2. Using any pictorial or other visual means of communication with or without an accompanying verbal text which directly or by implication creates a misleading impression in the minds of viewers as to the true state of material facts which are the subject of said pictures or other visual means of communication unless the respondent can establish it neither knew nor had reason to know nor upon reasonable inquiry could have known the true facts.

3. Misrepresenting in any manner or by any means any characteristic, property, quality, or the result of the use of any gasoline or gasoline additive product unless the respondent can establish it neither knew nor had reason to know nor upon reasonable inquiry could have known that such representations are false.

It is further ordered, That Subparagraphs 1, 3, 4, 5, 7, 8, 9, 10(b), 10(c) and 11 of Paragraphs Five and Six of the complaint be, and they hereby are, dismissed.

It is further ordered, That the respondent corporations shall forthwith distribute a copy of this order to each of their operating divisions.

It is further ordered, That respondents herein shall notify the Commission at least thirty (30) days prior to any proposed change in any of the corporate respondents such as dissolution, assignment, or sale resulting in the emergence of a successor corporation, the creation or dissolution of subsidiaries or any other change in the corporation which may affect compliance obligations arising out of the order.

It is further ordered, That respondents shall, within sixty (60) days after service of the order upon them, file with the Commission a written report, signed by the respondents, setting forth in detail the manner and form of their compliance with the order to cease and desist.

Commissioners Hanford and Nye did not participate since oral argument was heard prior to their assumption of Office.

IN THE MATTER OF

CROWN CENTRAL PETROLEUM CORPORATION

ORDER, OPINION, ETC., IN REGARD TO ALLEGED VIOLATION OF THE FEDERAL TRADE COMMISSION ACT

*Docket 8851. Complaint, July 14, 1971 - Decision, Nov. 26, 1974**

Order requiring a Baltimore, Md., seller and distributor of gasoline and other petroleum products, among other things to cease misrepresenting that its gasoline additive will produce pollution-free exhaust.

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*Petition for review filed Nov. 26, 1974, D. C. Cir.

Appearances

For the Commission: *Fauster J. Vittone, Jean F. Greene* and *Michael A. Pearlman.*

For the respondent: *James H. Kelley, Leonard H. Tokus, Bergson, Borkland, Margolis & Adler,* Wash., D.C. *Morton A. Sacks, Cable, McDaniel, Bowie & Bond,* Baltimore, Md.

COMPLAINT

Pursuant to the provisions of the Federal Trade Commission Act, and by virtue of the authority vested in it by said Act, the Federal Trade Commission, having reason to believe that Crown Central Petroleum Corporation, a corporation, hereinafter referred to as respondent, has violated the provisions of said Act, and it appearing to the Commission that a proceeding by it in respect thereof would be in the public interest, hereby issues its complaint stating its charges in that respect as follows:

PARAGRAPH 1. Respondent Crown Central Petroleum Corporation is a corporation organized, existing and doing business under and by virtue of the laws of the State of Maryland, with its principal office and place of business located at One North Charles, Baltimore, Md.

PAR. 2. Respondent Crown Central Petroleum Corporation is now, and for some time past has been, engaged in the sale and distribution of gasoline and other petroleum products under the trade name Crown and other names to the public.

In 1969 respondent Crown Central Petroleum Corporation's sales were in excess of $90,000,000.

PAR. 3. Respondent Crown Central Petroleum Corporation in the course and conduct of its business as aforesaid now causes and for some time past has caused its said products, when sold, to be shipped from its places of business in the States of Maryland and Texas to purchasers thereof located in various other States of the United States, and maintains, and at all times mentioned herein has maintained, a substantial course of trade in said products in commerce, as "commerce" is defined in the Federal Trade Commission Act.

PAR. 4. In the course and conduct of its business as aforesaid, and for the purpose of inducing the purchase of Crown gasolines containing CA-101, a gasoline additive, the respondent has made, and is now making, numerous statements and representations in advertisements published in newspapers and in other promotional material, and by means of radio broadcasts.

Typical of the statements and representations contained in said advertisements, but not all inclusive, are the following:

NOW: NEW CLEAN-AIR GASOLINE
WITH FORMULA CA-101

Dramatically reduces exhaust emissions
Crown Premium 100 PLUS and Super Regular Gasoline now contain Formula CA-101. This remarkable new gasoline additive dramatically reduces exhaust emissions from your engine. Crown with Formula CA-101 *reduces unburned hydrocarbons by as much as 66 percent*, deadly carbon monoxide 41 percent**. Clearly, this is a step toward cleaner air. Crown with Formula CA-101 works well in old cars and keeps new cars clean. Every car on the road should be using it.

