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CONTROLLING AIR POLLUTION FROM MOTOR VEHICLES

Report to the New Jersey Air Pollution Control Commission
from its Motor Vehicle Committee, September 21, 1964.

Introduction

On 16 December 1963 at a regular monthly meeting of the New Jersey Air Pollution Control Commission, then Chairman William Bradley appointed a committee on motor vehicles. This appointment followed discussion, at several previous Commission meetings, of the need of such a committee. The committee included the following three Commission members:

WILLIAM C. LYNN
NORMAN G. WHITE
RICHARD J. SULLIVAN, *Chairman*

The committee was given two charges:

1. Determine the scope of the motor vehicle air pollution problem in New Jersey.
2. Determine what action has been taken by other states.

Dr. White helpfully assisted in the early discussions of the committee. However, his term on the Commission expired. Therefore, he did not participate in the preparation of this report.

FACTS

Charge 1: The Problem

Vehicle Population

In 1963, according to the Division of Motor Vehicles, New Jersey had a total of 2,703,987 registered passenger cars, commercial vehicles, and omnibuses. This figure doubled in the 15 years since 1948. It rose 128,000 last year. The table in the next column shows the year-to-year rise for the last decade. The chart on page 250 extrapolates this growth to 1970.

According to *Automotive Industry Statistical Issue*, 1964, New Jersey in 1963 had a car population exceeded by only seven other states. More important, however, while our state is eighth in vehicle population it is *first in the nation* in the number of cars per square mile. Our vehicle density in 1963 was 359 per square mile—far above the figures for most states and for the nation. Only little Rhode Island comes close to depriving us of the doubtful prize. Table No. 2, on page 248 illustrates the contrast in densities. Included for comparison are all states with car registrations above two million, and the four states with an area less than ours.

This heavy concentration of vehicles is augmented in this state more than in most by a substantial number of vehicles traveling through. The New Jersey Turnpike is the nation's busiest toll road. According to its 1963 Annual Report, it handled 57 million toll-paying cars in that year contrasting with 18 million in 1952, the first year of its operation. Many of these cars were not New Jersey registered vehicles but contributed to our air pollution just the same. If we add the cars that happily visit New Jersey to partake in the state's biggest business, its resorts, and those that take advantage of the Garden State Parkway, Route 95 and other corridors, we know that our actual density is immeasurably above the 359 vehicles per square mile that live here. And now we have an Atlantic City Expressway, a Cape May Ferry, expanding Routes 95, 22, and 80, and a plan to make the northern 29 miles of the Turnpike a 12 lane highway. Whatever the actual vehicle concentration is now, we can surely say that it will be vastly increased in the next 10 years.

Table 1

New Jersey Vehicle Registrations				
Year	Passenger Registrations	Commercial Registrations	Omnibus Registrations	Total
1953	1,606,440	233,621	10,085	1,850,146
1954	1,702,264	241,071	10,167	1,953,502
1955	1,834,304	251,739	10,109	2,096,152
*1956	2,836,664	249,702	9,429	3,095,795
1957	1,924,953	277,910	9,597	2,212,460
1958	2,014,321	277,841	9,497	2,301,659
1959	2,054,955	279,108	9,670	2,343,773
1960	2,145,146	273,335	9,933	2,428,414
1961	2,231,336	262,431	9,654	2,503,421
1962	2,294,516	270,827	9,566	2,574,909
1963	2,420,114	274,210	9,663	2,703,987

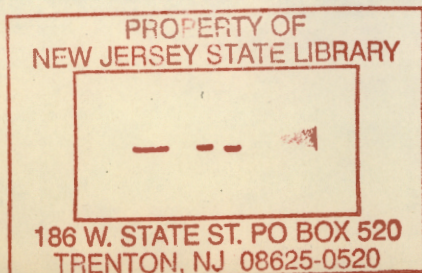
Source: New Jersey Division of Motor Vehicles

*Conversion Year:

All 1955 passenger registrations expired March 31, 1956. Renewals were issued on a pro-rated staggered basis, with expirations falling in all of the twelve months. The passenger car registration figure for 1956 is therefore inflated.

Vehicle Pollution

The most comprehensive study of the problem of air pollution from motor vehicles was conducted by the United States Public Health Service, 1960-1962.



The report of this study, *Motor Vehicles, Air Pollution, and Health*, was submitted by Surgeon General Luther L. Terry on 7 June 1962 to the United States Congress. The study was made as directed by Public Law 86-493 enacted 8 June 1960. The Report contains 459 pages of information and is recommended to any serious student of the subject. It is referred to as the PHS Report in these pages.

