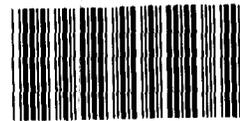


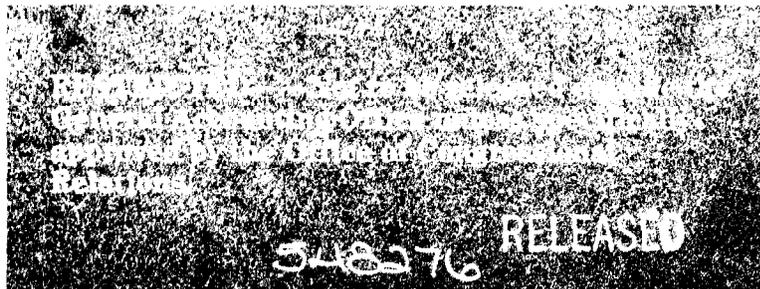
April 1990

GASOLINE MARKETING

Consumers Have Limited Assurance That Octane Ratings Are Accurate



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Washington, D.C. 20548

**Resources, Community, and
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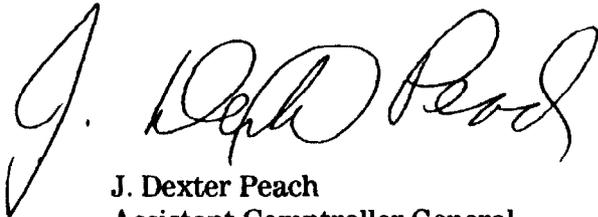
The Honorable Philip R. Sharp
Chairman, Subcommittee on Energy and Power
Committee on Energy and Commerce
House of Representatives

The Honorable Charles E. Schumer
House of Representatives

As you requested, we reviewed the Federal Trade Commission's (FTC) and the Environmental Protection Agency's (EPA) implementation of the Petroleum Marketing Practices Act's gasoline octane certification and posting requirements. This report discusses whether the act's objective of providing consumers with accurate information about gasoline octane ratings is being met.

As arranged with your offices, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to the Chairman, FTC, the Administrator, EPA, and other interested parties. We will also make copies available to others upon request.

This work was done under the direction of Victor S. Rezendes, Director, Energy Issues, (202) 275-1441. Other major contributors are listed in appendix I.



J. Dexter Peach
Assistant Comptroller General

Executive Summary

Purpose

A major concern of consumers buying gasoline is that they purchase a gasoline with an octane rating that meets their vehicles' octane requirements. In 1978, the Congress enacted the Petroleum Marketing Practices Act to provide a uniform nationwide system for posting accurate octane ratings at the point of sale (on the pump), informing consumers of the octane rating of the gasoline they were purchasing. The act requires the Environmental Protection Agency (EPA) and the Federal Trade Commission (FTC), respectively, to test the octane ratings and enforce compliance with the act. The Chairman, Subcommittee on Energy and Power, House Committee on Energy and Commerce, and Representative Charles E. Schumer asked GAO to determine (1) the effectiveness of the act in ensuring that octane ratings are posted accurately, (2) the extent and source of any octane mislabeling—the sale of gasoline with an octane rating lower than posted on the pumps—in the gasoline distribution system, and (3) the appropriate federal role in ensuring that octane ratings are posted accurately.

Background

Gasoline is generally sold to consumers in three different octane levels—87, 89 and 91 or above. The price of gasoline is tied to the octane level; higher octane gasolines cost more than lower octane gasolines. As gasoline is refined and transported through a complex distribution system to retail stations, gasoline octane can be accidentally or intentionally mislabeled. For example, gasoline labeled as 89 octane might be lower in octane than the posted rating. The lower octane could result in reduced vehicle engine efficiency, possible engine damage, and increased emissions. In addition, the consumer would be paying for octane that is not received. To guard against mislabeling, the act requires the determination and certification of octane levels at the time gasoline leaves the refinery and at subsequent points in the distribution system and the posting of octane ratings at the gasoline pump. In addition to EPA and FTC responsibilities to enforce accurate octane postings, 20 states, on their own initiative, also test octane ratings.

Results in Brief

Because FTC and EPA have not carried out their octane testing and enforcement responsibilities under the act, there are no federal controls to ensure that gasoline octane postings are accurate. Although nationwide information on the accuracy of octane ratings is not collected at the federal level, industry and state information indicates that octane mislabeling is a problem in some states. While this information is not sufficient to determine the nationwide extent or source of mislabeling, it

indicates that consumers may be paying millions of dollars each year for gasoline with lower octane levels than what is posted on the pump.

GAO also is concerned that the act lacks provisions for posting octane ratings for gasoline-alcohol blends and has other provisions that may interfere with state octane enforcement efforts. GAO believes that options exist for redefining federal responsibilities for implementing the act in a way likely to result in greater assurance that posted octane ratings are accurate.

Principal Findings

Extent of Mislabeling Unknown

FTC has not monitored compliance with the act's octane posting requirements or prosecuted violators, nor has EPA tested octane ratings at retail stations since 1981. FTC and EPA officials cited staff and budget cuts as reasons for not implementing the act's requirements. EPA officials also said that during the period in which they tested octane, FTC never used the test results to prosecute violators.

EPA compiled data for GAO from biannual gasoline quality surveys conducted between 1979 and 1987 by the Motor Vehicle Manufacturers Association. The surveys cover markets representing over 90 percent of the total domestic gasoline consumption. An analysis of these data revealed that over 9 percent of the gasoline sampled was mislabeled by more than one-half point below the posted octane rating. Any mislabeling can result in consumers paying a significant amount for octane they do not receive. For example, assuming that 9 percent of gasoline sold in 1988 was mislabeled by only one-half octane number, GAO estimates that consumers could have paid about \$150 million for octane they did not receive.

GAO obtained test results from 11 of the 20 states that test octane and found that in the majority of these states mislabeling was less than 2 percent for the 1985-1988 period of GAO's review. Officials from these states attribute the low rate of mislabeling to their state octane testing programs. On the other hand, officials in seven states GAO visited that do not have an octane testing program believe that mislabeling is a problem in their states. One-time tests of gasoline octane levels in four of these seven states, including tests conducted for GAO by EPA primarily in two

areas in two states, revealed that mislabeling of gasoline samples ranged from 22 to 53 percent.

While mislabeling may occur at any place in the gasoline distribution system, there is more potential for it to occur at distributors or retail stations than at refineries, pipelines, or bulk terminals, because these latter locations are covered by extensive quality control programs that include frequent testing of octane ratings. Few distributors or retailers test octane ratings, primarily because of the cost.

The Act's Restrictions

FTC has taken a narrow interpretation of the act and limited its application to traditional gasoline fuels and excluded the newer gasoline-alcohol blends from the act's octane posting requirements. As the use of these and other alternative fuels is increasingly required in urban areas to reduce air pollution, consumers could be without information on the octane levels of these newer fuels.