Gives better mileage
Crown with CA-101 is both new and different. You get better gasoline mileage. It cleans your engine and keeps it clean. Your engine performs better, more efficiently. It breathes easier. And so do you. Crown, with Formula CA-101 burns cleaner, more completely. You use less gasoline. As a result, you get more miles per gallon, more miles per dollar.

NOW: NEW CLEAN-AIR GASOLINE WITH FORMULA CA-101

**REDUCES EXHAUST EMISSIONS * * * unburned hydrocarbons up to 66%, deadly carbon monoxide up to 41%.
**CLEANS ENGINES
**GIVES BETTER MILEAGE* * *

Breathe A Little Easier With Formula CA-101

*Source: "A Study on the Effects * * * of Exhaust Emissions" DuPont Chemical Company.

PAR. 5. By and through the use of the statements and representations, set out in Paragraph Four above, and others of similar import not specifically set out herein, respondent has represented and is now representing that:

1. CA-101 additive produces pollution-free motor vehicle exhaust;
2. CA-101 additive will significantly reduce air pollution;
3. CA-101 additive will significantly reduce emissions of carbon monoxide and unburned hydrocarbons from every motor vehicle in which it is used;
4. Respondent had tests, or had conducted tests, or had had others conduct tests which proved or substantiated representations made for CA-101 additive in its advertisements before publication or dissemination of such advertisements; these representations include, but are not limited to, the following:

(a) CA-101 additive produces pollution-free motor vehicle exhaust;
(b) CA-101 additive will significantly reduce air pollution; and will significantly reduce emissions of carbon monoxide and unburned hydrocarbons from every motor vehicle in which it is used;
(c) Every purchaser of Crown gasoline containing CA-101 additive will obtain substantially better mileage by or through the use of such

gasolines that can be obtained by or through the use of any other commercially available gasoline.

5. CA-101 additive will clean or keep clean all engines and engine components.

PAR. 6. In truth and in fact:

1. CA-101 additive does not produce pollution-free motor vehicle exhaust;

2. CA-101 will not significantly reduce air pollution;

3. CA-101 additive will not significantly reduce emissions or carbon monoxide and unburned hydrocarbons from every motor vehicle in which it is used;

4. Respondent did not have tests, or conduct tests, or have others conduct tests which proved or substantiated representations made for CA-101 additive in its advertisements before publication or dissemination of such advertisements; these representations include, but are not limited to, the following:

(a) CA-101 additive produces pollution-free motor vehicle exhaust;

(b) CA-101 additive will significantly reduce air pollution; and will significantly reduce emissions of carbon monoxide and unburned hydrocarbons from every motor vehicle in which it is used;

(c) Every purchaser of Crown gasolines containing CA-101 additive will obtain substantially better mileage by or through the use of such gasolines than can be obtained by or through the use of any other commercially available gasoline;

5. CA-101 additive will not clean or keep clean all engines and engine components.

Therefore, the aforesaid statements, representations, and demonstrations set forth in Paragraphs Four and Five were and are false, misleading, and deceptive.

PAR. 7. In the course and conduct of its business as aforesaid, and at all times mentioned herein, respondent Crown Central Petroleum Corporation has been and is now in substantial competition in commerce with corporations, firms and individuals in the sale of gasolines and other petroleum products of the same general kind and nature as that sold by respondent.

PAR. 8. The use by respondent of the aforesaid false, misleading and deceptive statements and representations has had, and now has, the capacity and tendency to mislead members of the purchasing public into the erroneous and mistaken belief that said statements, representations and demonstrations were and are true and into the purchase of substan-

tial quantities of Crown gasolines with CA-101 by reason of said erroneous and mistaken belief.

PAR. 9. The aforesaid acts and practices of respondent, as herein alleged, were and are all to the prejudice and injury of the public and of respondent's competitors and constituted, and now constitute, unfair methods of competition in commerce and unfair and deceptive acts and practices in commerce in violation of Section 5 of the Federal Trade Commission Act.