Vehicles produce pollution in three ways: tailpipe exhaust, crankcase ventilation, and fuel evaporation. The amount and nature of the total pollution produced by each vehicle may vary at least with the following:

- Vehicle type
- Driving technique
- Type and quality of fuel
- Weather
- Traffic and road conditions
- Length of trip
- Driving cycle (idle, accelerate, cruise, decelerate)
- Engine adjustments (spark, carburetor, etc.)
- Age and health of vehicle

Beginning on page 283 of the PHS Report are 39 pages of emission concentration and weight data collected from various vehicles under various conditions of operation. The variety of these data defies summary here.

However, Technical Committee TA-10 of the Air Pollution Control Association provides a few helpful estimates of average tailpipe exhaust from gasoline burning vehicles.

Pollutant	Range	Average
Hydrocarbons	200 ppm to 5000 plus	700-900 ppm (about 5% by weight of fuel supplied to engine)
Carbon Monoxide	1 to 10% by volume	3 to 3.5%
Oxides of Nitrogen	100 to 2500 ppm	900 to 1100 ppm

Tests performed in Los Angeles indicate that the average passenger car exhaust volume is 30 cubic feet per minute. This means that the exhaust contains about .024 cfm of hydrocarbons; about 1 cfm of carbon monoxide and about .01 cfm of oxides of nitrogen.

The same Committee estimates that hydrocarbons leave the crankcase of passenger cars in a concentration of from 10,000 to 15,000 ppm, or about two percent of the fuel supplied to the engine. The average volume of the mixture leaving the crankcase is one cubic foot per minute.

The Committee further estimates that of all the hydrocarbons emitted from the car about five to 15 percent are lost through fuel evaporation, from the gas tank, the carburetor, and elsewhere.

These estimates indicate the magnitude of hydrocarbon loss by the three routes: tailpipe, 60 percent; crankcase, 30 percent; evaporation, 10 percent.

Table 2

State	Total Motor Vehicles	Sq. Miles	Vehicles Per Sq. Mile
New Jersey	2,701,277	7,521	359
Rhode Island	371,614	1,058	352
Connecticut	1,325,962	4,899	271
New York	5,476,500	47,939	114
Delaware	219,142	1,978	111
Ohio	4,423,800	40,972	108
Pennsylvania	4,809,000	45,007	107
Illinois	4,080,600	55,930	73
Michigan	3,585,910	57,019	63
California	8,902,395	156,573	57
Florida	2,693,500	54,252	50
Hawaii	265,834	6,415	41
United States	82,046,624	3,599,872	23
Texas	4,998,200	262,840	19

Source of motor vehicle figures:
Automotive Industry Statistical Issue, 1964

The Committee report makes the following estimates for diesel engine tailpipe exhaust:

Hydrocarbons

Perhaps 1/3 the quality of a gasoline engine of the same size.

Carbon Monoxide

Less than 1/10 of the gasoline engine of the same size.

Oxides of Nitrogen

About the same as a gasoline engine of the same size.

Diesel crankcase ventilation is a much less important source. Without any positive crankcase ventilation device, the average hydrocarbon emission is only about 1/7 of what California will permit on gasoline-fueled cars which are equipped with a control device. Diesel evaporation is also of much less significance because of the much lower volatility of the fuel.

Aside from applying our slide rule to the figures above, another route can be followed roughly to calculate total motor vehicle pollution in New Jersey. Page 21 of the PHS Report refers to studies conducted in Los Angeles County as to the total amount of pollution produced for every 1,000 gallons of gasoline consumed. If we apply these factors to the amount of gasoline reported sold in New Jersey, we arrive at an estimate of total pollution produced by gasoline-burning vehicles in the state. This will provide a conservative measure because of the fact noted above that the number of cars traveling in New Jersey considerably exceeds the native car population. Some of the fuel used by out-of-state vehicles, is, of course, purchased out of state and not reported here. To some extent this will be offset by fuel purchased in New Jersey and consumed elsewhere. The annual report of the Motor Fuels Tax Bureau, Department of Treasury, states that New Jersey motor fuel consumption in 1963 was

2,255,371,170 gallons. If we apply this amount to the estimates developed for Los Angeles we get the following interesting table.

