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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

COMMUNITY AND ECONOMIC DEVELOPMENT DIVISION

B-166506

MARCH 1, 1979

The Honorable Douglas M. Costle
Administrator, Environmental
Protection Agency

Dear Mr. Costle:

We have reviewed Environmental Protection Agency (EPA) efforts to decrease tampering with automobile emission control devices and fuel switching--using leaded gasoline in vehicles equipped with catalytic converters and designed for unleaded gasoline. These practices, if widespread, will substantially increase pollutant emissions. EPA has estimated that tampering and fuel switching are occurring nationwide at about a 19 percent and 10 percent rate, respectively. (See encs. I and II for a detailed discussion of these problems.)

The problems associated with tampering and fuel switching primarily occur after the vehicle is put into service rather than as the vehicle comes off the assembly line. While EPA programs have been reasonably effective in assuring that new cars coming off the assembly line meet emission standards, they do not keep the cars from exceeding emission standards after they are put into actual use. Programs dealing with the tampering practices discussed in this report have, to date, received relatively low priority.

An active enforcement program against these types of violations would require large personnel resources and would probably be impractical at the Federal level. Since the violations affect in-use vehicles, an enforcement program would be better suited at the State and local levels. According to EPA officials, although about 40 States presently have antitampering laws, they generally are not being actively enforced.

EPA should consider the use of State and local inspection and maintenance programs as a potential deterrent to tampering. The mere existence of an inspection and maintenance program may be enough to deter some tampering. We recently issued a report entitled "Better Enforcement

Of Car Emission Standards--A Way To Improve Air Quality," CED-78-180, January 23, 1979, in which we stated that

> "[Inspection and maintenance programs] offer the most direct and effective method of encouraging the proper use of emission control systems and bringing cars exceeding Federal emissions standards into compliance."

The report concluded that inspection and maintenance "* * * programs are needed only in those areas of the country where EPA has determined that car emissions contribute significantly to air quality problems."

If no inspection and maintenance program is required, EPA should consider the use of existing State periodic safety inspections as a means to quickly check for readily observable tampered items, such as removed or disabled emission control components and damaged gasoline tank filler inlets.

An effective public awareness campaign is a key factor in an antitampering program. The public must be made aware of the consequences of tampering regarding its impact on air quality and, ultimately, public health. EPA is on the right track in preparing radio spots and antitampering pamphlets and publicizing enforcement actions involving tampering and fuel switching.

EPA has recognized the adverse effect of tampering and fuel switching on the automobile's ability to meet emission standards and has begun placing more emphasis on controlling them. This is reflected in the 1980 EPA budget request which includes a new strategy for dealing with tampering and fuel switching violations. This strategy establishes two field offices--in Denver, Colorado, and Springfield, Virginia--to be run directly out of Washington, D.C., headquarters. The field offices will inspect private and municipal fleets of vehicles, perform new car dealership inspections, and use test vehicles to deter tampering and fuel switching in areas planned for inspection and maintenance programs.

Because of their potential impact on air quality, we believe that tampering and fuel switching deserve increased attention and additional corrective actions.

We recommend that the Administrator, EPA, possibly as part of the review of State Implementation Plans: 1/

--Evaluate existing State and local inspection and maintenance programs to determine their effectiveness in detecting and deterring tampering.

--Work with States which have tampering laws to encourage more vigorous enforcement.

--Examine the feasibility of using States periodic safety inspection programs to check for readily observable items, such as tampered gasoline tank filler inlets.

In addition, we agree with certain recent Agency actions involving tampering and fuel switching and recommend that EPA continue to

--emphasize controlling emissions from in-use vehicles,

--develop public awareness programs emphasizing the consequences of "switching" and tampering on air quality and public health, and

--publicize enforcement actions taken against violators.