INITIAL DECISION BY THEODOR P. VON BRAND, ADMINISTRATIVE LAW JUDGE
MAY 25, 1973

PRELIMINARY STATEMENT

On July 14, 1971, the Federal Trade Commission issued its complaint against Crown Central Petroleum Corporation (Crown), charging it with having violated Section 5 of the Federal Trade Commission Act.

Crown, a marketer and distributor of gasoline and other petroleum products, according to the complaint, misrepresented the performance of its gasolines containing CA-101, a detergent additive. Specifically, the complaint charges that respondent falsely represented that:

CA-101 produces pollution free motor vehicle exhaust.

CA-101 will significantly reduce air pollution.

CA-101 will significantly reduce emissions of carbon monoxide and unburned hydrocarbons from every motor vehicle in which it is used.

CA-101 will clean or keep clean all engines and engine components.

Crown had tests or conducted tests or had others conduct tests which proved or substantiated certain of the representations made for CA-101 in its advertisements before publication or dissemination thereof.

The product claims whose propriety is under consideration here are based essentially on the contention that the additive effectively reduces certain automobile emissions by preventing, removing, or reducing deposits in the carburetor and the engine's intake system and thus keeping in effect or restoring the optimum air fuel ratio.

Prehearing conferences were held on Oct. 22, 1971, Jan. 3, 1972, Mar. 24, 1972, Apr. 7, 1972, June 27, 1972 and Aug. 4, 1972. Evidentiary hearings commenced on Sept. 25, 1972, and the record was closed on Nov. 17, 1972. Oral argument on proposed findings was heard on Apr. 20, 1973. The Commission, at complaint counsel's request, extended the time for the filing of proposed findings and replies fixing June 22, 1973 as the due date of the initial decision.

This matter is now before the undersigned for final consideration of the complaint, answer, evidence, and the proposed findings of fact, conclusions, and briefs filed by counsel for the respondent and complaint counsel. Consideration has been given to the proposed findings of fact, conclusions and briefs filed by both parties, and all proposed findings of fact and conclusions not herein specifically found or concluded are rejected; and the undersigned, having considered the entire record herein, makes the following findings of fact, conclusions drawn therefrom, and issues the following order:

FINDINGS OF FACT[1]

I. The Respondent

1. Crown Central Petroleum Corporation is a corporation organized, existing and doing business under and by virtue of the laws of the State of Maryland, with its principal office and place of business located at One North Charles, Baltimore, Md. (Admitted in Answer)

2. Crown is now, and for sometime past has been, engaged in the sale and distribution of gasoline under the trade name Crown and other names to the public. In 1969, its sales were in excess of $90,000,000. (Admitted in Answer)

3. Crown, in the course and conduct of its business, now causes, and for sometime past has caused its products, when sold, to be shipped from its places of business in the States of Maryland and Texas to purchasers thereof located in various other States of the United States, and maintains, and at all times mentioned herein has maintained, a substantial course of trade in said products in commerce, as "commerce" is defined in the Federal Trade Commission Act. It is in competition in commerce with other corporations, firms, and individuals in the sale of petroleum products. (Admitted in Answer)

4. Crown, at the time of the advertisements challenged in this proceeding, had 30 stations in the Baltimore-Washington area and 17 stations in Virginia (CX 108, 108A). In 1970, its market share of gasoline sales in Maryland and Virginia was 2.65 percent and 1.42 percent, respectively (CX 120A-B).

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[1] References to the record are made in parenthesis, and certain abbreviations are used as follows:
CPF - Proposed findings of complaint counsel
RPF - Proposed findings of counsel for respondent
CX - Commission Exhibit
RX - Respondent's Exhibit
Tr. - Transcript page
CRPF - Complaint counsel's reply to respondent's findings
RRPF - Respondent's reply to complaint counsel's findings
Reference to the proposed findings of counsel are to page numbers, preceded by one of the abbreviations listed above. References to the testimony sometimes cite the name of the witness and the transcript page number without the abbreviation.

II. Air Pollution

5. Air pollution is the presence in the outdoor atmosphere of one or more substances in concentrations and over periods of time which have or tend to have a detrimental effect on human health, or adverse effect on vegetation, agricultural animals; reduce visibility, or interfere with reasonable enjoyment of one's property (Schueneman 448).

