ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 86 and 600

[EPA–HQ–OAR–2005–0169; FRL–8021–8]

RIN 2060–AN14

Fuel Economy Labeling of Motor Vehicles: Revisions To Improve Calculation of Fuel Economy Estimates

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of proposed rulemaking.

SUMMARY: The Environmental Protection Agency (EPA) is proposing changes to the test methods used to calculate the fuel economy estimates that are posted on window stickers of all new cars and light trucks sold in the United States. A fundamental issue with today's fuel economy estimates is that the underlying test procedures do not fully represent real-world driving conditions. Although no single test or set of tests can ever account for the wide variety of conditions experienced by every driver, the new fuel economy estimates would more accurately reflect a number of important factors that drivers are likely to experience on the road. These changes will take effect starting with 2008 model year vehicles. Under the new methods, the City MPG estimates for most vehicles would drop 10 percent to 20 percent from today's labels, depending on the vehicle. The Highway MPG estimates would generally drop 5 percent to 15 percent for most vehicles. Although today's proposed fuel economy test methods would provide more accurate estimates for many consumers, there will always continue to be drivers who get higher or lower fuel economy than the window sticker numbers. Currently the same test procedures are used for both the window sticker estimates and the fuel economy values used to determine a manufacturer's corporate average fuel economy (CAFE). However, this proposal would not alter the test procedures, driving cycles, measurement techniques, or the calculation methods used to determine CAFE.

DATES: *Comments:* Comments must be received on or before April 3, 2006. Under the Paperwork Reduction Act, comments on the information collection provisions must be received by OMB on or before March 3, 2006. See Section VII.A of the **SUPPLEMENTARY INFORMATION** section for more information about written comments.

Hearings: We will hold a public hearing in Romulus, Michigan, on March 3, 2006. See Section VII.C of the **SUPPLEMENTARY INFORMATION** section for more information about public hearings.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–HQ–OAR–2005–0169, by one of the following methods:

- *www.regulations.gov:* Follow the on-line instructions for submitting comments.
- Fax: (202) 566–1741.
- Mail: Environmental Protection Agency, EPA Docket Center (EPA/DC), Air and Radiation Docket, Mail Code 6102T, 1200 Pennsylvania Avenue, NW., Washington, DC 20460, Attention Docket ID No. EPA–HQ–OAR–2005–0169. In addition, please mail a copy of your comments on the information collection provisions to the Office of Information and Regulatory Affairs, Office of Management and Budget (OMB), Attn: Desk Officer for EPA, 725 17th St., NW., Washington, DC 20503.''
- Hand Delivery: Docket Center, (EPA/DC) EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC, Attention Docket ID No. OAR–2005–0169. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA–HQ–OAR–2005–0169. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *www.regulations.gov,* including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through *www.regulations.gov* or e-mail. The *www.regulations.gov* Web site is an ''anonymous access'' system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through www.regulations.gov your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD–ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket visit the EPA Docket Center homepage at *http://www.epa.gov/epahome/dockets.htm*. For additional instructions on submitting comments, go to Section VII of the **SUPPLEMENTARY INFORMATION** section of this document.

Public Hearing: The public hearing will be at the Crowne Plaza Hotel, Detroit—Metro Airport, 8000 Merriman Road, Romulus, Michigan.

Docket: All documents in the docket are listed in the *www.regulations.gov* index. Although listed in the index, some information is not publicly available, *e.g.*, CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in *www.regulations.gov* or in hard copy at the EPA Docket Center, EPA/DC, EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC. This Docket Facility is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The EPA Docket Center telephone number is (202) 566–1742. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744.

FOR FURTHER INFORMATION CONTACT: Rob French, U.S. EPA, Voice-mail (734) 214–4636; E-mail: *french.roberts@epa.gov*.

SUPPLEMENTARY INFORMATION:

Regulated Entities

This proposed action would affect companies that manufacture or sell new light-duty motor vehicles. Regulated categories and entities include:

Category	NAICS codes [A]	Examples of potentially regulated entities
Industry	336111, 336112	Motor vehicle manufacturers.
Industry	811112, 811198, 541514 ...	Commercial Importers of Vehicles and Vehicle Components.

[A] North American Industry Classification System (NAICS).

This list is not intended to be exhaustive, but rather provides a guide regarding entities likely to be regulated by this action. To determine whether particular activities may be regulated by this action, you should carefully examine the proposed regulations. You may direct questions regarding the applicability of this action to the person listed in **FOR FURTHER INFORMATION CONTACT.**