Pollutant	Amount Per 1000 Fuel Gallons	Total Amount Emitted in N. J. (in tons per week)
Carbon Monoxide	3000 lbs.	64,800
Hydrocarbons	300 lbs.	6,480
Oxide of Nitrogen	100 lbs.	2,160
Aldehydes	5 lbs.	108
Sulphur Compounds	7.5 lbs.	162
Organic Acids	2 lbs.	43
Ammonia	2 lbs.	43
Miscellaneous Solids	0.3 lbs.	6.5

These data do not include pollution by diesel vehicles.

Effects of Vehicle Pollution

Automobile exhaust contains ingredients known to be harmful with sufficient exposure: carbon monoxide, oxides of nitrogen, aldehydes, a number of cancer-producing hydrocarbons, lead, sulphur dioxide, and other elements and compounds. If automobile exhaust is allowed to fill a closed garage, it will kill anyone remaining inside. This we know from hundreds of suicides and fatal accidents. The question, therefore, is not whether such exhaust is harmful. The question is: Are the emissions from automobiles, in the concentrations found in the atmosphere, harmful to our health? And, if so, at what levels do they cease to be safe. The PHS Report, page 62, says that the answer is years away.

It is not known with any exactness at what levels in our breathing atmosphere motor vehicle-type contaminants are present. Even if this were known, we could not be certain how much came from cars and how much from other sources. The PHS Report, page 25, expresses the current status of this knowledge:

"While there are many published reports of measurements made in many localities throughout the world, some are of dubious reliability, few valid conclusions can be drawn as to the actual exposure of the populations involved, and comparisons . . . are difficult because of differences in sampling and analytical procedures. Although references are made to such data in . . . this Report, the deficiencies . . . are acknowledged."

However, our ignorance of the possible effects of such pollution is not complete. What *do* we know, for example?

1. The American Conference of Governmental Industrial Hygienists for many years has established threshold limit values for many of the kinds of contaminants produced by automobiles. These values were established to help in the prevention of occupational disease. It is believed that below these levels

in the air, employees will not be harmed by eight hours exposure per day, five days a week. It is not pretended that these levels should apply to the whole population, including the very young, the aged and the infirm, who may be exposed 24 hours a day to a great variety of contaminants in the community atmosphere.

2. The State of California has established atmospheric standards for a number of vehicle-type pollutants, giving levels believed to be "adverse," "serious," "emergency," (*California Standards for Ambient Air Quality, 1959, 1961, 1962*).

3. It is known that smog—the kind of aerosol haze that irritates eyes, obscures visibility, and damages vegetation—can be produced in the laboratory by mixing automobile exhaust with air and exposing it to artificial sunlight in a simulation of actual outdoor conditions.

4. According to the Haagen-Smit view of smog (used as the theoretical basis for regulation in California) two of the three principal vehicle pollutants—hydrocarbons and oxides of nitrogen—are vital ingredients in the chemical reactions occurring in the atmosphere which produce smog.

5. That excessively smoking cars, trucks and buses—especially diesels—are an obvious local nuisance. No sophisticated instrumentation other than our noses is needed to measure their objectionability.

6. It is known that in certain times of the day and in certain times of the year (especially autumn), meteorological conditions in New Jersey are right for smog. On the majority of days, we experience temperature inversion early in the morning for an hour or more. This inversion prevents dilution of pollutants by holding them close to the ground. During November and December of 1962, New Jersey experienced 10 days of temperature inversion and low velocity wind. Fifteen such smog-qualifying days

The report reproduced in these pages is a report of the Motor Vehicle Committee of the New Jersey Air Pollution Control Commission to the Commission itself. The report was submitted to the Commission on September 21, 1964. The members of the Committee at the time the report was submitted were Richard J. Sullivan, chairman, and William C. Lynn, both members of the Air Pollution Control Commission.

Other members of the Air Pollution Control Commission are Louis A. Winkelman, chairman; Vernon C. Winn, vice chairman; John P. Brady; Dr. Roscoe P. Kandle; Joseph F. Mellor, Jr.; Walter J. Nicol; and Roland S. Yunghans.

were recorded in October, 1963. And it is known by measurement here that oxidant levels in the air have at times exceeded the smog index level established in Los Angeles. When these conditions exist, the metropolitan area sky is a vast garbage can which every pollution source in the area tends to fill, to the misery of those who live under the lid.

7. A number of the hydrocarbons found in vehicle exhaust are carcinogens—that is, upon repeated application to laboratory animals in sufficient quantity and for sufficient duration, they will produce cancer of the lung, skin cancer or other malignancies.