Further, the act authorizes only limited civil remedies and penalties for mislabeling violations and appears to preempt any applicable state or local enforcement provisions differing from those of the act. Officials from states that test octane ratings believe other remedies and penalties can be more effective and cost-efficient in ensuring that posted octane ratings are accurate but expressed concern that such actions could be challenged as being outside the authority of the act. For example, stop sale orders, although not allowed under the act, are used by some states to immediately halt the sale of mislabeled gasoline.

Federal Role

According to FTC and EPA, monitoring compliance with the act and prosecuting violators are not possible without additional funds—a problem given the current budget deficit. Neither FTC nor EPA had an estimate of how much it would cost to carry out their testing and enforcement responsibilities. Since about half the states currently have or are considering instituting octane testing programs, there may be options involving both federal and state efforts for carrying out the act's objectives. State officials interviewed in GAO's review indicated an interest in such an approach.

Recommendations to the Congress

GAO recommends that the Congress amend the Petroleum Marketing Practices Act to

- include octane certification and posting requirements for gasoline-alcohol blends and other alternative motor fuels that may become available to reduce air pollution and
- make it clear that states may employ a range of remedies broader than those available under the act to enforce octane posting requirements.

Recommendations to the Federal Trade Commission and the Environmental Protection Agency

GAO recommends that the Chairman, FTC, and the Administrator, EPA, in consultation with the appropriate congressional committees and the states take the following actions:

- Develop and assess options that could be employed to monitor compliance with the act's octane certification and posting requirements. Such options should include a total federal role, joint federal-state roles, and a total state role.
- Report the results of their evaluations and their recommendations, along with funding requirements and recommendations for any needed legislative changes, to the Congress.

Agency Comments

GAO discussed the information contained in this report with FTC and EPA officials and incorporated their comments where appropriate. Agency officials generally agreed with the accuracy of the information presented relating to their agency's activities. However, as requested, GAO did not ask either agency for official written comments on this report.

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Abbreviations

API	American Petroleum Institute
EPA	Environmental Protection Agency
FTC	Federal Trade Commission
GAO	General Accounting Office
MVMA	Motor Vehicle Manufacturers Association
PMPA	Petroleum Marketing Practices Act
RCED	Resources, Community, and Economic Development Division

Introduction

In 1988 millions of American consumers purchased over 113 billion gallons of gasoline. A major concern of consumers when buying gasoline is that they purchase a gasoline with an octane rating that meets their vehicles' octane requirements. The price of gasoline is tied to the octane rating—higher octane gasolines cost more than lower octane gasolines. In 1978 the Congress enacted the Petroleum Marketing Practices Act (PMPA), in part, to provide a uniform nationwide system for posting octane ratings at the point of sale (on the pump) so consumers would be informed of the octane rating of the gasoline they were purchasing.

Octane Ratings

Octane is a rating applied to gasoline used in spark ignition engines¹ that indicates their resistance to engine knock: the higher the rating, the greater the resistance to engine knock. Engine knock is a metallic “pinging” or “knocking” noise caused by improper combustion; instead of burning smoothly, a portion of the fuel-air mixture explodes prematurely in the engine cylinder.

Table 1.1 shows the typical octane ratings and market shares of the four most common gasoline grades sold in the United States in 1988, according to information compiled from industry market surveys.

Table 1.1: Octane Ratings and Market Shares of the Four Most Common Gasoline Grades Sold in 1988

Gasoline grade	Octane rating	Market share (percent)
Unleaded		
Premium unleaded	91–94	28
Midgrade unleaded	89	5
Regular unleaded	87	54
Leaded		
Regular leaded	89	13

Engine Octane Requirements Vary

The octane requirements of engines vary. In general, higher performance and higher compression engines have higher octane requirements because they have higher internal operating temperatures. Most automobiles sold in the United States are equipped with engines designed to use 87 octane (regular) unleaded gasoline.

¹The vast majority of motor vehicles in the United States are powered by such engines; the remainder are powered by diesel engines.

Octane requirements also vary depending on driving conditions. Requirements are lower for moderate driving conditions, such as driving at a constant speed on a level road, and higher under stressful driving conditions, such as during rapid acceleration or pulling a heavy load up a hill. Similarly, octane requirements vary depending on environmental conditions, such as altitude and temperature.

Consumers Need to Know Octane Ratings

Consumers need to buy gasoline with an octane rating that matches their engines' octane requirements. Buying gasoline with too little octane can cause engine knock, which can damage an engine, lower engine efficiency, reduce mileage, and increase emissions. On the other hand, buying gasoline with more octane than needed generally does not increase engine efficiency or power, and since higher octane gasoline has a greater retail price than lower octane gasoline, consumers pay for octane they do not need. As gasoline is refined and transported through a complex distribution system to retail stations, gasoline octane ratings can be accidentally or intentionally mislabeled. For example, gasoline labeled as 89 octane might be lower in octane than the posted rating. As discussed previously, octane lower than needed could have harmful effects. Unfortunately, consumers cannot determine octane ratings visually or in other ways that allow them to know if they are getting what they are paying for. Assurances are therefore needed that octane ratings are accurate.

Federal Octane Posting Requirements

The Congress enacted PMPA in 1978, in part, to provide consumers with information about the octane ratings of the gasoline they were buying. Before the enactment of PMPA, octane posting was not universal or uniform.

Title II of PMPA directs the Federal Trade Commission (FTC) to promulgate a rule to implement and enforce a uniform nationwide system of octane posting, to monitor the accuracy of posted ratings, and to prosecute violators. FTC was given this role because it had the responsibility for enforcing regulations prohibiting unfair or deceptive acts in commerce under the Federal Trade Commission Act. PMPA also directs the Environmental Protection Agency (EPA) to test the octane ratings of gasoline samples taken from retail stations nationwide and to report the results to FTC. EPA was given the sampling and testing duties to minimize the cost of the program. EPA at that time was sampling and testing gasoline to enforce its gasoline lead content regulations.

Title II of PMPA also

- requires (1) refiners and importers to determine and certify octane ratings to their customers, (2) distributors to certify octane ratings to their customers, and (3) retailers to post octane ratings on their pumps;
- requires automobile manufacturers to disclose engine octane requirements to consumers by posting a label in the vehicle or by including the information in the vehicle owner's manual; and
- authorizes FTC to seek civil penalties in federal district court against violators of up to \$10,000 per violation under provisions of the Federal Trade Commission Act.

Figure 1.1 shows an example of the label gasoline retailers are required to post on their pumps.

Figure 1.1: Federal Octane Rating Label



Note: Labels are bright yellow with black lettering.

Source: 16 C.F.R. 306.11

State Octane Testing

In addition to the federal testing and enforcement requirements, 20 states test gasoline octane ratings through their own initiative to ensure that posted ratings are accurate (see fig. 1.2). Some of these states have their own gasoline testing laboratories, while others contract with other states' laboratories or with private laboratories. Some local governments

Objectives, Scope, and Methodology

The Chairman, Subcommittee on Energy and Power, House Committee on Energy and Commerce, and Representative Charles E. Schumer asked GAO to evaluate the implementation of PMPA's octane certification and posting requirements. Specific questions posed by the Chairman and Representative Schumer included:

- What is the extent and source of any octane mislabeling—the sale of gasoline with an octane rating lower than posted on the pump—in the domestic gasoline distribution system?
- Has PMPA been effective in ensuring that octane ratings are posted accurately?
- What is the appropriate federal role in ensuring that octane ratings are posted accurately?