Among the principal air contaminants are sulfur dioxide, arising primarily from the combustion of sulfur containing fuels; carbon monoxide which arises primarily from motor vehicle exhaust and to some extent from industrial processes; nitrogen dioxide which arises from photochemical reactions in the atmosphere involving hydrocarbons and nitric oxide; nitric oxide arising primarily from the combustion of any fuel; and photochemical oxidants which are produced in the atmosphere through reaction between nitric oxides and hydrocarbons in the presence of strong sunlight. Another principal class of contaminants is particulate matter, which are particles in the atmosphere made up of dust, fumes, metallurgical fumes, and chemical particles. In addition, air pollution is also comprised of such contaminants as lead, asbestos, beryllium, mercury and fluorides (Schueneman 448-49).

6. Over the past 30 years, the major pollutants with the exception of particulates have increased significantly. Such increases may be ascribed to the major increase in population and industrialization marking this period and the short time in which serious control effects have been undertaken (RX 19, p. 6).

Weight of Emissions of Air Pollutants, 1940-1970 (Tons X 10^6)

Year	SO_x	CO	Particulates	HC	NO_x
1940	22	85	27	19	7
1950	24	103	26	26	10
1960	23	128	25	32	14
1968	31	150	26	35	21
1969	34	154	27	35	22
1970	34	147	25	35	23

Source: EPA, "Nationwide Air Pollutant Emission Trends, 1940-70," 1972, forthcoming. (RX 19, p. 6)

The abbreviations stand for the following: SO_x - sulfur oxides; CO - carbon monoxide; HC - hydrocarbons; NO_x - nitrogen oxides.

Broken down by source, pollutants on a weight basis were set forth as follows in preliminary federal estimates for 1970:

Estimated Emissions of Air Pollutants by Weight, Nationwide, 1970 (Preliminary Data)
(In millions of tons per year)

Source	CO	Particulates	SO_x	HC	NO_x
Transportation	111.0	0.7	1.0	19.5	11.7
Fuel combustion in stationary sources	.8	6.8	26.5	.6	10.0
Industrial processes	11.4	13.1	6.0	5.5	.2
Solid waste disposal	7.2	1.4	.1	2.0	.4
Miscellaneous	16.8	3.4	.3	7.1	.4
Total	147.2	25.4	33.9	34.7	22.7
Percent change 1969-70	−4.5	−7.4	0	0	+4.5

Source: Environmental Protection Agency (RX 19, p. 6)

7. The significance of air pollutants should not be evaluated solely in terms of their aggregate weight. Pollutants are of concern because of their effect on human health, damage to vegetation, livestock and structures and effects on atmospheric processes. For example, other things being equal, a pound of sulfur oxides is a greater threat to welfare than a pound of carbon monoxide (CX 72, p. 213, CX 74, p. 10, CX 75, p. 2).

III. The Automobile and Air Pollution

8. Air pollution from automobiles is a major environmental problem. While smog resulting from the automobile was originally considered to be a Southern California problem, it is now becoming a national phenomenon (CX 40E, The President's 1971 Environmental Program).

In terms of total national air pollution, the automobile is the greatest single contributor by weight. Among the pollutants emitted by motor vehicle exhaust are carbon monoxide, hydrocarbons, oxides of nitrogen, lead compounds, and sulfur dioxide. The amount of sulfur dioxide added to the atmosphere by the motor vehicle is, however, insignificant compared to the amounts from stationary sources (CX 75, p. 1).

9. Emissions from uncontrolled automobiles manufactured prior to 1968, came from the crankcase blowby gases, fuel evaporation from the fuel tank and carburetor, and the engine exhaust. The crankcase and evaporative losses were controlled as of 1971. The emissions from the engine exhaust result from the combustion process occurring inside the engine cylinder. Hydrocarbons and carbon monoxide result from incomplete combustion of the fuel-air mixture; oxides of nitrogen form in the high-temperature burnt gases as the combustion process proceeds (CX 115, p. 10).

10. The annual pollution contributed by 90 million vehicles may roughly be estimated as follows:

66,000,000 tons of carbon monoxide
6,000,000 tons of nitrogen oxides
12,000,000 tons of hydrocarbons
190,000 tons of lead compounds (as lead)
1,000,000 tons of sulfur oxides
1,000,000 tons of particulates

Within the automobile itself, the relative importance of various emission sources is estimated as follows:

Hydrocarbons: 55% from the exhaust, 25% from the crankcase or "blowby" and 20% from carburetor and fuel tank evaporative losses
Carbon monoxide: 99% from the exhaust
Oxides of nitrogen: 99% from the exhaust
Lead: 100% from the exhaust

"The Automobile & Air Pollution: A Program for Progress Part II" (1967) (CX 75, p. 1).