Table of Contents

I. Introduction
A. History of Federal Fuel Economy Requirements
B. Why is Today's Action Warranted?
C. What New Requirements Are We Proposing?
D. Today's Proposal Does Not Impact or Change CAFE Test Procedures
E. When Will the New Fuel Economy Estimates Take Effect?
F. How Will EPA Communicate to the Public the Transition Between the Old Label Values and New?
G. Statutory Provisions and Legal Authority
II. Description of the Proposed Fuel Economy Label Methodology
A. Proposed Fuel Economy Label Formulae
B. Application of the Formulae To Develop Fuel Economy Labels for Specific Vehicles
C. Derivation of the Proposed 5-Cycle Fuel Economy Formulae
D. Derivation of the MPG-Based Approach
E. Effect of the New Formulae on Fuel Economy Label Values
F. Comparison to Other Onroad Fuel Economy Estimates
III. What Major Alternatives Were Considered?
IV. Revisions to the Fuel Economy Label Format and Content
A. Estimated Annual Fuel Cost
B. Fuel Economy of Comparable Vehicles
C. ''Your mileage will vary * * *'' Range of Expected Fuel Economy Information
D. Other Format Changes
V. Other Related Proposals
A. Comparable Class Categories
B. Electronic Distribution of Dealer-Supplied Fuel Economy Booklet
C. Testing Provisions
D. Voluntary Fuel Economy Labeling for Vehicles Exceeding 8500 Pounds GVWR
E. Consideration of Fuel Consumption vs. Fuel Economy as a Metric
F. Environmental Information on Fuel Economy Labels
VI. Projected Impacts of the Proposed Requirements
A. Information and Reporting Burden
B. Fees
C. Aggregate Costs
VII. Public Participation
A. How and To Whom Do I Submit Comments?
B. How Should I Submit CBI to the Agency?
C. Will There Be a Public Hearing?
VIII. Statutory and Executive Order Reviews
A. Executive Order 12866: Regulatory Planning and Review
B. Paperwork Reduction Act
C. Regulatory Flexibility Act
D. Unfunded Mandates Reform Act
E. Executive Order 13132: Federalism
F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments
G. Executive Order 13045: Protection of Children From Environmental Health and Safety Risks
H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use
I. National Technology Transfer Advancement Act
IX. Statutory Provisions and Legal Authority

I. Introduction

The EPA fuel economy estimates have appeared on the window stickers of all new cars and light trucks since the late 1970's and are well-recognized by consumers. The fuel economy estimates essentially serve two purposes: to provide consumers with a basis on which to compare the fuel economy of different vehicles, and to provide consumers with a reasonable estimate of the range of fuel economy they can expect to achieve. While the estimates historically have been a valuable tool for comparison shopping purposes, attention has been focused recently on how closely the EPA estimates approximate consumers' real-world fuel economy experience.

Today, we are proposing changes to EPA's fuel economy test methods to bring the estimates closer to the fuel economy consumers are achieving in the real-world. We believe these estimates will provide car buyers with useful information when comparing the fuel economy of different vehicles. It is important to emphasize that fuel economy varies from driver to driver for a wide variety of reasons, such as different driving styles, climates, traffic patterns, use of accessories, loads, weather, and vehicle maintenance. Even different drivers of the same vehicle will experience different fuel economy as these and other factors vary. Therefore, it is impossible to design a ''perfect'' fuel economy test that will provide accurate real-world fuel economy estimates for every consumer. With any estimate, there will always be consumers that get better or worse actual fuel economy. The EPA estimates are meant to be a general guideline for consumers, particularly to compare the relative fuel economy of one vehicle to another. Nevertheless, we do believe that today's new fuel economy test methods will do a better job of giving consumers a more accurate estimate of the fuel economy they can achieve in the real-world.

It is essential that our fuel economy estimates continue to be derived from controlled, repeatable, laboratory tests. However, the inputs to our estimates are based on data from actual real-world driving behavior and conditions. Because the test is controlled and repeatable, an EPA fuel economy test result can be used for comparison of different vehicle models and types. EPA and manufacturers test over 1,250 vehicle models annually and every test is run under identical conditions and under a precise driver's trace, which assures that the result will be the same for an individual vehicle model no matter when and where the laboratory test is performed. Variations in temperature, road grade, driving patterns, and other variables do not impact the result of the test. While such external conditions impact fuel economy on a trip-to-trip basis, they do not change the laboratory test result. Therefore, a repeatable test provides a level playing field for all vehicles, which is essential for comparing the fuel economy of one vehicle to another. Finally, EPA must preserve the ability to confirm the values achieved by the manufacturers' testing, and this can only be achieved with a highly repeatable test or set of tests. No other fuel economy test program provides the level of repeatability as the EPA program.

However, the EPA fuel economy test methods need to reflect real world conditions as well as being a repeatable test. While some organizations have issued their own fuel economy numbers based on on-road driving, this approach introduces a wide number of variables—different drivers, driving patterns, weather conditions, temperatures, etc.—that make repeatability impossible. Our proposed fuel economy test methods are more representative of real-world conditions than the current fuel economy tests—yet we would retain our practice of relying on controlled, repeatable, laboratory tests.

The methods used today for calculating the city and highway mpg estimates were established in the 1970's, and were adjusted in the mid-1980's. Since these adjustments were made, America's driving behavior has changed. In the past 20 years, speed limits have increased and vehicles have been designed for higher power—as a result, Americans are driving faster and more aggressively than ever before. Vehicle technology has changed markedly, and many more vehicles are equipped with energy-consuming accessories like air conditioning. These and other factors are not accounted for in the current test procedures used to determine the city and highway mpg estimates. Our analyses indicate that if these factors were better accounted for, the city and highway fuel economy label estimates would be generally lower and closer to the average real-world experience of consumers.

A fundamental issue with today's fuel economy estimates is that the underlying test procedures do not fully represent real-world driving conditions. Some of the key limitations are that the highway test has a top speed of only 60 miles per hour, both the city and highway tests are run at mild climatic conditions (75 deg. F), both tests have mild acceleration rates, and neither test is run with the use of accessories, such as air conditioning. However, since the time of the last fuel economy labeling revisions in the mid-1980's, EPA has established several additional test procedures, used for emissions compliance purposes, which capture a much broader range of real-world driving conditions. Specifically, these emissions test cycles capture the effects of higher speeds, more aggressive driving (i.e., higher acceleration rates), the use of air conditioning at higher ambient temperatures, and colder temperature operation. Our analysis indicates that these factors can have a significant impact on fuel economy, and that the impacts can vary widely across different vehicles.

