs of intake manifolding and carburetion of automobile engines that have reduced emissions of unburned hydrocarbons and carbon monoxide ~~by as much as two-thirds~~ to levels well below present standards. A detailed report on these new devices will be filed with the Committee.

While extensive additional work must be done before the devices can be applied to mass production engines, we think they hold real promise for a breakthrough in this area of air pollution. We have already shared our research information on the devices with auto manufacturers, and any patented designs will be licensed to the manufacturers on a royalty free basis.

We are also exploring in the Ethyl automotive laboratory

several devices designed to entrap lead and other particulate matter in the automobile exhaust system and thereby prevent its discharge into the atmosphere. While we have so far obtained insufficient data to enable us to make the devices public, our early tests indicate sufficient promise to justify our speeding up this development program.

These accounts of our own experimental work are just one indication of the work going on today in the laboratories of the automobile, oil and equipment manufacturing industries. Some have stated that it is not possible to eliminate harmful emissions from the internal combustion engine, and that other forms of automotive power will be required in 15 to 20 years if auto population increases substantially and air pollution problems continue to intensify. Our technical people, however, prefer to believe that the problem can be solved by the continued refinement of the automobile engine and the addition of control devices now in the laboratory stage. They believe this can be accomplished long before automotive exhaust becomes a hazard to the public health.

Conclusion

On the basis of our experience of 40 years and of all the authoritative evidence compiled to date, we of Ethyl Corporation recommend:

1. That additional Federal legislation in the field of automotive air pollution be deferred for sufficient time to assess

the results of the 1965 amendments to the Clean Air Act.

2. That cooperative research by industry, government and the universities be directed toward more effective mechanical devices to control automobile exhaust emissions.

3. That the ~~present level of~~ use lead antiknocks in gasoline, as voluntarily established by the antiknock industry with the advice and counsel of appropriate Public Health Service personnel, be continued.

4. That the cooperative program to monitor concentrations of lead in air and in human blood and urine be continued. The recent Public Health Service survey in Los Angeles, Cincinnati and Philadelphia can be used to provide a valid baseline of data. Continuing studies can now be made to expand this sound monitoring background.

5. That additional cooperative research to broaden the knowledge of the use of lead antiknocks in relationship to public health be carried out.