The Environmental Protection Agency has estimated the motor vehicle's percentage of national emissions in 1969 as follows:

Carbon Monoxide	*Hydrocarbons*	*Nitric Oxides*
64.7%	45.7%	36.6%

(CX 43, p. 4-1)

11. Emissions from automotive vehicles are largely responsible for the formation of photochemical smog in certain areas (CX 74, p. 1). The extent to which the automobile contributes to this process varies area by area (Levy, CX 128A; Tr. 1269).

Smog formation is involved in the interaction between oxides of nitrogen, the hydrocarbons, particularly certain classes of reactive hydrocarbons and sunlight (Calvert 365). This stimulates a lengthy and complex series of reactions in which a part or all of the various hydrocarbons are consumed and various secondary products are formed as a result of the photochemical reaction. This entails the formation of products such as nitrogen dioxide, ozone, peroxyacyl nitrates (PAN), aldehydes, organic aerosols and other compounds (Altshuller, CX 124; Tr. 3367-69, CX 5, pp. 2-5, 2-6). In short, the reactions of hydrocarbons are important in the urban atmosphere because they give rise to secondary contaminants and reaction intermediates which cause most of the detrimental effects of hydrocarbon air pollution (CX 5, p. 2-2).[2]

12. In Maryland, the city of Baltimore and the Washington, D.C. metropolitan area have photochemical smog problems in the sense that

[2] The rates at which the various hydrocarbons react covers a very broad spectrum. Some are considered unreactive or react very slowly in contrast to a whole range of hydrocarbons which are quite potent in causing the manifestations of the photochemical process (Altschuller, CX 124; Tr. 3369-70).

concentrations of photochemical oxidants occur substantially above national ambient air quality standards. Levels of photochemical oxidants have been observed which are more than double the standard considered safe from a public health point of view. Photochemical smog in Maryland is of primary concern during the warm summer months. The smog problem is worst from May through September with occasional high concentrations occurring in April and October and perhaps into November. The most severe smog problems, however, occur during July and August (Schueneman 457).

The State of Virginia has a photochemical smog problem evidenced by higher levels of oxidants in those areas with high auto population. These areas are the Northern Virginia area associated with metropolitan Washington, the metropolitan Richmond area, and the metropolitan Norfolk area. Smog in these areas is primarily a problem in the summer months (Watson 959).

IV. Health Effects Associated with Automobile Pollutants

13. The long term health effects of air pollution are of considerable concern. With continued exposure, those living in polluted air come a little closer to a diagnosable diseased condition. Such diseases are mainly diseases of the bronchial tree ranging from the common cold to lung cancer. Air pollution may also irritate the eyes, and some pollutants in the air, like lead, may build up in the body until they reach harmful levels (CX 98, p. 4).

14. Carbon monoxide is a poisonous gas entering the blood stream replacing the oxygen needed to carry on the body's metabolism. It is not cumulative in its effects but at high concentrations, it kills; at lower concentrations, it brings on headaches and a slowing of physical and mental activity (CX 98, pp. 4, 8).

There is no measurable health effect from a 10 percent reduction in carbon monoxide from automobiles at the lower end of the scale of concentration which is the exposure for the majority of the population (Carrol, CX 130B; Tr. 2976, 3001). At either end of the scale, it would be difficult to pick a point where a 10 to 15 percent reduction of carbon monoxide would be meaningful in terms of health effects to the people exposed to it (Rokaw, CX 132; Tr. 2542).

15. Most hydrocarbons are not considered directly harmful in the amounts found in urban air (CX 98, pp. 11, 12). The adverse health effects of hydrocarbons result primarily from their participation in the photochemical process resulting in a number of secondary pollutants, the photochemical oxidants (Finding 11, *supra*.)

The most common effect of photochemical oxidants on humans is eye irritation. The level at which this occurs is commonly reached in almost every urban area of the country anywhere from a few days a year to as frequently as a third of the days per year depending on factors such as the amount of sunlight, the density of the automobile population and the ability of the local atmosphere to cleanse itself (CX 98, p. 10).