We have informally discussed the report with Agency officials and they generally agree with our findings, conclusions, and recommendations; changes have been made where appropriate. The officials also stated that, as part of the new antitampering and anti-fuel switching strategy, a pilot program is planned that will provide funds to selected States which have antitampering laws and which now indicate a desire to enforce these laws. These funds will be available to States likely to implement inspection and maintenance programs.

As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to

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1/The Clean Air Act requires each State to submit to EPA for approval a State Implementation Plan specifying how the National Ambient Air Quality Standards will be achieved and maintained.

submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the Agency's first request for appropriations made more than 60 days after the date of the report.

Copies of this report are being sent to the Chairman, House Committee on Appropriations; Chairman, House Committee on Government Operations; Chairman, Senate Committee on Governmental Affairs; the Senate Committee on Environment and Public Works; and the House Committee on Interstate and Foreign Commerce.

We appreciate the courtesy and cooperation extended to our staff during the review.

Sincerely yours,

Henry Eschwege

Henry Eschwege
Director

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ENCLOSURE I

TAMPERING

Tampering with pollution control devices on automobiles appears to be a widespread problem which causes increased pollutant emissions. EPA's most recent study shows that about 19 percent of all vehicles tested had been tampered with. If this level is representative of a nationwide tampering rate, EPA estimates that by the time a model year fleet reaches 50,000 miles its emissions will quadruple.

Tampering can be defined generally as removing, disconnecting, damaging, or in any way rendering ineffective any device or element of design installed on a motor vehicle to control emissions. Tampering results primarily from the vehicle owner wanting to improve the vehicle's drivability and/or the erroneous belief, according to EPA, that altering emission control equipment will result in improved fuel economy. To reduce pollutant emissions, automakers have added parts or altered recommended settings on adjustable engine components. These changes may have made the vehicle perform below the owner's expectations. In handling customer complaints of poor drivability, an unscrupulous mechanic may tamper with engine emission control components, thus causing them to become ineffective.

EPA study shows high rate of tampering

EPA believes that tampering is one of the major reasons in-use vehicles do not meet emission standards. In order to obtain additional information on this problem's significance, EPA conducted a survey in mid-1978 to (1) determine the extent of tampering taking place on a nationwide basis, (2) determine the types of tampering most prevalent, and (3) quantify the relationships between tampering and an idle emissions test. Almost 2,000 vehicles--model years 1973 through 1978--were tested in six States (Delaware, Maine, Virginia, Washington, Tennessee, and Texas). The vehicles were tested while participating in a nonvoluntary program, such as mandatory State safety inspections.

The survey consisted of (1) an inspection of 15 emissions related components, (2) an idle hydrocarbon and carbon monoxide emissions test, and (3) a fuel sample from all vehicles requiring unleaded fuel. On the basis of the inspection, each vehicle was classified into one of four mutually exclusive groups:

--Tampered. At least one emissions related component had been removed or rendered inoperative.

--Arguably tampered. Some evidence existed to indicate that the vehicle may have been tampered with but the evidence was not conclusive. An example is the removal of the idle limiter cap which restricts adjustments to the carburetor. Removal of the limiter cap is not conclusive proof of tampering, but it is likely that if the cap is removed, the carburetor was adjusted or tampered with.

--Malfunction. Some emission related component was not functioning properly.

--O.K. All components were functioning properly.

The study showed that about 19 percent of the vehicles tested had been tampered with. More importantly, the rate increased significantly with the age of the vehicle. Model year 1978 vehicles had a 7 percent tampering rate while 1973 vehicles had a substantially higher rate of 32 percent. Perhaps even more important than the tampering rate was the finding that only about 31 percent of the vehicles had all components functioning properly and were, therefore, classified "O.K." In contrast to the tampering rate, the O.K. rate decreased significantly with the age of the vehicle--from 58 percent for new cars to less than 10 percent for vehicles 5 and 6 years old.

In addition to the 19-percent tampering rate, another 48 percent of the vehicles were classified "arguably tampered." In many cases, this meant that the idle limiter cap, which restricts adjustment to the carburetor, had been removed. Carburetor maladjustment can cause significant emissions increases; 65 percent of the vehicles tested had this emission control device removed.