Today, we are proposing that three additional emission tests, already used by manufacturers, could be utilized to derive more accurate fuel economy estimates. These three test procedures encompass a much broader range of real-world driving, as they incorporate the effects of higher speeds, more rapid accelerations, air conditioning use, and cold temperatures. Our proposed approach would utilize these additional emission tests, together with the current two fuel economy tests, so that our fuel economy test methods reflect a much broader range of driving conditions.

In the Energy Policy Act of 2005, Congress required EPA to update or revise adjustment factors to better reflect a variety of real-world factors that affect fuel economy. Section 774 of the Act directs EPA to ''* * * update or revise the adjustment factors in [certain sections of the fuel economy labeling regulations] to take into consideration higher speed limits, faster acceleration rates, variations in temperature, use of air conditioning, shorter city test cycle lengths, current reference fuels, and the use of other fuel depleting features.'' [1] Today's proposal does take into account these conditions and would address this statutory requirement.

Over the past few years, there have been several independent studies comparing EPA's fuel economy estimates to the real-world experience of consumers. These studies confirm that there is considerable variation in real-world fuel economy, and provide further evidence that EPA's mileage ratings often overestimate real-world fuel economy. Although these studies differ in a number of variables, including their test methods, driving conditions, and fuel economy measurement techniques, they indicate that EPA's approach to estimating fuel economy needs to be improved to better represent some key real-world fuel economy impacts.

Currently the same test procedures are used for both the window sticker estimates and the fuel economy values used to determine a manufacturer's corporate average fuel economy (CAFE), although the label estimates are adjusted downward. This proposal would not alter the test procedures, driving cycles, measurement techniques, or the calculation methods used to determine CAFE. The Energy Policy and Conservation Act of 1975 requires that CAFE values be determined from the EPA test procedures in place as of 1975 (or procedures that give comparable results), meaning that whatever action we take to improve the window sticker estimates must leave in place the existing tests used for CAFE determination. The proposed test methods for determining the new fuel economy label estimates would be incorporated in sections of the regulations that are entirely separate from the CAFE regulations.

This section begins with a history of EPA's involvement in fuel economy programs. Then we discuss why we are taking action, including discussions of the limitations of the current tests, various data sources of real-world fuel economy, the additional real-world driving conditions captured by other emissions tests procedures, and the impact of these factors on fuel economy. We then provide an overview of our proposed new fuel economy test methods (which are discussed in detail in Section II), and conclude with a discussion of the relevant Federal statutes and how they bear on this proposal.

A. History of Federal Fuel Economy Requirements

The Energy Policy and Conservation Act of 1975 (EPCA) established two primary fuel economy requirements: (1) Fuel economy information, designed for public use, in the form of fuel economy labels posted on window stickers of all new motor vehicles, and the publication of an annual booklet of fuel economy information to be made available free to the public by car dealers; and (2) calculation of a manufacturer's average fuel economy and compliance with a standard (later, this compliance program became known as the Corporate Average Fuel Economy (CAFE) program). The responsibilities for these requirements were split between EPA, the Department of Transportation (DOT) and the Department of Energy (DOE). EPA is responsible for establishing the test methods and procedures both for determining the fuel economy estimates to be posted on the window stickers and in the annual booklet, and for the calculation of a manufacturer's corporate average fuel economy. DOT is responsible for administering the CAFE compliance program, including establishing standards for non-passenger automobiles and determining if manufacturers were complying with the applicable CAFE standards, and assessing any penalties as needed. DOE is responsible for publishing and distributing the annual fuel economy information booklet.

EPA published regulations implementing portions of the EPCA statute in 1976.[2] The provisions in this regulation, effective with the 1977 model year, established procedures to calculate fuel economy values for labeling and CAFE purposes that used the Federal Test Procedure (FTP or ''city'' test) and the Highway Fuel Economy Test (HFET or ''highway'' test) data as the basis for the calculations. At that time, the fundamental process for determining fuel economy was the same for labeling as for CAFE, except that the

[1] Pub. L. 109–58, 119 Stat. 835 (2005).

[2] See 41 FR 38685, which is promulgated at 40 CFR Part 600.

CAFE calculations combined the city and highway fuel economy into a single number.

After a few years of public exposure to the fuel economy estimates on the window stickers of new vehicles, it soon became apparent that drivers were disappointed that they were not often achieving these estimates on the road and that they expected them to be as accurate as possible. In 1978, Congress recognized the concern about differences between EPA estimated fuel economy values and actual consumer experience and mandated a study under section 404 of the National Energy Conservation Policy Act of 1978.[3] In February, 1980, a set of hearings were conducted by the U.S. House of Representatives Subcommittee on Environment, Energy, and National Resources. One of the recommendations in the subsequent report by the Subcommittee was that ''EPA devise a new MPG system for labeling new cars and for the Gas Mileage Guide that provides fuel economy values, or a range of values, that most drivers can reasonably expect to experience.'' [4]

EPA commenced a rulemaking process in 1980 to revise its fuel economy labeling procedures, and analyzed a vast amount of in-use fuel economy data.[5] In 1984, EPA published new fuel economy labeling procedures that were applicable to 1985 and later model year vehicles.[6] The decision was made to retain the FTP and highway test procedures, primarily because those procedures were also used for other purposes—emissions certification and CAFE determination. Based on the in-use fuel economy data, however, it was evident that the final fuel economy values put on the labels needed to be adjusted downward in order to more accurately reflect consumers' average fuel economy experience. The final rule, therefore, included downward adjustment factors for both the city and highway label fuel economy estimates. The city values (based on the raw FTP test data) were adjusted downward by 10 percent and the highway values (likewise based on the raw highway test data) were adjusted downward by 22 percent.