To answer these questions, we discussed them and related issues with officials from

- FTC, EPA, the Federal Energy Regulatory Commission, and the Departments of Commerce and Transportation;
- seven states that test gasoline octane (Arkansas, California, Florida, Georgia, Maryland, North Carolina, and Virginia);
- seven states that do not test gasoline octane (Indiana, Michigan, Missouri, Montana, Oregon, Tennessee, and Washington);
- the New York City Department of Consumer Affairs;
- General Motors Research Laboratories;
- the Motor Vehicle Manufacturers Association (MVMA), a trade association which gathers various types of information for domestic motor vehicle manufacturers;
- interested consumer groups, including the American Automobile Association, the Center for Auto Safety, and the Consumers Union;
- eight large and one small refiner;
- three large common carrier interstate petroleum products pipeline companies;
- four independent distributors of gasoline and other petroleum products; and
- petroleum industry associations, including the American Petroleum Institute, the National Petroleum Refiners Association, the Petroleum Marketers Association of America, the Service Station Dealers of America, the Society of Independent Gasoline Marketers of America, and the Western States Petroleum Association.

To determine the extent and source of any octane mislabeling, we obtained and reviewed octane test results from the following sources:

- MVMA's biannual surveys of gasoline quality for the years 1979-1987.
- Eleven states that tested octane ratings primarily for the years 1985-1988 (Arkansas, California, Florida, Georgia, Louisiana, Maryland, North Carolina, North Dakota, Oklahoma, South Carolina, and Virginia). The states used various testing methodologies from random selections to targeted selections.
- Oregon and Tennessee, which conducted limited one-time gasoline quality surveys in 1987 and 1988, respectively. Gasoline samples were selected primarily at random; however, Oregon targeted some stations for sampling.

In addition, we requested that EPA test the octane ratings of 65 samples collected by state officials from retail stations primarily in the Detroit, Michigan, and St. Louis, Missouri, areas. We selected these cities for testing because Michigan and Missouri officials were concerned that there was a mislabeling problem in these and other locations in their states. The samples were taken from retail stations suspected of mislabeling gasoline. We did not evaluate any of the testing methodologies nor verify any of the test results obtained from MVMA, states, or EPA; thus, none of the data obtained from our sources is projectable on a nationwide basis.

We also obtained information about the quality control procedures that exist in the gasoline distribution system from refiners and pipeline companies. To observe how these procedures were applied, we visited 5 refineries and refinery quality control laboratories, 3 pipeline company pumping and switching facilities, 8 bulk terminals, 10 wholesalers, and 8 state gasoline testing laboratories. We compared the quality control procedures found in the gasoline distribution system with PMPA's octane certification and posting requirements to determine whether the procedures were consistent with PMPA. We also examined octane testing laboratory reports, gasoline shipment invoices, and other related documents.

To evaluate how effective PMPA has been in ensuring that posted octane ratings are accurate, we reviewed FTC's and EPA's enforcement and testing activities since PMPA was enacted in 1978. As part of this effort, we reviewed both agencies' Federal Managers' Financial Integrity Act reports for previously reported weaknesses in their enforcement and testing programs. Neither agency had reported any weaknesses in this area.

To address the question regarding the appropriate federal role in ensuring that posted octane ratings are accurate, we reviewed Senate and

House Committee Reports and other documents to obtain the rationale for enacting PMPA; determined the past and current federal role and the extent of state involvement; and discussed the role of the federal government with petroleum industry officials and associations, consumer groups, and federal, state, and local government officials.

We discussed the information contained in this report with FTC and EPA officials and incorporated their comments where appropriate. Agency officials generally agreed with the accuracy of the information presented relating to their agency's activities. However, as requested, we did not ask either agency for official written comments on this report.

Our review was conducted between April 1988 and August 1989, and, except as noted above, in accordance with generally accepted government auditing standards.

Mislabeling Occurs but Extent Is Unknown

Although there is no current information at the federal level on the nationwide extent of mislabeling, industry and state information indicates that mislabeling is occurring. While the information is not sufficient to determine the extent of octane mislabeling nationwide or the source of mislabeling, it indicates that consumers may be paying millions of dollars for gasoline octane they do not receive. There appears, however, to be a greater potential for mislabeling at gasoline wholesalers (distributors) and retail stations than at refiners or bulk (storage) terminals where quality control procedures are more extensively used.

Federal and Industry Mislabeling Information

Although PMPA directs EPA to test gasoline octane ratings at retail stations nationwide to ensure that posted ratings are accurate, EPA did so for only 2 years. In fiscal years 1980-81 EPA tested 2,254 gasoline samples. Our analysis of 1,388 available samples showed that about 7 percent were mislabeled below the posted rating.¹ EPA stopped testing octane ratings at the end of 1981, according to EPA officials, in part because of staff and budget cuts. No other federal agency tests gasoline octane ratings to ensure that posted ratings are accurate.

While there is no recent federal information available either at EPA or FTC, there are industry surveys of gasoline quality that include tests of octane ratings at retail stations, for example, the biannual surveys conducted by the Motor Vehicle Manufacturers' Association. According to a MVMA official, these surveys currently cover 26 markets, which represent over 90 percent of domestic gasoline consumption. MVMA data show posted and actual octane ratings found at the stations included in their surveys. At our request, EPA analyzed MVMA survey data conducted between 1979 and 1987 using a six-tenths octane point tolerance level and provided the results to us. The results showed that about 9 percent of all gasoline samples tested were mislabeled below the posted octane rating. Mislabeling occurred more frequently in premium (higher octane) gasolines—about 11 percent of the premium samples tested were mislabeled. From 1979 to 1983, the percentage of all samples tested that were mislabeled was decreasing; however, the percentage has been going up since 1984. According to an MVMA official, the number of gasoline samples taken in each survey is small—about 500 per survey—thus, the results give an indication of gasoline quality and octane ratings but are not projectable nationwide.

¹These were mislabeled by six-tenths of one point or more below the posted rating. We applied a six-tenths octane point mislabeling criteria to determine the number of violations based on tolerance levels used by some testing states and the American Society of Testing and Materials in their procedures for testing octane.

The major domestic automobile manufacturers use MVMA surveys to track the quality of gasoline available to consumers. Engineers at the General Motors Research Laboratories told us that MVMA surveys are a generally accurate indicator of nationwide trends in gasoline quality, including octane ratings.

State Mislabeling Information

We obtained information from both testing and non-testing states on gasoline mislabeling. Testing states report that generally little mislabeling is occurring. Officials from the seven non-testing states we visited, however, believe that mislabeling is a problem in their states. This was supported by the results of recent one-time octane tests conducted in four of these states. In two of the states, the testing was conducted for us by EPA and state officials primarily in two cities. These tests revealed that mislabeling was occurring. Officials from both testing and non-testing states agree that testing octane ratings to ensure that posted ratings are accurate is an effective deterrent to mislabeling.