In its survey, EPA also attempted to use an idle emissions test, similar to that used by States in inspection and maintenance programs, to identify tampered vehicles. The vehicles classified "O.K." had generally lower idle test scores than either tampered or arguably tampered vehicles. EPA also simulated the testing done in the New Jersey inspection and maintenance program. The results showed that 86 percent of the O.K. vehicles passed the test while only 65 percent of the tampered and 68

percent of the arguably tampered vehicles passed. Thus, there appears to be a higher probability of failing the idle test with a tampered vehicle. An inspection and maintenance program has the potential to not only identify a significant percentage of tampered vehicles but may also deter tampering. The motorist, knowing that his car may not pass the test if he tampers with the emission control devices, may be reluctant to tamper.

Although exact calculations are difficult, EPA believes that the impact of tampering on emissions is substantial and by the time a model year fleet reaches 50,000 miles, the average hydrocarbon and carbon monoxide emissions will be nearly 4 times that of a fleet with no tampering or malmaintenance.

EPA has collected other information which also indicates that tampering is occurring. Because of varying testing and sampling procedures, however, comparing this information with the present survey is very difficult. The various studies, however, have generally shown gross tampering rates ranging from 6 to 30 percent. This data was taken mostly from voluntary samples in areas having inspection and maintenance programs.

ENCLOSURE II

FUEL SWITCHING

Introducing leaded gasoline into vehicles equipped with catalytic converters--called fuel switching--destroys the converter's effectiveness and causes increased pollutant emissions from automobiles. A few tankfuls of leaded gasoline significantly reduces the converter's effectiveness and continued use will destroy it almost completely.

Introducing leaded fuel into a catalyst equipped vehicle can be accomplished in various ways. The nozzle on the unleaded gasoline pump is smaller than that of a leaded gasoline nozzle. In cars equipped with catalysts, there is a "filler inlet" in the gas tank opening that is small enough to prevent the larger leaded nozzle from entering the tank but is large enough to allow the smaller unleaded nozzle to enter. EPA, however, has found instances where this filler inlet has been removed, thus allowing the larger leaded nozzle to be inserted. A funnel could also be used to circumvent the filler inlet. Instances have also been found where the smaller unleaded nozzle has been placed on a leaded gasoline pump. All of these practices allow leaded gasoline to be introduced into vehicles equipped with a catalyst, thus ruining the catalyst.

Presently, Federal regulations only prohibit gasoline retailers and fleet operators from introducing or causing or allowing the introduction of leaded gasoline into vehicles requiring unleaded. An individual is not prohibited by Federal regulations from doing this.

Is fuel switching a problem?

During the past year, EPA has been conducting surveys around the country to determine the extent to which fuel switching is occurring. It has now observed the fueling of more than 6,000 vehicles in over 40 States. Through the individual State departments of motor vehicles, EPA determined the type of cars and whether they required leaded or unleaded fuel. EPA determined that 1,160 of these vehicles required unleaded fuel and observed that 110, or about 10 percent, of these had refueled with leaded gasoline. EPA estimates that if the violation rate is 10 percent nationwide, the emissions for the total catalyst equipped fleet will be increased about 30 to 70 percent. Despite these figures, some question remains as to the extent of fuel switching by motorists. For example, the previously

discussed tampering survey attempted to determine the extent to which motorists were using leaded gasoline in vehicles requiring unleaded by checking fuel samples. Valid fuel samples were taken and checked from 481 vehicles and only 4.2 percent contained leaded gasoline. This differs sharply from the EPA-observed switching rate of almost 10 percent.

The results of fuel switching studies performed by other organizations also differ from EPA's fuel switching survey.

--The California Air Resources Board did a survey in December 1977 to determine the extent to which owners of vehicles equipped with catalytic converters were using leaded fuel. The survey was conducted at self-serve gasoline stations and involved over 1,100 vehicles. The survey showed that 3.4 percent of the vehicles were filled with leaded gas.