8. Believable evidence has been collected in California and New Jersey that vegetation has been seriously damaged because of the presence in the air of several pollutants produced by automobiles as well as other sources. Dr. Robert Daines, of Rutgers—the State University, claims that air pollution is one of the greatest single threats to New Jersey's agricultural industry.

9. The PHS Report page 54, says “. . . On the basis of the studies thus far conducted, it is evident that components of automobile emissions produce biological effects. These include eye irritation in people, changes in pulmonary function and reduction of spontaneous activity in animals, as well as damage to vegetation;” further “there is . . . a strong statistical association between air pollution and emphysema and there are indications that the clinical status of this disease is affected by photochemical

pollution. The rising death rate ascribed to emphysema is a matter of real concern. Furthermore, the evidence with respect to the production of lung cancers is such as to require further study . . .” as soon as possible.

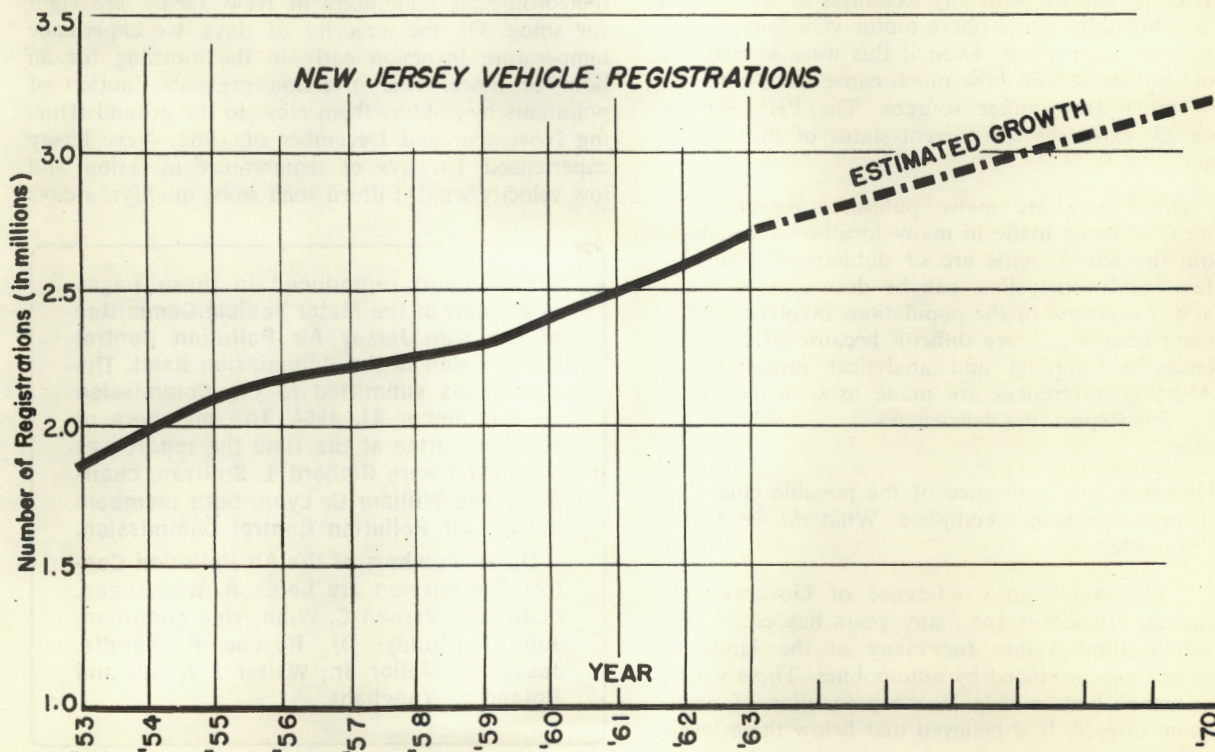
Air pollution contributes to ill health; to what extent we don't exactly know. Motor vehicles contribute to air pollution; to what extent we don't exactly know.

Charge 2: Legislative Action Elsewhere

California

California has pioneered in the regulation by government of motor vehicle pollution.

In 1959, the California Legislature directed the State Board of Public Health to establish standards for the quality of ambient air and for emissions from motor vehicles. In 1960, the Legislature created the Motor Vehicle Pollution Control Board in the Department of Public Health. The Board comprises 13 members, nine representing the public and four State Department heads. Public members serve four-year rotating terms. The function of the Board is to test and certify crankcase ventilation devices and exhaust-limiting methods and devices that would bring the amount of contaminants released from these two sources below the standards to be promulgated by the Board of Health.