EPA projected at the time that these adjustments would put the average city and highway MPG values in the middle of the range of fuel economy values experienced by consumers.[7] During the rulemaking process, the Office of Management and Budget (OMB) expressed concern that fuel economy estimates based on the average experience would result in a significant number of drivers failing to achieve that fuel economy. They requested that EPA provide a range of values on the label that would encompass the expected fuel economy of about 75 percent of the driving population.[8] To address this concern, in the final rule, EPA required the label to contain the range of city and highway fuel economy that most drivers should expect. Based on our understanding of the frequency distribution of in-use fuel economy data at the time, the range was set at plus or minus 15 percent of the stated city and highway estimates, and appears on fuel economy labels today as small print text. Further in this section, we discuss, in the context of today's proposal, similar issues regarding how best to communicate to the public the level of the city and highway mpg estimates, as well as the range of drivers' fuel economy experience.

B. Why Is Today's Action Warranted?

The fundamental problem with the current fuel economy estimates is that the test procedures on which they are based do not reflect a broad enough range of in-use driving conditions. The current test procedures omit several critical factors that are prevalent in the real-world and that can have a significant impact on fuel economy. Key among these are higher speeds, faster accelerations, the use of air conditioning, and colder temperatures. The impact of these factors on fuel economy can vary widely from vehicle to vehicle. However, for emissions compliance, we have already developed additional test procedures to account for these factors, and these test procedures are already being regularly used by the auto companies. Today, we are proposing to use these tests, in conjunction with the existing fuel economy tests, as an input into the calculation of fuel economy estimates. In doing so, the fuel economy test methods would reflect a much broader range of real-world conditions than they do today.

There is broad-based support among automobile manufacturers and other stakeholders proposing changes to current fuel economy estimates. Congress recognized the need for action by including a provision in the Energy Policy Act of 2005 requiring EPA to revise its fuel economy estimates. EPA has worked closely with auto manufacturers, states, and other organizations in developing this proposed rule.

Bluewater Network petitioned EPA to revise the fuel economy labeling test procedures.[9] EPA published a **Federal Register** notice requesting comments on the petition, and received over 33,000 comments.[10] Nearly all of these comments support the revision of EPA's fuel economy estimates to better reflect real world driving. Today's proposal is responsive to this petition.

1. Fuel Economy Labels Could Be Improved To Better Reflect Real-World Driving

First, it is important to stress that the EPA city and highway mpg ratings are estimates—they are not intended to give consumers an exact indication of the fuel economy they will achieve. The complete range of consumer fuel economy experience can not be represented perfectly by any one estimate. Fuel economy varies based on a wide range of factors, which we have discussed above. There will always be consumers that achieve real-world fuel economy both better and worse than a given estimate.

In the past few years, there have been a number of studies, conducted by a variety of sources, suggesting that there is often a shortfall between the EPA estimates and real-world fuel economy. Several organizations have provided consumers with their own fuel economy estimates, which in some cases vary from EPA's estimates. For example, Consumer Reports utilizes on-road driving to measure fuel economy under a variety of conditions. They derive city, highway, and overall fuel economy estimates, and their methods clearly demonstrate the large degree of variation across vehicles. While their city fuel economy estimates fall on average below the EPA label values, their highway estimates are, on average, higher than the EPA label values. Consumer Reports' overall fuel economy estimates range from 27 percent below to 20 percent above the EPA overall rating. The Automobile Association of America (AAA) likewise publishes the

[3] Pub. L. 95–619, Title IV, 404 (November 9, 1978).

[4] See House Committee on Government Operations, ''Automobile Fuel Economy: EPA's Performance,'' Report 96–948, May 13, 1980.

[5] See ''Passenger Car Fuel Economy: EPA and Road,'' U.S. Environmental Protection Agency, Report no. EPA 460/3–80–010, September, 1980, and ''Technical Support Report for Rulemaking Action: Light Duty Vehicle Fuel Economy Labeling,'' U.S. Environmental Protection Agency, Report no. EPA/AA/CTAB/FE–81–6, October, 1980.

[6] See 49 FR 13845, April 6, 1984, and 49 FR 48149, December 10, 1984.

[7] See 49 FR 13832, April 16, 1984.

[8] See 49 FR 13835, April 16, 1984.

[9] The Bluewater Network petition was submitted to EPA on June 7, 2002.