Testing States Generally Report Little Mislabeling

We obtained octane testing results from 11 states that routinely test gasoline octane ratings. We visited seven of these states to obtain the data with the remaining four states reporting their results to us. As shown in table 2.1, seven of the states found that less than 2 percent of the samples tested were mislabeled from 1985 to 1988. The far right column of the table shows the criteria used by these states for determining when gasoline is mislabeled. The samples mislabeled, as indicated in the table, are all instances where the actual octane was below the posted rating. State officials told us that almost all violations found are under rather than over the posted octane.

Table 2.1: Mislabeling in 11 States That Test Octane Ratings for the Years 1985-88

State	Total samples	Samples mislabeled	Percent mislabeled	Mislabeled criteria ^a
Arkansas	6,171	248	4.0	1.0
California	10,983	651	5.9	0.6 - 0.7 ^b
Florida	217,512	305	0.1	1.0
Georgia ^c	13,219	253	1.9	0.5
Louisiana ^d	22,829	1,782	7.8	0.5
Maryland	56,421	564	1.0	0.6 - 0.7 ^b
North Carolina	66,332	1,116	1.7	0.6 - 0.7 ^b
North Dakota	2,871	88	3.1	0.7
Oklahoma	18,063	326	1.8	0.0
South Carolina	8,091	113	1.4	0.5
Virginia	16,844	151	0.9	1.0

^aIf posted ratings exceed actual ratings by this amount or more, a violation has occurred. In the case of Oklahoma, any variance is a violation.

^bRange varies depending on octane level.

^cInformation for Georgia was available only for 1986-87.

^dIn Louisiana, the percent of samples mislabeled declined steadily between 1985 and 1987, from a high of 9.8 percent in 1985 to a low of 4.2 percent in 1987.

According to California officials, their state reports a high percentage of samples mislabeled because a substantial number of California's samples are taken from retail stations suspected of mislabeling or taken to confirm that previous samples were mislabeled, rather than randomly. California officials cited random surveys conducted in each county every 5 years as better overall measures of mislabeling in the state; less than 3 percent of gasoline samples in recent county surveys were mislabeled. Arkansas officials did not explain why the percentage of samples mislabeled was higher than other states but reported that it had varied between 1 and 5 percent since 1980.

Tests Conducted in Four States Without Testing Programs Indicate Mislabeling Is a Problem

One-time tests of gasoline octane ratings conducted in four states without testing programs included in our review showed frequent octane mislabeling. Two of these states, Oregon and Tennessee, conducted their own tests, and two other states, Michigan and Missouri, helped EPA test gasoline samples for our review primarily in one city in each state.

The Oregon and Tennessee tests were conducted in 1987 and 1988, respectively, because officials from these states were concerned about

mislabeling in their states. The tests were conducted primarily on a random basis; however, Oregon also focused on some retail stations suspected of mislabeling gasoline. Table 2.2 shows the results of the tests conducted in these two states.

Table 2.2: Oregon and Tennessee Octane Test Results

State	Total samples	Samples mislabeled	Percent mislabeled	Mislabeled criteria ^a
Oregon	110	24	21.8	0.6
Tennessee	81	18	22.2	0.6

^aWe applied a six-tenths octane point mislabeling criteria to determine the number of violations based on tolerance levels used by some testing states and the American Society of Testing and Materials in their procedures for testing octane. If posted ratings exceeded actual ratings by this amount or more, a violation occurred.

In Oregon the average difference between the actual and posted octane ratings for the 24 mislabeled samples was 1.5 octane numbers; this is equivalent to selling 87-octane regular unleaded gasoline as 89-octane midgrade unleaded gasoline. The largest difference between the actual and posted octane rating was 4.0 octane numbers; this is equivalent to selling 87-octane regular unleaded gasoline as 91-octane premium unleaded gasoline.

In Tennessee the average difference between the actual and posted octane ratings for the 18 mislabeled samples was 1.9 octane numbers. The largest difference between the actual and posted octane rating was 5.9 octane numbers.

During our review, officials from Michigan and Missouri expressed concerns about octane mislabeling in their states. At our request, EPA arranged for the North Carolina Department of Agriculture's Standards Division to test the octane ratings of 65 gasoline samples collected by state officials from retail stations primarily in the Detroit and St. Louis areas. State officials collected the samples from retail stations suspected of selling mislabeled gasoline, based on consumer complaints and the observations of state inspectors. Missouri officials collected 38 samples between December 1988 and April 1989; Michigan officials collected 27 samples between February and April 1989. Table 2.3 shows the results of the tests conducted in these two states.

Table 2.3: Michigan and Missouri Octane Test Results

State	Total samples	Samples mislabeled	Percent mislabeled	Mislabeled criteria ^a
Michigan	27	14	51.9	0.6
Missouri	38	20	52.6	0.6

^aWe applied a six-tenths octane point mislabeling criteria to determine the number of violations based on tolerance levels used by some testing states and the American Society of Testing and Materials in their procedures for testing octane. If posted ratings exceeded actual ratings by this amount or more, a violation occurred.

In Michigan the average difference between the actual and posted octane rating for 13 of the 14 mislabeled samples was 2.3 octane numbers with the largest difference being 5.6 octane numbers. The remaining mislabeled sample had an actual octane rating 11.8 octane numbers below the posted rating. According to state officials, this gasoline probably was contaminated. In Missouri, the average difference between the actual and posted octane rating for the 20 mislabeled samples was 2.2 octane numbers with the largest difference being 4.6 octane numbers. At the end of our review, Michigan and Missouri officials were planning to take actions against the more serious violators.

State, Industry, and Consumer Group Officials Attribute Mislabeled to the Lack of Octane Testing

Officials from the seven states visited that test gasoline octane ratings, as well as officials from the industry and consumer groups, attribute the low number of samples mislabeled in these states to their gasoline quality testing programs, which include testing octane ratings to ensure that they are posted accurately. They believe that testing octane ratings has improved the integrity of the gasoline distribution system in these states and that as a result of these state programs, consumers buying gasoline in those states are more likely to receive the octane that they pay for.

According to these officials, highly visible and frequent octane testing, combined with strict penalties, decreases octane mislabeling and cheating. Such testing increases the risk of violators getting caught selling mislabeled gasoline and thus of facing stiff penalties and negative publicity. As a result, distributors and retail stations are encouraged to pay more attention to quality control procedures, and potential cheaters are discouraged.

Such a deterrent effect was evident in two states where mislabeling declined significantly after they began testing octane ratings to ensure that posted ratings were accurate. Information obtained from Arkansas, which began testing octane ratings in 1975, shows that the percent of samples mislabeled fell from 24 percent in 1975 to 2 percent by 1979

and has varied between 5 percent and 1 percent since. Similar information obtained from Maryland, which also began testing octane ratings in 1975, shows that the percent of samples mislabeled fell from about 10 percent in 1975 to about 1 percent by 1980 and has remained at that lower level since, according to state officials.