Oxidants, at the levels routinely found in the cities, make it more difficult to breathe especially in the case of those already suffering from respiratory disease (CX 98, p. 10).

Ozone, one of the photochemical oxidants, can severely irritate the mucous membranes. At certain levels and exposures, it produces coughing, choking, and severe fatigue. At relatively high levels, ozone will interfere with lung function (CX 98, p. 10).

At the temperatures commonly reached when fuels are burned, nitrogen in the air combines with oxygen to form nitric oxide which is relatively harmless, but which usually converts to the more dangerous nitrogen dioxide which is also considered a photochemical oxidant. The rate at which nitric oxide converts to nitrogen dioxide is greatly accelerated by the same conditions which lead to the formation of photochemical smog. It is usually considered to be one of the photochemical oxidants. However, nitrogen dioxide is present in the air wherever fuels are burned and whether or not photochemical smog has been produced. Nitrogen dioxide, which is directly toxic to man and animals, may result in eye irritation and increased susceptibility of infection (CX 75, p. 2, CX 98, p. 11).

The control of hydrocarbons is desirable. This, however, does not permit any findings as to the functional relationship between hydrocarbons and oxidants in any particular region. The purpose of controlling hydrocarbons is not to reduce hydrocarbons as such but to achieve such reductions thereof as will control oxidants (Altshuller, CX 124; Tr. 3400). It is not possible to determine whether a 10 percent reduction of hydrocarbons would have reduced smog in the area relevant to this proceeding. There is no way of predicting what such a reduction will accomplish in any atmosphere in view of the many other interrelated factors such as possible increases in nitric oxides, nitrogen dioxides, aldehydes or various meterological conditions (Calvert 406, 419, 437).

16. Certain hydrocarbons have produced cancer in laboratory animals (CX 98, pp. 11, 12). A 10 to 15 percent reduction of hydrocarbons would have no significant effect on the potential carcinogenesis of hydrocarbons, however (Rokaw, CX 132; Tr. 2533-34).

17. Atmospheric lead became a public health problem in a significant new way, when in 1924, tetraethyl lead was found to be a useful gasoline additive (CX 75, p. 3).

Lead, a biologically nonessential metallic element, is a pollutant which is clearly toxic under conditions of prolonged and excessive exposure as for example, when paint containing lead is ingested (CX 43, pp. 4-8). "Over 95 percent of the total lead emitted into the atmosphere derives from additives in gasoline. Lead particles can penetrate the lungs and can be retained and absorbed in the blood stream. In urban areas, the margin of safety between blood levels of lead in humans and levels at which lead poisoning symptoms have been identified are growing smaller. While no clear case has been found of lead poisoning from automobile emissions, there is ample reason for concern." (CX 40E).[3]

In densely populated areas such as Baltimore where motor vehicle traffic is heavy, lead in the opinion of the chief of the Division of Air Quality Control of the State of Maryland is a health hazard particularly to children living in such areas (Schueneman 454).

18. Particulate matter from automobile exhaust poses a health problem for the following reasons:

> Most of the liquid and solid particles in auto exhaust are submicroscopic. Their concentration in automobile exhaust is often in excess of 10^7 particles per cubic centimeter and their emission rate may exceed 1×10^{12} particles per second at a speed of 30 miles per hour. One of the most serious aspects of modern-day widespread levels of air pollution is the generation and increasing concentrations of submicroscopic Aitken nuclei. These particles are of size less than 0.1 microns diameter and serve as "condensation" nuclei which may absorb pollutants. They constitute the majority of airborne particles now found in urban and most "country" air. Particles in this size range are readily coated with monomolecular layers of organic or inorganic chemicals while in the atmosphere or during passage through the upper respiratory tract. The particles thus may act as carriers for other pollutants and produce more serious adverse effects than larger size particulates which are intercepted in the nose or throat.
>
> (The Automobile & Air Pollution: A Program For Progress Part II, U.S. Department of Commerce 1967; CX 75, p. 4).

The sulfur oxide pollutants aggravate existing respiratory disease and contribute to its development (CX 98, p. 9).