On 2 December 1960, the Board of Health decreed that hydrocarbon emission from the crankcase may not exceed 0.15% by weight of the fuel supplied to the engine. All new cars sold in California beginning in 1963 were required to be equipped with a crankcase device approved by the MVPCB as capable of meeting its emission and performance criteria. The latter criteria were set with regard to the cost of the device, its durability, the ease of determining its proper operation, and other factors.

Legislation further established a schedule of compliance, requiring cars purchased prior to 1963 to be equipped with certified crankcase devices. The law allowed County Boards of Supervisors to decide whether they wished this statutory requirement to apply in their county to used cars. The compliance schedule requires that by January, 1966 all California motor vehicles (with several minor exemptions) be equipped with an approved crankcase emission control device as a condition of license renewal in 1966.

"If practical, effective, and relatively inexpensive devices and methods are about to be available to help clean up California's sky, then why not get them for New Jersey, too?"

The law further provides that the Department is empowered to license official installation and inspection stations which are authorized to install, repair, inspect, or recharge motor vehicle pollution control devices.

On 20 September 1963, the California Board of Public Health promulgated a visual standard for smoke emitted from motor vehicles based upon opacity measured by the Ringelmann chart.

In addition to the standards noted above, the State Board of Health promulgated a standard for tailpipe exhaust: 275 parts per million of hydrocarbons and 1.5% carbon monoxide. These standards were adopted in consideration of the ambient air quality standards already promulgated. The real basis, however, of the standards was an attempt to assure that the total pollution by hydrocarbons and carbon monoxide from all of the cars expected to exist in 1970 would not exceed the total pollution by these substances calculated to have been emitted by the 1940 car population.

The law requires that new vehicles sold more than 12 months after the approval by the MVPCB of at least two devices or methods for meeting these tailpipe exhaust standards, must be equipped with such a device or method. On 17 June 1964, the MVPCB announced the approval of four devices, three of the catalytic type and one afterburner. This means that cars sold for the 1966 model year must

be equipped with one of these devices or any other approved in the interim.

Meanwhile, however, (early in 1964) the Automobile Manufacturers Association, on behalf of the principal domestic vehicle manufacturers, stated the intention of the industry voluntarily to equip all cars to be sold in California in the 1967 model year with devices and/or engine modifications that would cause them to meet the exhaust standards established by the Board of Health. In mid-1964, the Association further promised to equip the 1966 models of its lower priced and faster selling lines with such control measures. The industry thus sought to have the MVPCB nullify its requirements that all vehicles sold by the 1966 model year be equipped with one of the devices already approved.

New York

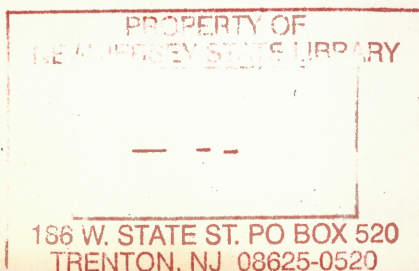
In 1962, the State of New York enacted legislation requiring the installation of positive crankcase ventilation devices on new cars. The law authorizes the State Air Pollution Control Board to promulgate standards of performance for required devices. In 1962, the Air Pollution Control Board promulgated interim criteria applicable for the years 1963 and 1964. The effective date of the requirement that devices be installed on new cars was 1 July 1963. The obligation of the law actually was imposed upon the car owner making the installation of a satisfactory device a condition of vehicle registration. During 1963, the Board established permanent criteria. The Board has approved more than 140 variations of ventilating devices. The devices with which new American (manufactured in the United States) cars all over the country are now (with the exception of one manufacturer) equipped met the criteria established by the Board. The manufacturer who is the exception has apparently purchased a device for installation on all of its cars to be sold in the State of New York in compliance with the law. The law does not apply to cars sold prior to 1 July 1963. There is no indication of the enactment of legislation to regulate these older vehicles.