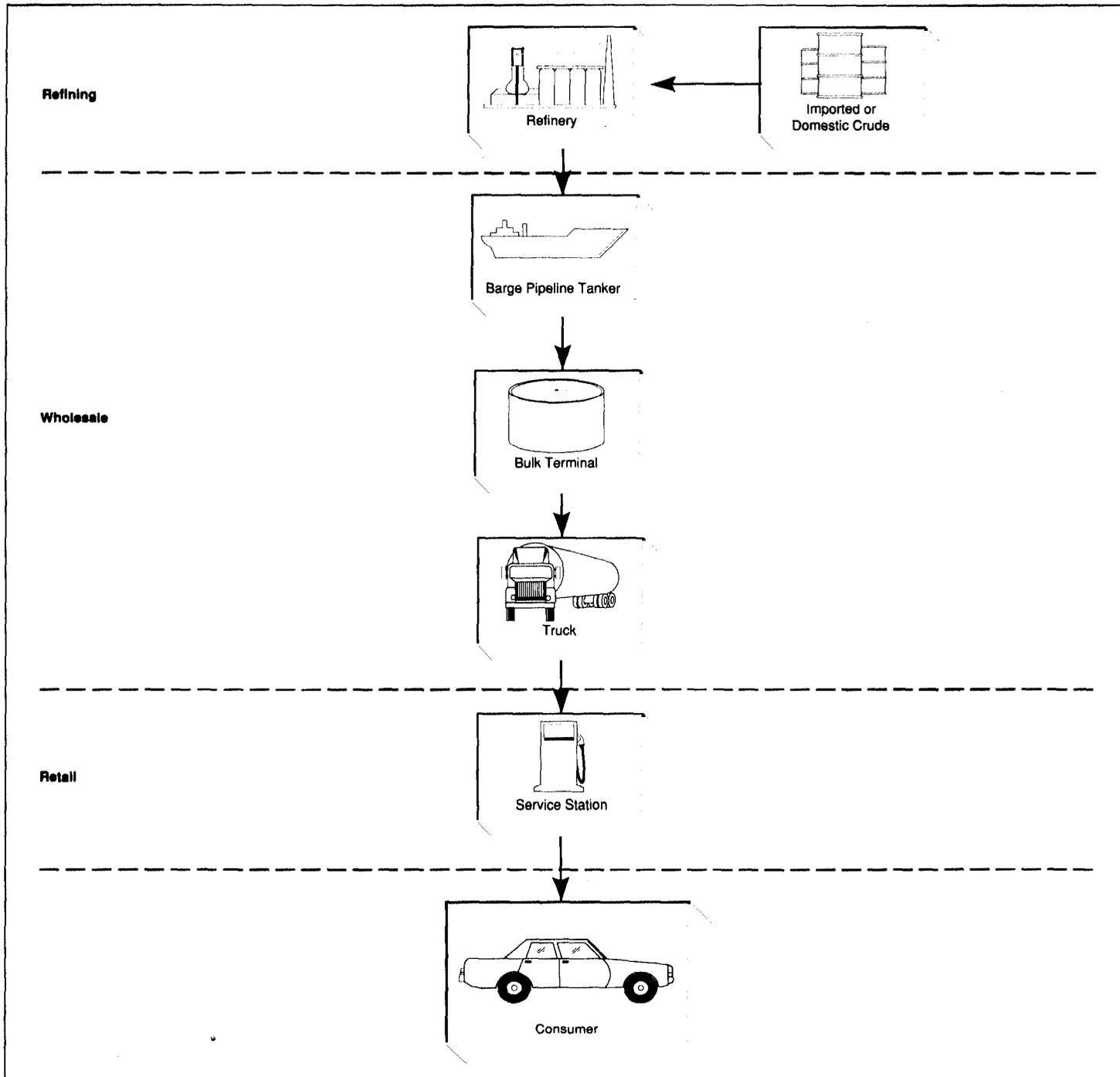
Sources of Mislabeling in the Distribution System

Based on information and comments obtained from industry officials, it appears that there is more potential for octane mislabeling at the lower levels in the distribution system, such as distributors and retail stations rather than at refineries, common carrier pipelines, or bulk terminals, where gasoline octane ratings are tested frequently. Large refiners and common carrier pipelines have extensive quality control programs that include testing octane ratings; however, these programs focus on refineries, pipelines, and bulk terminals, not distributors and retail stations. Officials from the seven states visited that test octane ratings all agree that they have found little mislabeling above the wholesale distributors and retail levels of the distribution system.

Octane Ratings Can Change Along the Gasoline Distribution System

The domestic gasoline distribution system for moving gasoline to the consumer can be divided into three broad levels: refining (manufacturing), wholesale (distributors), and retail. Figure 2.1 is a simplified diagram of the domestic gasoline distribution system showing the flow of gasoline through these three levels.

Figure 2.1: Domestic Gasoline Distribution System



According to the American Petroleum Institute (API), over 100 domestic gasoline refiners supply the domestic gasoline market, with the 10 largest refiners accounting for over 50 percent of the nation's total gasoline production. Most gasoline is transported from refineries to bulk terminals by common carrier pipeline (60 percent) and barge or ship (30 percent). A small amount (10 percent) is transported by railroad car or tanker (truck). At the wholesale level, over 11,000 gasoline wholesalers distribute gasoline from bulk terminals to other terminals and retail stations. At the lowest level of the distribution system, there are about 165,000 gasoline retail stations, including traditional full-service stations, self-serve and "super" (volume) stations, and convenience stores.

There are a number of points along the gasoline distribution system where gasoline octane ratings are changed:

- Refiners raise the octane rating of gasoline by more intensively refining the crude oil to increase its hydrocarbon content; by adding certain metals (such as lead);² by blending it with ethanol, methanol, or methyl tertiary butyl ether; or by some combination of the previous three methods.
- Below the refineries, wholesalers change the octane rating of gasoline by blending it with higher or lower octane gasolines or with ethanol, methanol, or methyl tertiary butyl ether.
- Some retail stations are equipped with special gasoline pumps that blend two grades of gasoline into a variety of intermediate grades.

Unintended changes in gasoline octane ratings can also occur. For example, pipelines can accidentally mix shipments with different octane ratings, or trucks can pick up the wrong loads or deliver them to the wrong storage tanks at retail stations. Such events can lead to octane mislabeling. If the mislabeling occurs intentionally, it is known as octane cheating. Intentional mislabeling, or octane cheating, may take place because the incentive to mislabel gasoline octane ratings is great. For example, the difference in gasoline prices at the wholesale level of the distribution system between regular and premium unleaded is about 13 cents per gallon, while at the retail level the difference may be up to 20 cents per gallon.

²To protect people's health and the environment, the federal government prohibits or severely restricts the use of these metals to enhance octane.