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[3] In a notice of proposed rulemaking on Feb. 23, 1972, 37 F.R. 3882 (RX 26A-D) pertaining to the "Regulation of Fuels and Fuel Additives," the Administrator of the Environmental Protection Agency stated:

"Based on the available evidence, the Administrator has concluded that *air borne lead levels exceeding 2 micrograms per cubic meter, averaged over a period of 3 months or longer, are associated with a sufficient risk of adverse physiologic effects to constitute endangerment of public health.* Since airborne lead levels in many major urban areas currently range from 2 to somewhat over 5 micrograms, and since motor vehicles are the predominant source of airborne lead in such areas, attainment of a 2 microgram level will require a 60 to 65 percent reduction in lead emissions from motor vehicles* * *." (RX 26B) (emphasis supplied).

V. The Additive

19. DMA-101, referred to as CA-101 in Crown's advertisements, is a gasoline additive manufactured by the E.I. du Pont de Nemours Company of Wilmington, Del. (RX 1A-B).

20. Du Pont has been selling detergent additives since 1958 (Scheule 818). Du Pont's first offering was RP-2 which provided rust prevention and anti-icing properties. It was marketed about 1958 or 1959 (Scheule 818).

In the early 1960's, RP-2 was modified to the DMA-4 and DMA-4A additives which were to provide carburetor icing protection, anti-rust protection and carburetor detergency (Scheule 819).

In the period 1967-1968, du Pont began work on a second generation multifunctional additive to clean up existing deposits as well as to prevent deposit buildup and to combat malfunctions of valves in engines due to deposit formation on intake valves. This work led to the development of the DMA-101 additive which is a combination of a hydrocarbon polymer and DMA-4, an amine neutralized phosphate. Du Pont first introduced DMA-101 in Nov. 1969 (Scheule 819-20, Hagele 1156, Bettoney 1538-39).

21. An additive such as DMA-4 provides carburetor detergency by virtue of its surfactant mechanism. DMA-101 includes DMA-4, the surfactant, and a polymer which acts in concert with the surfactant (Bettoney 1533).

Another of du Pont's detergent additives in the DMA-100 series is DMA-115. It has a higher DMA-4 content versus polymer content than does DMA-101. However, all additives in the series function similarly and are considered by du Pont to be in the same class (Scheule 821, 836). With respect to the reduction of exhaust emissions, du Pont found on the basis of laboratory tests and field tests that there was very little difference in their performance in this respect with a very slight edge in favor of DMA-115 (Scheule 836-37).

22. In DMA-101, the DMA-4 component works as a surfactant which has physical and chemical properties enabling it to attach to the surface of a metal vessel such as a carburetor. By interaction with the metal, the additive forms a water and dirt repellent film and thus prevents the buildup of deposits (Bettoney 1532-34). The polymer component of DMA-101 acts with the surfactant to soften and penetrate deposits which when loosened are washed away (Bettoney 1534).

23. The DMA-101 additive is probably an effective carburetor cleanliness detergent (Cattaneo 1919).

24. Carburetor deposits may form or accumulate in almost any place in the carburetor. The ones that are critical to the mixture of air and fuel are particularly those in the neighborhood of the throttle plate (Bettoney 1512-13). Such deposits interfere with the flow of air with an effect similar to the closing of the throttle valve (Tr. 1514). The net effect is to enrich the air-fuel mixture *viz.* the mixture has more fuel than the manufacturer had in mind when the carburetor was built (Tr. 1515). An enrichment of the air-fuel ratio will cause formation of higher amounts of carbon monoxide and hydrocarbons in automobile exhausts (Tr. 1575). In addition, the deposits on intake valves and some other parts of the engine reached by gasoline with DMA-101 can increase exhaust emissions (Scheule 910).

25. The amount of improvement in automobile exhaust emissions, as a result of the use of the CA-101 additive in a car, depends on how dirty the carburetor or intake system is (Bettoney 2100-01). Such reductions could vary from some small amount up to the order of 50 to 60 percent for some carburetors (id 2099-2100). Prior use of another additive such as DMA-4 would limit the formation of deposits in these areas (Scheule 852). And in the case of a clean or new carburetor, there would be little or no reduction of exhaust emissions as a result of the use of CA-101 (Bettoney 2099-2100).

26. Considered in the light most favorable to respondent, the available technical data would support a claim for a 10 percent overall reduction in the general car population of hydrocarbons and carbon monoxide as a result of CA-101, if used by all cars (Bettoney 2049, 2099, 2124).[4]

27. The CA-101 additive will not reduce exhaust emissions of hydrocarbons and carbon monoxide below the levels that new cars will emit (CX 123C).