Federal

On 17 December 1963, the Congress adopted P.L. 88-206, referred to as the Clean Air Act. Section 6 of the Act reads as follows:

Automotive Vehicle and Fuel Pollution

Sec. 6 (a) The Secretary shall encourage the continued efforts on the part of the automotive and fuel industries to develop devices and fuels to prevent pollutants from being discharged from the exhaust of automotive vehicles, and to this end shall maintain liaison with automotive vehicle, exhaust control device, and fuel manufacturers. For this purpose, he shall ap-



point a technical committee, whose membership shall consist of an equal number of representatives of the Department and of automotive vehicle, exhaust control device, and fuel manufacturers. The committee shall meet from time to time at the call of the Secretary to evaluate progress in the development of such devices and fuels and to develop and recommend research programs which could lead to the development of such devices and fuels.

(b) One year after enactment of this section, and semi-annually thereafter, the Secretary shall report to the Congress on measures taken toward the resolution of the vehicle exhaust pollution problem and efforts to improve fuels including (A) occurrence of pollution as a result of discharge of pollutants from automotive exhaust; (B) progress of research into development of devices and fuels to reduce pollution from exhaust of automotive vehicles; (C) criteria on degree of pollutant matter discharged from automotive exhausts; (D) efforts to improve fuels so as to reduce emission of exhaust pollutants; and (E) his recommendations for additional legislation, if necessary, to regulate the discharge of pollutants from automotive exhausts.

"New Jersey is first in the nation in the number of cars (registered) per square mile. Our vehicle density in 1963 was 359 per square mile. The average for the United States was 23 per square mile."

The essence of the section is a directive from Congress to the Secretary that he ". . . shall encourage . . . continued efforts . . . to prevent pollutants from being discharged from the exhaust of automotive vehicles. . . ." The implication is that while research should continue, the time for control measures has arrived.

On 16 July 1964, the Secretary of Health, Education, and Welfare appointed the Committee called for in this Section of the Law.

The information provided on the preceding pages of this report is this committee's attempt to respond to the two charges given at the time of its establishment. The opinions and recommendations presented below are gratuitous. They are offered simply because the committee sincerely believes that they merit the attention of the Commission.

Opinions

The problems in determining with any exactness the effect of motor vehicle pollution on health are much the same as those encountered in measuring

the health effect of air pollution in general—problems with which the Commission is quite familiar.

This Committee hopes and believes that research will proceed to identify cause and effect. Also, we believe that New Jersey should acquire baseline data on the presence in our atmosphere of various pollutants—including the kinds produced by cars—at different times and places. The so-called Big Sniff Operation, which has been authorized in the Air Sanitation Program's fiscal 1965 budget should proceed. We are also hopeful that a proposal of the Interstate Cooperative Committee that a comprehensive air pollution survey be made of the New York-New Jersey Metropolitan area will be adopted.

However, it will be at least several years before these projects produce meaningful information on air pollution levels. And it is not at all sure that the data will tell us how much of the airborne refuse was put there by the auto. It is even less sure that research done in New Jersey or anywhere will soon tell us how much motor vehicle pollution must be restricted so as not to be harmful to public health.

"This heavy concentration of vehicles (native to the state) is augmented in this state more than in most by a substantial number of vehicles traveling through. The New Jersey Turnpike is the nation's busiest toll road . . . If we add the cars that take advantage of the Garden State Parkway, Route 95, and other corridors, we know that our actual density is immeasurably above the 359 vehicles per square mile that live here."

As noted above, motor vehicles in this state produce immense quantities of air contaminants. The quantities grow each year. The sky gets murkier. Scientists tell us that this murk is not good for us. We don't know with exactness how bad it is for us; and we don't know with exactness how much of the murk is provided by the automobile.

We do know, however, that the principal American (United States) automobile manufacturers are prepared to sell in California beginning in 1966 automobiles which are equipped to reduce drastically the total amount of tailpipe exhaust. The added expense probably will range from one to two percent of the car's retail cost. We can't help but ask: If practical, effective and relatively inexpensive devices and methods are about to be available to help clean up California's sky, then why not get them for New Jersey, too?

Control of motor vehicle pollution without having in hand conclusive proof of the alleged harm that it does would basically not be different from the regulation we have already undertaken of open

burning of refuse, and of smoke and flyash. In those cases, the Commission determined that unnecessary and reasonably avoidable pollution was excessive. The same may now be said of automobile emissions.

The question really is not *whether* to control such emissions, but *when*? The eventual need for vehicle exhaust control is an absolute certainty. As the car population continues its inexorable rise, the time must come when even the present foes of control will admit the need for exhaust reduction. Otherwise we will one day be smothered by such pollution, if not by the cars themselves.

It appears to us that five approaches to control deserve consideration. The five are listed below with some comments on each.