--General Motors Corporation did a survey to determine the extent of fuel switching. However, it involved model year 1975 through 1978 General Motors vehicles only. They observed over 1,200 vehicles and showed a switching rate of only 2 percent.

--In 1976, Union Oil did a survey involving model year 1975 through 1977 vehicles. It sampled over 500 vehicles and found a switching rate of 2.5 percent, but it now believes its results are conservative and that the switching rate has increased.

--EPA contracted for an analysis of factors leading to the use of leaded gasoline in catalytic converter-equipped vehicles. This study, completed in September 1978, estimated that currently the switching rate is roughly 15 percent.

Reasons for switching

The price differential between unleaded and leaded gasoline and the vehicle's drivability appear to be the primary causes of fuel switching. The average price differential nationwide between leaded gas and the higher priced unleaded gas is about 4 cents per gallon.

The differential varies between regions of the country and even at individual service stations. Differentials as high as 14 cents per gallon have been observed. EPA claims these differentials induce motorists with catalyst-equipped vehicles to switch from the required unleaded gasoline to less expensive leaded gas to save money.

Using unleaded gas may also affect the vehicle's drivability. Since lead enhances the gasoline's octane level, leaded gasoline generally has a higher octane rating than unleaded and thus improves performance. Only a few refiners produce a higher octane or premium unleaded gasoline. The lower octane level may cause the vehicle engine to "knock" or "ping." To eliminate this, the motorist may switch to higher octane leaded fuel.

Motorists may or may not know that fuel switching a few times will deactivate the catalytic converter and thus increase pollutant emissions while destroying a device that was paid for when the vehicle was purchased.

EPA contracted for a study (see p. 5 of enc. II) to better define the causes and scope of the fuel switching problem. The study, completed in September 1978, identified both the price differential and performance as probable causes of switching. The results of the study suggest that eliminating the price differential and improving the quality of unleaded gasoline, and thus the car's performance, would greatly reduce fuel switching. The study did not, however, identify which factor has the greater impact on switching.

Gasoline price deregulation

The Department of Energy is considering a proposal to deregulate the price of gasoline having concluded that continued price controls on gasoline are no longer necessary to assure an adequate supply and/or equitable prices. In its June 1978 Environmental Assessment, the Department concluded that decontrol was not likely to cause the price differential between leaded and unleaded gasoline to increase and, therefore, would have no significant effect on automobile emissions. EPA, however, believes that deregulation may further increase the price differential, thus inducing more motorists to "switch." Both the Department of Energy and EPA have presented their respective positions in congressional hearings dealing with the gasoline decontrol issue.

ENCLOSURE II

To more closely study the environmental issues involved, the Department of Energy prepared a draft Environmental Impact Statement in November 1978. The draft impact statement discussed, among other things, the environmental and economic impacts that could result from exempting motor gasoline from price controls. The Department concluded that the most observable effect of deregulation would be to remove the price controls on retail dealers, thus allowing prices to be set in response to the market. The statement concluded that:

> "It is possible, although not likely, that the average price differential between leaded and unleaded gasoline will grow to 7 - 9 cents, with potential increases in vehicular emissions resulting from price differential-induced misfueling. If such a differential occurs, * * * the expected incremental environmental impact of deregulation is not significant * * *."

In commenting on the draft statement, EPA had "reservations" regarding the environmental effects discussed in the statement. EPA questioned the methodology the Department of Energy used both in analyzing projected price differentials between leaded and unleaded gasoline and in predicting the effect of decontrol on attaining ambient air standards. EPA believed that, due to insufficient information, the statement underestimated the environmental impact of the proposed action.

The Department issued a final Environmental Impact Statement on January 30, 1979. Although we have not had time to fully analyze this document, the overall conclusions appear to be basically the same as those in the draft statement.