Octane Testing in the Distribution System

Octane testing of gasoline is part of an overall quality assurance program employed by the petroleum industry to ensure the integrity of gasoline supplies. According to petroleum industry officials, quality control procedures exist throughout the distribution system, but they cover the refiners, pipelines and large bulk terminals more extensively than distributors and retail stations. According to API, the 20 largest gasoline refiners, which have the capacity to refine over 75 percent of all gasoline sold in the United States and Puerto Rico, have extensive quality control programs that include testing octane ratings. Other refiners also have similar programs. Officials from the nine refiners we visited informed us that they test octane ratings extensively during and after refining—during refining to ensure correct octane ratings are achieved and after refining to ensure correct ratings are maintained as the gasoline moves through the distribution system. Our visits to refineries and bulk terminals revealed extensive octane testing at these locations with controls built into the quality control system to ensure accuracy.³

According to industry officials, it is very important to the large refiners to test octane ratings at bulk and other terminals to ensure that gasoline received from other refiners and pipelines was not altered during shipment. This is because refiners make extensive use of “product exchange agreements” to trade gasoline supplies with each other. Moreover, an increasingly large percentage of gasoline is “fungible”—refined to meet generic industry specifications so it can be exchanged. Such gasoline is then customized by adding proprietary additives—like detergents that clean engine parts—when the gasoline is loaded into tankers for transportation to retail stations. According to API officials, over 50 percent of all pipeline gasoline shipments are fungible. According to industry and state officials, refiners use product exchange agreements and fungible gasoline to minimize their transportation costs and increase their supply flexibility throughout the distribution system. Because of the large quantities of gasoline involved, these features of the distribution system give refiners a great incentive to test.

Also according to API, large common carrier pipeline companies have extensive quality control programs as well, including octane testing, to ensure that the ratings certified by shippers are accurate and to protect the pipeline companies from accusations that they altered the quality of the gasoline during shipment. About 60 percent of all gasoline is transported by pipeline at some point along the distribution system. Officials

³Industry officials were willing to show us their quality control systems but because the data was considered proprietary, they were not willing to provide data for us to analyze.

from three large common carrier pipelines told us that their companies have extensive quality control programs including octane testing. Officials at the largest of these pipeline companies said the company tests samples from 30 to 50 percent of all gasoline shipments transported through its pipeline facilities. Laboratory reports obtained from this company showed that it was conducting an average of 55 octane tests per month.⁴

According to industry and state officials, there is less testing of octane ratings after gasoline leaves bulk terminals. Officials we spoke to at refineries and bulk terminals said that they have little control over the gasoline after it leaves the terminal, other than limited testing at retail stations by large refiners. Officials from testing and non-testing states also agree that mislabeling is more likely to occur at the wholesale or retail levels of the distribution system, and officials from testing states point out that the results of their octane tests support this position—they have found very little, if any, mislabeling at bulk terminals. State and industry officials noted that quality control procedures are generally more lax at the lower levels of the distribution system and that many large-volume retail stations or convenience stores have part-time or inexperienced personnel. In some areas, deliveries of gasoline are commonly made when the retail station is closed for business and there are no station personnel present, according to state and industry officials. Wholesalers and retail gasoline station associations we spoke to generally did not believe octane mislabeling was a problem but agreed that there are less controls in place to detect octane mislabeling below the refiners and bulk terminals.

Several large refiners we talked to test or hire a private laboratory to test octane ratings at company owned and operated retail stations and at retail stations using their brand names. However, the number of tests is relatively small.⁵ Moreover, officials of the large refiners state that they generally have limited control over the independently owned and operated retail stations using their brand names, which represent about 50 percent of all retail stations. One gasoline retail association we contacted agreed with this statement and pointed out that many independently owned and operated retail stations cannot afford to test for octane, which costs about \$100 per sample.

⁴See footnote 3.

⁵See footnote 3.

Observed Instances of Octane Cheating

Officials in seven non-testing states visited during our review believe octane cheating is a problem. They based their belief on observed or suspected instances of cheating. All seven of these states have weights and measures programs where state inspectors visit distributors and retail stations to check gasoline pump accuracy. In two of these states, inspectors also collect gasoline samples at retail stations to be tested for ingredients or characteristics, such as vapor pressure or the presence of metals (e.g., lead), but not octane ratings. State officials informed us that state inspectors had observed practices during their visits to distributors or retail stations that indicated cheating was occurring at some of these locations.

One practice observed in several states by state inspectors at some retail stations was the sale of gasoline from pumps posted with different octane ratings, but which were supplied by the same storage tank. State officials said that at least one of the posted octane ratings had to be wrong. Another practice observed in several states was the sale of 87-octane unleaded gasoline as 89-octane leaded gasoline. According to state officials, this occurs because the wholesale price of 87-octane unleaded gasoline is less than the wholesale price of 89-octane leaded gasoline. While state officials discussed these observations with us, they were anecdotal in nature and we were not provided documentation supporting them.

Impact of Mislabeling on Consumers

When consumers buy gasoline with an octane rating lower than the rating posted on the pump, they are paying for octane they do not receive. How much they pay for these misrepresented octanes depends on a number of factors, including the variance or degree of mislabeling and the cost differential between gasoline grades. Our analysis shows that even a small amount of mislabeling can result in consumers paying a significant amount for octane they do not receive. For example, assuming that 9 percent of gasoline sold is mislabeled by only one-half octane number and that each octane number represents 3 cents, consumers in 1988 could have paid about \$150 million for octane they did not receive, based on 1988 gasoline sales.

Conclusions

Octane mislabeling is occurring; however, only limited information is available on the extent of mislabeling on a nationwide basis. An analysis of the latest available octane data collected by MVMA indicated an average mislabeling of 9 percent. Also, one-time tests in four states without testing programs revealed frequent octane mislabeling. Information

from states that have implemented octane testing programs, however, indicates that mislabeling was less than 2 percent in the majority of these states and suggests that such programs can reduce the occurrences of octane mislabeling. While mislabeling may occur at any place in the gasoline distribution system, there is more potential for it to occur at the lower levels of the system, such as at distributors or retail stations, than at refineries, pipelines, or bulk terminals, because these latter locations are covered by extensive quality control programs that include frequent testing of octane ratings.

FTC and EPA Have Not Effectively Implemented the Petroleum Marketing Practices Act

FTC and EPA have not carried out their gasoline octane testing and enforcement responsibilities under PMPA to ensure that the octane ratings posted on gasoline pumps are accurate. Thus, there are no federal controls in place to ensure the accuracy of octane ratings. Moreover, although not explicitly stated in its regulations, FTC has taken the position that PMPA's octane certification and posting requirements only apply to gasoline and not to the more recent gasoline-alcohol blend fuels that are being used to reduce automotive air pollution. Also, states are concerned that PMPA may interfere with their efforts to ensure that posted octane ratings are accurate because they believe it limits the remedies and penalties they may take against violators.

Given the current federal budgetary constraints, it may be difficult for FTC and EPA to increase their efforts in enforcing PMPA. There may be options, however, for redefining federal responsibilities for implementing PMPA requirements, which would involve the states in a joint federal-state program, or perhaps a total state enforcement program is possible.