1. Requiring positive crankcase ventilation to be installed on all new gasoline-burning vehicles registered in New Jersey.

Comments

a. All domestic manufacturers except one are now voluntarily providing such devices on cars sold in New Jersey. If all domestic and foreign manufacturers equip their vehicles with adequate devices a legal requirement may not be necessary.

b. California and New York require by statute that such devices be installed on all new cars. California further requires that older vehicles be so equipped on a schedule provided in the statute.

c. It is not known by us whether these installations have reduced the efficiency of the combustion process, increasing the amount of the carbon monoxide in the exhaust; or whether they interfere in any other way with normal engine operation.

d. These devices require periodic maintenance or replacement to be effective. It is expected that it will be difficult to convince the public of this need. Gas station mechanics are not now fully informed as to what must be done. It is believed that some mechanics and dealers are removing the device to avoid any problems with it.

e. The device is believed to reduce hydrocarbon pollution from the total vehicle by about 30 percent.

f. A device can be purchased and installed for less than \$15.

g. If new cars come equipped with positive crankcase ventilation, it would not make sense to require such devices on older cars. By the time the legislation were adopted and standards established, most of the older cars on the road would already be so equipped.

h. To require positive crankcase ventilation on cars as a condition of their registration with the

Division of Motor Vehicles would call for new legislation.

2. Require exhaust control or engine modifications to reduce tailpipe exhaust hydrocarbon content to less than some specified standard.

Comments

a. Domestic automobile manufacturers have agreed to meet the California standards of 275 ppm of hydrocarbon and 1.5% CO, on some of the cars in their 1966 model series and on all of their cars in the 1967 model series, to be sold in California.

b. No other state has any statutory requirement for tailpipe exhaust control.

c. California has approved four devices for installation on cars but because of the action taken by car manufacturers, it is likely that these may only be employed on cars retailed not later than the 1965 model series.

d. These devices are more expensive than positive crankcase ventilation with costs running up to \$100. At a price of \$50 per car, it would cost New Jersey car owners in excess of \$125 million to equip cars now registered and \$20 million per year thereafter. However, if the industry's incentive is aroused, we are sure that its ingenuity will soon produce, at lower cost, control methods superior to what California now requires.

e. By such regulation of air pollution, the general public will, for the first time, be treated not just as victims but as the sources of air pollution. This would give another dimension to a public problem. Perhaps the public can legitimately contend that all other major pollution sources be corrected to the best of our ability before assessing control costs on millions of automobile owners and buyers. Of course, the Commission already has promulgated mandatory standards for smoke, flyash, open burning, and particulate matter.

f. The argument can be made by us that if this control is feasible and is about to benefit California residents, why shouldn't New Jersey benefit as well?

g. The automobile manufacturing industry is likely strongly to oppose such a requirement. Their stated position is that the need for such control has not been demonstrated outside of California.

h. In addition to the emission standards, criteria would have to be developed for control devices including costs (for added devices), reliability, simplicity of maintenance and inspection, etc.

i. To require the installation of such devices on new cars as a condition of sale or as a condition of motor vehicle registration would call for new legislation.

- 3 Regulate quality of diesel and gasoline fuels.

a. Certain low quality diesel fuels apparently cause excessive smoke. (See *The Diesel Vehicle and Its Role in Air Pollution*, California Department of Public Health Report to the Legislature, December, 1962). This unneeded and avoidable smoke can be prevented by prohibiting the sale in New Jersey of such fuel. This would involve establishing a quality standard.

b. Certain gasolines are believed to produce pollutants (olefins) more highly reactive in the ambient atmosphere. Los Angeles County as of 1 January 1962 required that no gasoline may be sold as a motor vehicle fuel if it has a degree of unsaturation greater than that indicated by a Bromine Number of 20, determined by a specified method.

c. This kind of regulation would also call for additional legislation.

d. Such examination would add to the burden of car examination requiring more personnel and time, and probably would be quite unpopular with car owners.

e. This type examination at inspection stations would be a departure from their present function which is to determine the safe condition of the vehicle.

f. Additional legislation would be required.

Recommendations

1. That the Commission urge the Department to proceed as quickly as possible with its operation "Big Sniff" which will hopefully provide information as to the levels in New Jersey's atmosphere of contaminants of the type produced by motor vehicles. And, further, that the Department be urged to aim this monitoring system as far as possible toward the evaluation of automotive pollution.