[10] See 69 FR 16188, March 29, 2004.

fuel economy results they achieve in their annual auto guide for new cars and trucks. In their 2004 auto guide, about half of their estimates were below the EPA combined city/highway value, and about one half were above the EPA city/highway combined value. Their estimates ranged from 40 percent lower than EPA's to 22 percent higher, again reflecting a great deal of vehicle-to-vehicle variation. Other sources of fuel economy data include Edmunds.com, the Department of Energy's (DOE) ''Your MPG'' database on the fueleconomy.gov Web site, and DOE's FreedomCar program.

Each of these studies differs in its test methods, driving cycles, sampling of vehicles, and methods of measuring fuel economy. There are strengths and weaknesses of each study, which we discuss further in Section II and in the Draft Technical Support Document. Collectively, these studies indicate there are many cases where real-world fuel economy falls below the EPA estimates. The studies also indicate that real-world fuel economy varies significantly depending on the conditions under which it is evaluated. Nevertheless, taken as a whole, these studies reflect a wide range of real-world driving conditions, and show that fuel economy can be much lower than EPA's estimates if more real-world conditions are considered.

The fundamental problem with the current fuel economy estimates is that the test procedures on which they are based are missing a number of critical factors that exist in real-world driving and have a significant impact on fuel economy. The following section discusses the limitations of our existing fuel economy test procedures.

2. Today's Fuel Economy Tests Do Not Represent the Full Range of Driving Conditions

The current city and highway fuel economy tests do not represent the full range of real-world driving conditions. The 1985 adjustment factors were designed to ensure that the fuel economy estimates across the vehicle fleet reflected the average impacts of a number of conditions not represented on the tests. However, as we noted earlier, many changes have occurred since then that make it once again a reasonable time to reevaluate the fuel economy test methods. Given the significant degree of variation that is apparent across vehicles, we believe it is important to reconsider the approach of ''one-size-fits-all'' adjustment factors and instead move to an approach that more directly reflects the impacts of fuel economy on individual vehicle models.

The city fuel economy estimate is based on the Federal Test Procedure (FTP), which was designed to measure a vehicle's tailpipe emissions under urban driving conditions. The driving cycle used for the FTP is called the LA–4, which was developed in the mid-1960's to represent home-to-work commuting in Los Angeles. The FTP is also one of the tests used to determine emissions compliance today. The FTP includes a series of accelerations, decelerations, and idling (such as at stop lights). It also includes starting the vehicle after it has been parked for an extended period of time (called a ''cold start''), as well as a start on a warmed-up engine (called a ''hot start''). The total distance covered by the FTP is about 11 miles and the average speed is about 21 mph, with a maximum speed of about 56 mph.

The highway fuel economy estimate is based on the Highway Fuel Economy Test (HFET), which was developed by EPA in 1974 and was designed to represent a mix of interstate highway and rural driving. It consists of relatively constant higher-speed driving, with no engine starts or idling time. The HFET covers a distance of about 10 miles, at an average speed of 49 mph and a top speed of about 60 mph.

There are several key limitations in the FTP and HFET tests that cause them to not adequately reflect real-world driving today. First, most consumers understandably think ''highway'' fuel economy means the fuel economy you can expect under freeway driving conditions. In fact, the highway test has a top speed of only 60 mph, since the test was developed more than 20 years ago to represent more rural driving conditions at a time when the national speed limit was 55 miles per hour. The national speed limit since has been eliminated, states have established speed limits of 65 to 70 miles per hour, and much driving is at even higher speeds. Recent real-world driving studies indicate that about 28 percent of driving (vehicle miles traveled, or VMT) is at speeds of greater than 60 mph. (This analysis is detailed in the Draft Technical Support Document). These studies also show that 33 percent of real-world driving VMT falls outside the FTP/HFET speed and acceleration activity region. Thus, a substantial amount of high speed driving is not captured at all in today's FTP or HFET tests. This is a critical weakness in our current fuel economy test procedures. Since higher speed driving has a negative impact on fuel economy, incorporating these higher speed driving conditions into the fuel economy tests would lower the fuel economy estimates.

Second, the maximum acceleration rates of both the FTP and HFET tests are a relatively mild 3.3 miles-per-hour per second, considerably lower than the maximum acceleration rates seen in real-world driving. Recent real-world driving studies indicate that maximum acceleration rates are as high as 11 to 12 mph/sec and significant activity occurs beyond 3.3 mph/sec. Even at the time these tests were first developed, the real-world accelerations were higher than 3.3 mph/sec, but the test cycle's acceleration rates needed to be constrained to the mechanical limitation of the dynamometer test equipment. These constraints no longer exist with today's dynamometers, so we now have the ability to incorporate higher maximum acceleration rates that more closely reflect those of actual driving. In fact, we have incorporated higher acceleration rates into a test recently developed for emissions compliance, which we discuss in the next section. As with high speed driving, higher acceleration rates have a negative impact on fuel economy; thus, if these higher accelerations were factored into our fuel economy methods, the estimates would be lower.

The maximum deceleration rate of the FTP and HFET tests is important to consider as well, because it relates to the regenerative breaking effect of hybrid electric vehicles. The FTP and HFET tests include a mild maximum deceleration rate of -3.3 mph/sec; yet in recent real-world driving rates as high as -11 to -17 mph/sec were recorded. Under higher deceleration rates, the effects of regenerative breaking for hybrid electric vehicles are diminished, thereby lowering fuel economy. In this regard, today's FTP and HFET tests result in better fuel economy, which is seldom achieved under actual driving conditions.