PMPA Not Fully Implemented

PMPA required FTC to set and define gasoline certification and octane posting requirements and directed EPA to (1) inspect retail stations nationwide to ensure that they were complying with the octane posting requirements and (2) test gasoline octane ratings at retail stations to ensure that the posted ratings were accurate. EPA was further directed to report the test results to FTC. In cases where violations were identified, PMPA authorized FTC to prosecute and seek civil penalties against violators in Federal District Court. While octane ratings are being posted on pumps at retail stations, there are no federal controls in place to ensure the accuracy of octane ratings because EPA stopped testing the accuracy of octane ratings at the end of 1981 and FTC has not prosecuted any octane violations.

Octane Posting Regulations

In 1979, as required by PMPA, FTC issued the Octane Certification and Posting Rule to establish standard procedures for determining, certifying, and posting the octane ratings of automotive gasoline. PMPA requires refiners to determine and certify octane ratings to their customers and requires anyone who receives and distributes gasoline to another party (i.e. pipeline companies) other than the ultimate purchaser to certify the octane rating of such gasoline to its customers.

Petroleum industry officials, including nine refiners and three pipeline companies, advised us that they comply with PMPA octane certification

requirements at every level of the distribution system. During our visits in 10 states to the nine refineries, three pipeline companies, various terminals, and four distributors, we discussed company certification procedures and reviewed documents, such as gasoline shipment invoices for evidence of octane certifications, and confirmed that with one exception, these facilities and their parent companies were complying with these requirements. We did not, however, validate the accuracy of the octane certifications. The exception involved a small independent distributor in Missouri. The owner said that he was unaware of PMPA's octane certification requirements and promised to comply as soon as possible by printing the octane ratings of the gasolines he sold on his customers' invoices. We advised FTC officials of the facts surrounding this case during our field work and they agreed to follow up to ensure that the owner was fully informed of PMPA's requirements. An FTC official advised us that they sent a letter to the distributor in August 1989 along with a copy of FTC's octane certification and labeling rules.

Since 1979, during visits to retail stations in conjunction with its nationwide lead testing program, EPA has ensured that retail stations posted octane ratings on their gasoline pumps. EPA officials report that retail stations generally post octane ratings on their pumps, as required by PMPA, but occasionally they find stations without posted ratings. These are subsequently reported to FTC. FTC officials told us that they send out letters to these stations telling them to comply with PMPA's posting requirement. Some states, such as Washington, enforce PMPA posting requirements in conjunction with their weights and measures programs.

EPA Stopped Testing Octane Ratings After 1981

In 1980 and 1981 EPA tested gasoline octane at retail stations. According to EPA officials, EPA discontinued testing after fiscal year 1981 because of staffing and budget cuts and also because EPA considered it to be a low priority, given the Agency's other enforcement programs. EPA officials noted that the Congress had not provided any funds to test octane ratings, which cost about \$100 per test. However, EPA did not inform the Congress of any inability to execute the program without additional funds. EPA officials also said that FTC had not used the 1980-81 test results to prosecute octane violators and that they could see few benefits from spending additional public funds to test if FTC was not going to take action.

Up to now this conflict has caused few problems, since most states have not considered the effects of PMPA's preemption clause. However, in early 1988 California officials dropped criminal charges brought against a large distributor for octane mislabeling, because in the San Diego City Attorney's opinion, PMPA preempted the state law and precluded action by the state. In this case, the state law was much stricter than PMPA in that it included criminal prosecution and up to 6 months in jail and a \$1 million fine. California officials believe that such substantial penalties are sometimes necessary to deal with large distributors engaged in octane mislabeling at a number of retail stations (as was alleged in this case) since the profits from mislabeling can be large. In this case, the distributor had already paid more than \$160,000 in civil fines during a 1 year period.

In other cases, some state officials contend that the formal court procedures required in bringing a civil action are too cumbersome. State officials told us that the time required to prepare and bring a case to court under current civil enforcement procedures results in an extensive period of time before corrective action can be taken. On the other hand, they believe that their state enforcement actions can be more effective because they are immediate and thus result in greater compliance with the goals of PMPA. In this regard, we noted that FTC's first formal investigation of octane mislabeling has been on-going since 1987 and still has not been settled or brought to trial.

FTC officials agreed with these state arguments and stated that the states' concern over PMPA preempting their own state enforcement actions hinders FTC's efforts to encourage states to test and enforce octane posting. They noted that the preemption issue was not a practical problem for most states because it seldom has been raised as a defense by violators; however, it is a legal problem that has yet to be settled in court. FTC officials support an amendment to PMPA that would allow states to employ a broader range of enforcement options, including immediate stop sale orders or criminal prosecution, yet preserve PMPA's uniform nationwide posting and certification requirements.

Options to Implement Monitoring and Enforcement

FTC and EPA officials advised us that testing octane ratings to ensure that posted ratings are accurate is not possible without additional funds. However, neither FTC or EPA had an estimate of how much it would cost to test octane ratings nationwide to ensure that they are accurate and to prosecute violators. In 1978, the Congressional Budget Office estimated that establishing a nationwide federal octane testing program would

cost \$1.1 million in 1979 and between \$2.1 and \$2.4 million a year in the 1980-1983 time frame. EPA officials did not know how much it would cost to establish an octane testing program today but stated that it would be much higher today than the earlier estimates.

Ensuring the accuracy of posted octane ratings, however, need not be entirely a federal effort. While FTC and EPA are faced with budgetary constraints in implementing PMPA octane testing requirements, a number of states have taken action to implement their own testing programs. In view of this, there may be options worth exploring involving both federal and state efforts, which would provide greater assurance that the objectives of PMPA are met. We did not evaluate the effectiveness or cost of such options; however, we did obtain information on them from federal, state, industry, and consumer group officials.

Officials we talked to from all of the testing and non-testing states we visited were generally in favor of state testing and enforcement. According to officials from the testing states, ensuring that octane ratings are posted accurately and that mislabeling is prosecuted is primarily a local responsibility and more effectively dealt with at the state—not national—level. However, one official added that he would favor a federal role for cases involving interstate issues, for example, a distributor in one state supplying retail stations in another state. Several state officials were against the federal government mandating state octane testing without providing funding for that testing.

Officials from two states in favor of state testing said that the biggest obstacle to state octane testing was the cost of constructing and equipping a testing laboratory—about \$1.6 million according to estimates prepared by Tennessee officials. The cost of collecting gasoline samples for testing would probably be less of an obstacle, because most states have a weights and measures program where inspectors visit retail stations at least once a year to check pump calibration. Officials from testing and non-testing states believe that testing octane ratings to ensure that posted ratings are accurate would be cost-effective. They said that it saves consumers more money than the testing costs—even though, as noted previously, constructing and equipping a testing laboratory is expensive.

Officials in two states specifically suggested that the federal government might consider encouraging the non-testing states to test octane ratings by sharing this cost. One state official said that in the long run

FTC Has Never Prosecuted an Octane Violation

FTC has never prosecuted an octane violation, even in 1980-1981, when it had octane test results from EPA. FTC officials cited staff shortages and budget cuts as reasons for its lack of action. They noted that between 1980 and 1988, FTC's staff was cut by about 44 percent as part of the federal government's deregulation efforts. FTC officials also noted that the Congress did not provide additional funds to FTC to enforce PMPA, however, as with EPA, FTC has not advised the Congress of their inability to carry out the program without additional funding.