2. That the Commission and the Department urge the U. S. Public Health Service to approve and assist the comprehensive air pollution survey proposed to be undertaken in the New York-New Jersey Metropolitan Area as outlined in the proposal of 7 February 1964, of the Interstate Cooperative Committee.

"In certain times of day and in certain times of the year (especially autumn), meteorological conditions in New Jersey are right for smog . . . Oxidant levels in the air have at times exceeded the smog index level established in Los Angeles. When these conditions exist, the metropolitan area sky is a vast garbage can which every pollution source in the area tends to fill, to the misery of those who live under the lid."

3. That the Commission request the Department to secure as much detailed information as it can on the effectiveness of positive crankcase ventilation devices on cars being sold in New Jersey and to determine, if possible, whether the use of such devices has, in fact, proved harmful to the operation of the car, or has increased tailpipe exhaust. The Department should further determine to what extent such devices are now adequately maintained and replaced and whether or not an educational program along these lines is needed.

4. That the Commission draft proposed legislation which would require all gasoline-burning vehicles in New Jersey to be so equipped with control devices or engine modification that the tailpipe exhaust ingredients would not be in excess of standards to be determined by the Commission; provided, however, that such a requirement would become effective on all new cars and progressively on used cars only after the Commission has:

4. Control smoking vehicles on the road.

Comments

a. It is possible to establish a visual standard of smoke for both diesel and gasoline burning equipment. (California has done so.)

b. With the cooperation of state and local police, enforcement could be undertaken to eliminate excessive smoke by issuing summonses to operators of vehicles violating the standard.

c. This would curb acute exposure but would not make a remarkable contribution to the reduction of total vehicle pollution.

d. A substantial education program would be involved before police officers could enforce the standard.

e. Probably additional legislation would be required. The Motor Vehicle Law now prohibits "annoying smoke."

5. Require Motor Vehicle station inspection.

Comments

a. It is possible that inspection stations could undertake to check the condition of positive crankcase ventilation and tailpipe control devices if such become required equipment.

b. Inspection could also involve a quick test to determine the smokability of diesel and gasoline-burning vehicles as an indication of the degree of maintenance of the engine.

c. Standards would have to be established for such tests and inexpensive equipment devised and provided. The State Health Department has already developed such a device for diesels.

- (1) Promulgated exhaust standards,
- (2) Promulgated criteria for control devices and/or engine modifications,
- (3) Determined that control devices or engine modifications to meet the standards are feasible.

5. That the Commission draft proposed legislation prohibiting the sale in New Jersey of sub-standard motor vehicle fuel. And, that the Commission request the Department to secure specific information as to minimum diesel and gasoline fuel quality standards that can reasonably be imposed.

6. That the Commission, with the cooperation of the Divisions of Motor Vehicles and State Police, draft proposed legislation authorizing state and local police to enforce on the road visual smoke standards to be promulgated by the Commission, covering both diesel and gasoline vehicles.

7. That the Commission urge the Department to proceed with the final development of its device for measuring the smokability of diesel engines; and, further, urge the Department to develop an equivalent device for measuring smokability of gasoline-burning engines. These devices ought to be portable, inexpensive, convenient and quick to use in a regular motor vehicle station inspection, or in a road-side check.

8. That the Commission recommend to the Department the employment or assignment of a person with technical training who can specialize in the intricacies of motor vehicle pollution control methods and practices.

We acknowledge with thanks the assistance given this committee by Department personnel, especially Mr. William Munroe.*

This committee appreciates the opportunity to present these facts, opinions and recommendations and hopes that they may assist the work of the Commission.

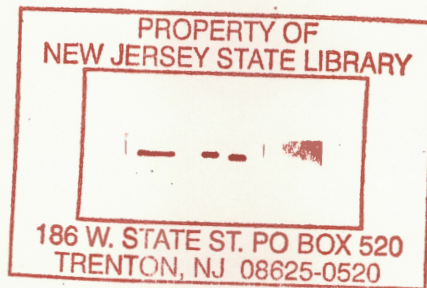
WILLIAM LYNN

R. J. SULLIVAN, *Chairman*

*Coordinator, Air Sanitation Program, New Jersey Department of Health.

"Congress has directed the Secretary of Health, Education, and Welfare to encourage continued efforts to prevent pollutants from being discharged from the exhaust of automotive vehicles. The implication is that while research should continue, the time for control measures has arrived."

This article was reprinted from the November 1964 issue of PUBLIC HEALTH NEWS published by the New Jersey State Department of Health



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