Third, both tests are run at mild ambient conditions (approximately 75 degrees Fahrenheit), while real-world driving occurs at a wide range of ambient temperatures. Fuel economy is lower at temperatures colder or warmer than the 75 degree F test temperature. Only about 20 percent of VMT occurs between 70 and 80 degrees F—approximately 15 percent of VMT occurs at temperatures above 80 degrees F, and 65 percent occurs below 70 degrees F. Moreover, neither the FTP nor HFET tests are run with accessories operating, such as air conditioners, heaters, or defrosters. These accessories, most notably air conditioning, can have a significant impact on a vehicle's fuel economy.

Finally, there are many factors that affect fuel economy that cannot be replicated on dynamometer test cycles in a laboratory. These include road grade, wind, vehicle maintenance (e.g., tire pressure), snow/ice, precipitation, fuel effects, and others. It is not possible to develop a test cycle that captures the full range of factors impacting fuel economy. However, it is clear that the FTP and HFET tests alone are missing some critical elements of real-world driving. All of these factors have a negative impact on fuel economy. This largely explains why our current estimates often do not reflect consumers' real-world fuel economy experience. However, since the 1985 adjustment factors were established, EPA has adopted several new test cycles for emission compliance purposes, which collectively represent a much broader range of in-use driving conditions than those captured by the FTP and HFET tests. These additional emission tests, discussed below, can be brought into the fuel economy estimate calculations.

3. Additional Emissions Tests Reflect a Broader Range of Real-World Driving Conditions

Since 1984 when we last updated the fuel economy estimate methodology, EPA has established several new test cycles for emissions certification. EPA was concerned that the FTP omitted many critical driving modes and conditions that existed in actual use, and that emissions could be substantially higher during these driving modes compared to the FTP. Manufacturers were frequently designing their vehicles' emission control systems to meet the specified FTP test conditions, and actual emission levels could be quite different under the broader range of real-world ''off-cycle'' conditions.

The need for these actions was recognized by Congress, in the passage of Sections 206(h) and 202(j) of the Clean Air Act Amendments of 1990 (CAAA).[11] Section 206(h) required EPA to study and revise as necessary the test procedures used to measure emissions, taking into consideration the actual current driving conditions under which motor vehicles are used, including conditions relating to fuel, temperature, acceleration, and altitude. Section 202(j) of the CAAA required EPA to establish emission standards for carbon monoxide under cold (20 deg. F) temperature conditions.

In 1992, EPA published rules implementing the 202(j) cold temperature testing requirement, acknowledging that the ambient temperature conditions of the FTP test (run between 68 and 86 °F) do not represent the full range of ambient temperature conditions that exist across the United States and that cold temperature had different emissions effects on different vehicle designs.[12] EPA's cold temperature emission regulations required manufacturers to conduct FTP testing at 20 °F. By promulgating this new test procedure and associated emission standard, EPA sought to encourage manufacturers to employ better emission control strategies that would improve ambient air quality across a wider range of in-use conditions.

In fulfillment of the 206(h) CAAA requirement, EPA published a report in 1993 which concluded that the FTP cycle did not represent the full range of urban driving conditions that could impact the in-use driving emission levels.[13] Consequently, EPA promulgated a rule in 1996 that established two new test procedures, with associated emission standards, that addressed certain shortcomings with the current FTP.[14] Known as the ''Supplemental FTP,'' or ''SFTP,'' these procedures, similar to the cold temperature FTP, encouraged the use of the better emission controls across a wider range of in-use driving conditions in order to improve ambient air quality.

One of the new test cycles, the US06, was designed to address high speed, aggressive driving behavior (with more severe acceleration rates and speeds) as well as rapid and frequent speed fluctuations. The US06 test contains both lower-speed city driving and higher-speed highway driving modes.[15] Its top speed is 80 mph, and average speed is 48 mph. The top acceleration rate exceeds eight mph per second. The other new SFTP test, the SC03, was designed to address air-conditioner operation under a full simulation of high temperature (95 °F), high sun-load, and high humidity. The SC03 drive cycle was designed to represent driving immediately following a vehicle startup, and rapid and frequent speed fluctuations.[16] Its top speed is about 55 mph and average speed is 22 mph. The top acceleration rate is about five mph per second.

The basis for the SFTP rulemaking was a study of real-world driving in four cities, Baltimore, Spokane, Atlanta and Los Angeles, where driving activity was measured on instrumented vehicles as well as by chase cars.[17 18] At that time, it was found that 18 percent of the driving (in Baltimore) occurred outside of the speed/acceleration distribution of the FTP drive schedule. More recent real-world driving activity data indicates that driving has become even more aggressive than it was in 1992. Recent real-world activity data collected in California and Kansas City found that about 28 percent of driving (vehicle miles traveled) is at speeds greater than 60 mph. Further, about 33 percent of recent real-world driving falls outside of the FTP/HFET speed and acceleration activity region.[19 20 21 22] This is based on extensive chase car studies in California and instrumented vehicle studies in Kansas City. Our assessment of these recent real-world driving activity studies is described in detail in the Draft Technical Support Document.

Clearly, the FTP and HFET tests alone do not fully capture the broad range of real-world driving conditions. In order for EPA's fuel economy tests to be more representative of key aspects of real-world driving, it is critical that we consider the test conditions represented by these additional emission tests.