Currently, FTC is taking some actions in response to complaints and other information received from outside sources. For example, since 1987 FTC's Dallas Regional Office has been investigating a case of suspected octane mislabeling brought to its attention by an outside party, which it intends to settle or bring to trial. Partly as a result of this case and complaints from state enforcement officials, informants, consumers and consumer groups, FTC officials told us that they would like to assume a more active role in enforcing PMPA's octane certification and posting requirements. However, FTC officials noted that future efforts will be hindered because EPA has stopped testing octane ratings and FTC has limited funds for its enforcement activities.

Posting Requirement Only Covers Gasoline

In a 1979 letter to the state of Nebraska, FTC expressed the opinion that gasohol, which is a blend of 90 percent gasoline and 10 percent ethanol, was exempt from PMPA octane posting and certification requirements because the statutory definition of gasoline did not include such fuels. According to this letter:

"No mention of composite fuels such as gasohol is found in either the statute or its legislative history. This indicates to us that Congress did not contemplate coverage of gasohol by either PMPA or the Commission's Rule."

FTC officials advised us that staff opinions were not binding unless they are adopted by the Commission and that this staff opinion has not been so adopted. Nevertheless, according to FTC officials, as a result of this opinion gasohol and other gasoline-alcohol blends are viewed as exempt from PMPA octane certification and posting requirements. FTC has not issued similar staff opinions on other gasoline-alcohol blends or other alternative fuels; however, FTC officials told us that they also would be exempt following the same rationale used in the 1979 letter.

Currently, as a result of this opinion, octane ratings are not required to be posted for gasoline-alcohol blends. However, octane ratings are

posted for these fuels in some states because they have their own laws requiring such postings. The areas affected by this opinion may grow as more urban areas require the use of gasoline-alcohol blends and other alternative fuels to fight air pollution.

In August 1989, the close of our review, FTC officials advised us that they are reconsidering the rationale behind the 1979 opinion with a view toward making gasoline-alcohol blends and other composite fuels subject to PMPA. FTC officials stated that the opinion expressed in the 1979 letter was appropriate at the time because gasohol and other composite fuels were viewed as alternatives to gasoline. However, market conditions have changed, and FTC officials now view these fuels as gasoline containing an octane-enhancing additive (in this case, alcohol). FTC officials believe that consumer perceptions of these fuels have changed similarly and that PMPA requirements should apply to these fuels, although they noted that the courts might interpret PMPA more narrowly as FTC did in 1979.

However, FTC officials doubt that PMPA could be interpreted broadly enough to cover all alternative fuels for spark ignition engines, such as pure methanol, that may be used in the future. For example, the President's recently announced plan for amending the Clean Air Act could lead to the use of such fuels in at least nine major U.S. cities by 1995. FTC officials stated that there is a need to amend PMPA to clarify and expand the definition of gasoline to include all fuels used in spark ignition engines, such as any new alternative fuel that may become available to reduce air pollution.

PMPA May Interfere With State Enforcement Efforts

PMPA authorizes the FTC to seek civil penalties of up to \$10,000 for each mislabeling violation. Section 204 of PMPA sets forth its relationship to state laws and provides that state laws (including remedies or penalties) dealing with any act or omission covered by PMPA are to be the same as the applicable provisions of PMPA. State officials are concerned about this apparent preemption of some existing state enforcement provisions.

Officials from states that test octane ratings believe that prosecuting octane labeling violators may become a problem if their laws are preempted by PMPA and they cannot use more effective measures than civil penalties to prosecute violators and correct problems. For example, the seven states we visited that test octane use administrative stop sale orders to immediately halt the sale of mislabeled gasoline. PMPA would seem to preempt this option.

the cost to the federal government of sharing the expense of constructing and equipping state laboratories would be less than the cost of establishing and maintaining a nationwide federal octane testing program.

Another argument for involving the states in implementing and enforcing PMPA is that 20 states are already performing octane tests and more are planning or considering octane testing programs. Both Michigan and Missouri plan to begin testing gasoline octane ratings as soon as they complete construction of new testing laboratories. Moreover, both the Tennessee and Washington legislatures were considering such testing at the time of our review.

Officials from three consumer groups believe that federal or state testing is acceptable; however, these officials feel that the federal government should set national posting requirements. They noted that federal posting requirements have significant advantages for consumers, including uniformity. If posting were left up to the individual states, labels might vary between states, creating confusion for consumers. Moreover, some states might not require any posting or testing, leaving consumers without critical information about gasoline quality.

Conclusions

In enacting PMPA, the Congress wanted a uniform nationwide system to provide assurance to consumers that the posted gasoline octane ratings were accurate. This assurance, however, is not being provided because there are no federal controls in place to monitor the accuracy of octane postings. EPA and FTC have not taken the steps required by PMPA to test octane ratings and take actions against violators, primarily because of funding limitations. Furthermore, there is (1) confusion as to whether newer gasoline-alcohol blended fuels—or future fuels that may become available to abate vehicle pollution—are subject to PMPA's octane posting requirements and (2) concern in the states that PMPA provisions may limit state enforcement efforts.

We believe there needs to be assurance that consumers are getting the octane they pay for. We also believe that in addition to a total federally administered PMPA, there are options for including the states in the program in a way likely to result in greater assurances that PMPA's objectives are achieved. Such options need to be explored, and in doing so a number of factors such as the cost, staff requirements, range of enforcement actions, and the risk to consumers need to be considered. Necessary control measures needed to ensure program success also should be an integral part of each option considered.

Recommendations to the Congress

We recommend that the Congress amend PMPA to

- include octane certification and posting for gasoline-alcohol blends and other alternative motor fuels that may become available to reduce air pollution and
- make it clear that states may employ a range of remedies broader than those available under PMPA to enforce octane posting requirements.

Recommendations to the Federal Trade Commission and the Environmental Protection Agency

We also recommend that the Chairman, FTC, and the Administrator, EPA, in consultation with the appropriate congressional committees and the states take the following actions:

- Develop and assess the options that could be employed to monitor compliance with the act's octane certification and posting requirements. Such options should include a total federal role, joint federal-state roles, and a total state role in implementing PMPA's requirements. This analysis should include, among other things, the benefits and costs of the various options, including necessary control measures, as well as milestones for their implementation.
- Report the results of their evaluations and their recommendations, along with funding requirements and recommendations for any needed legislative changes, to the Congress.

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Related GAO Products

Gasoline Marketing: States' Programs for Gasoline Octane Testing (GAO/RCED-89-91FS, April 12, 1989).

Gasoline Marketing: States' Programs for Pump Labeling of Gasoline Ingredients (GAO/RCED-89-6, January 12, 1989).

Gasoline Marketing: Octane Mislabeling in New York City (GAO/RCED-87-180BR, August 18, 1987).

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