28. An automobile may have high emissions because of mechanical conditions which can only be improved by mechanical repairs and on which the additive's detergent action will have no effect (Bettoney 2081, 2122; Cattaneo 1944).[5]

Some cars are high emitters of pollutants because of bad spark plugs,[6] points, wiring, etc., and the use of an additive would not cure that condition. The same would be true as to bad wiring (Bettoney 2047,

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[4] The opinion of the director of du Pont's Petroleum Laboratory on this point was based on du Pont's testing and the literature generally pertaining to carburetor detergents similar in their function to DMA-101. It is further the opinion of this witness that CA-101 is one of the four most effective detergent additives and that it is possible these additives could achieve a result similar to CA-101 in reducing emissions (Bettoney 2101, 2050).

[5] *E.g.*, carbon monoxide emissions may drastically increase when the carburetor metering rod linkage is out of position (CX 152K; Tr. 2081).

[6] Spark plug misfires increase hydrocarbon and carbon monoxide emissions substantially (CX 115, p. 23).

2122; Cattaneo 1944). Similarly, a deterioration of the timing of an engine can also result in an increase of emissions (Bettoney 2047). Burned valves, although not occurring regularly at this time, nevertheless, exist in the general car population and a car with that condition would put out "extremely high hydrocarbons" (Mills, CX 129; Tr. 3085).

In addition, the air-fuel ratio can be reduced by factors such as an automotive choke sticking closed or because of a very dirty air cleaner element. This would generally increase emissions of carbon monoxide and hydrocarbons (CX 65, p. 2-13). The additive would not remedy those conditions.

29. The CA-101 additive will not clean all engine components. It will not affect deposits such as exhaust valve tulips, combustion chamber deposits, crankcase area deposits or rocker arm cover deposits (CX 123F; Scheule 872-73). Combustion chamber deposits increase hydrocarbon emissions (Bettoney 2085).

30. In fact, "there are many, many factors that influence the emissions of vehicles, * * * many of these factors are extremely subtle and cannot be detected in all cars at all times." (Bettoney 1633; See also Mills, CX 129; Tr. 3079-80; CX 367).

31. The additive may work in a car but uncontrolled variables beyond the reach of the additive may nevertheless cause emissions from some vehicles to increase (CX 148, Scheule 883-87, 929-32).[7] Certain vehicles suffering from mechanical defects and subjected to severe operating conditions will not realize significant reductions of carbon monoxide and unburned hydrocarbons as a result of a detergent additive such as CA-101 (CX 152).[8]

32. Gasoline with CA-101 will not significantly reduce emissions of carbon monoxide and unburned hydrocarbons in every vehicle in which it is used. (Findings 27 to 31, *supra*).

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[7] Respondent states in connection with du Pont's road test, CX 148, "In other words, the additive probably worked in those cars, but *uncontrolled variables beyond the reach of the additive caused emissions from those vehicles to increase* (Scheule 883-87). In the other 18 cars, the action of the additive overwhelmed the variables and the net effect from all 23 cars was a net decrease of HC emissions by about 9 percent (Scheule 883-87, 929-32)" (emphasis supplied) RRPF p. 18.

[8] In the case of a nine thousand mile test "involving twenty high-mileage and high blowby taxicabs, no significant differences in exhaust emissions or other engine parameters were indicated with the use of DMA-115 relative to a control gasoline. Excessive variability caused by test severity and vehicle condition overshadowed the anticipated fuel effect." (CX 152A) For future testing it was recommended:

"1. Use other tests to evaluate the effectiveness of DMA-115 in reducing exhaust emissions.

"2. *In future tests* with similar objectives, select fleets with engines and carburetors responsive to deposits and *avoid severe operating and maintenance conditions*" (emphasis supplied) (CX 152D).

See also CX 65, "Control Techniques for Carbon Monoxide, Nitrogen Oxide, and Hydrocarbon Emissions from Mobile Sources" U.S. Department of Health, Education and Welfare (1970) p. 4-9:

"In a large group of vehicles, a few of them could not meet any reasonable emission limit, no matter how much they were repaired or tuned up. This is due to the variability of emissions of both controlled or uncontrolled vehicles.* * *"