4. Fuel Economy on Driving Modes Represented by Additional Emissions Tests is Lower for Many Vehicles

As discussed above, there are several key conditions missing from the current fuel economy test procedures that are prevalent in real-world driving. These conditions—higher speeds, faster

[11] See 42 U.S.C. 7525(h), 42 U.S.C. 7521(j).

[12] See 57 FR 31888, July 17, 1992.

[13] U.S. Environmental Protection Agency. Federal Test Procedure Review Project: Preliminary Technical Report. U.S. Environmental Protection Agency, No. EPA420–R–93–007, May 1993. Website: *http://www.epa.gov/otaq/sftp.htm.*

[14] See 61 FR 54854 published on October 22, 1996.

[15] See 40 CFR Part 86 Appendix I (g).

[16] Ref. 40 CFR Part 86 Appendix I (h).

[17] Final Technical Report on Aggressive Driving Behavior for the Revised Federal Test Procedure Notice of Proposed Rulemaking, 1995. Website: *http://www.epa.gov/otaq/sftp.htm.*

[18] U.S. Environmental Protection Agency. Federal Test Procedure Review Project: Preliminary Technical Report. U.S. Environmental Protection Agency, No. EPA420-R–93–007, May 1993. Website: *http://www.epa.gov/otaq/sftp.htm.*

[19] Sierra Research, Inc., ''Task Order No. 2 SCF Improvement—Field Data Collection,'' Sierra Report No. SR02–07–04, July, 2002.

[20] U.S. EPA Draft Technical Support Document ''Fuel Economy Labeling of Motor Vehicles: Revisions to Improve Calculation of Fuel Economy Estimates,'' December, 2005.

[21] Brzezinski, D., E. Nam, J. Koupal, G. Hoffman. Changes in Real World Driving Behavior: Analysis of Recent Driving Activity Data. Proceedings of the 15th Coordinating Research Council On Road Vehicle Emissions Workshop, 2005.

[22] Eastern Research Group. Late Model Vehicle Emissions and Fuel Economy Characterization Study: Addendum to the Kansas City Exhaust Characterization Study-Draft Report. ERG No. 0133.18.004.001, September 26, 2005.

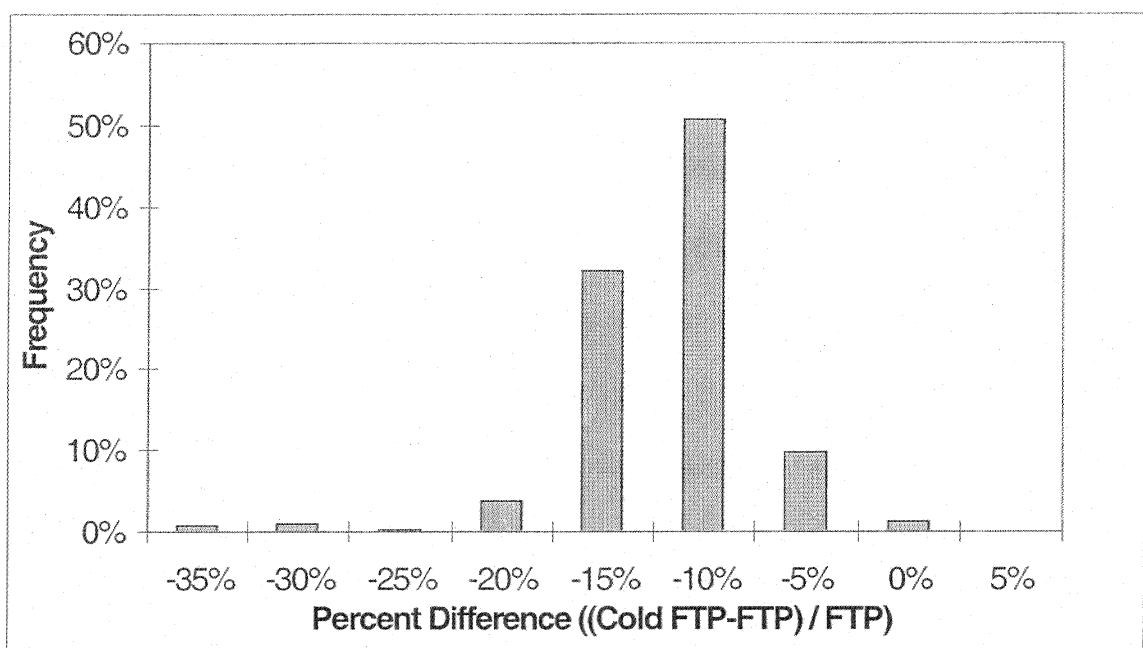
accelerations, air conditioning operation, and cold temperatures—have already been incorporated into our test procedures for emissions compliance, as a result of our finding in the 1990's that they have a significant impact on emissions. Our analysis below demonstrates that these additional driving conditions can also have a significant impact on fuel economy—and that these impacts vary widely from vehicle to vehicle. Thus, we believe that these factors need to be included in our fuel economy test methods.

We analyzed fuel economy data collected by manufacturers for emissions certification purposes in the 2003, 2004 and 2005 model years. This analysis included data from all five tests used for emissions compliance today, including the FTP, HFET, US06, SC03, and Cold Temperature FTP. The fuel economy measured on the standard fuel economy tests (FTP and HFET) was compared to the fuel economy on the other emissions certification tests (US06, SC03, and Cold FTP) in order to assess the impact of these factors on fuel economy. The analysis includes data from more than 400 vehicles. Comparisons were made to the unadjusted city and highway fuel economy test results, and the findings are summarized below. Because so many other factors bear on real-world consumer experience, it is important to point out that these comparisons are not intended to indicate the exact impact of a given factor on real-world fuel economy. However, comparing these different test results is informative because we establish the relative magnitude of the impacts and of the variation across vehicles. The entire report of this analysis is in the docket for this rulemaking.[23]

a. *Cold Temperature Operation.* To assess the impact of cold temperature operation on fuel economy, we compared the fuel economy measured over the Cold FTP test directly to that over the standard FTP test. The driving cycles in these two tests are identical (i.e., the LA4 cycle). Both tests include both cold and hot starts at their respective ambient temperatures, and both tests are generally run with accessories turned off. The difference in fuel economy should therefore be entirely due to the difference in ambient temperature: 20 °F versus 75 °F.

On average, fuel economy over the Cold FTP was about 12 percent lower than over the standard FTP. There was wide vehicle-to-vehicle variation, with the loss in fuel economy due to the cold conditions as much as 40 percent. Figure I.B–1 below shows the range of cold temperature impacts. Hybrid vehicles tended to show the greatest sensitivity to cold temperature. Of the six vehicles showing a cold temperature impact of greater than 30 percent, five are hybrids. Overall, conventional gasoline vehicles averaged a cold temperature effect of about −11 percent, while the impact on hybrid vehicles averaged about −32 percent.

Figure I.B-1. – Cold Temperature Impacts

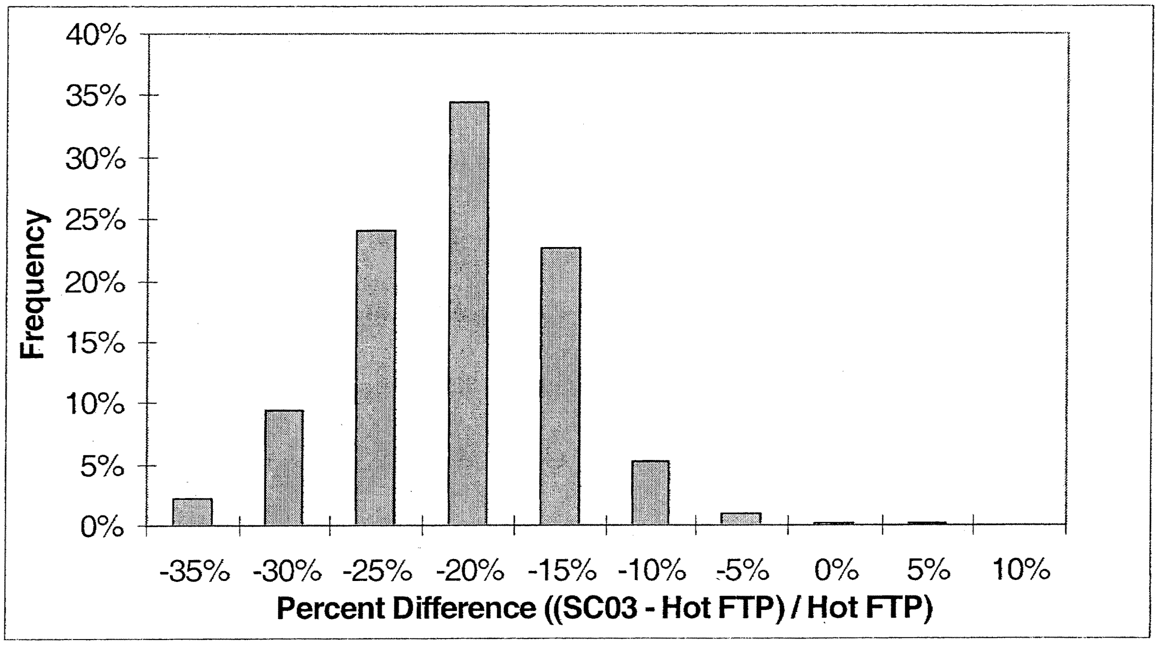


b. *Air Conditioning.* To assess the impact of air conditioning on fuel economy, we compared the fuel economy measured over the SC03 test to a comparable portion of the FTP. The SC03 test is run with the air-conditioning turned onto its maximum setting in a test cell set at 95 °F with strong sun load and moderate humidity. On average, air conditioner operation at 95 °F reduced fuel economy by about 21 percent. The impact of air conditioning ranged from −41 percent to −25 percent for more than a third of the vehicles. Similar to the cold temperature impacts, there was a great deal of vehicle-to-vehicle variation in the impact of air conditioning on fuel economy. Figure I.B–2 shows the distribution of the percentage differences (negative numbers indicate lower fuel economy over SC03). As can be seen in the figure, the vast majority of vehicles show an impact of −27.5

[23] U.S. Environmental Protection Agency, Office of Transportation and Air Quality, ''Vehicle Fuel Economy Labeling and The Effect of Cold Temperature, Air-Conditioning Usage and Aggressive Driving on Fuel Economy,'' Draft Staff Report, August 2005.

percent to −7.5 percent. Hybrid vehicles tended to show greater sensitivity to air conditioning operation than conventional vehicles. The effect of air conditioning operation reduced hybrid fuel economy by 31 percent, 50 percent greater than the 20 percent impact on conventional vehicle fuel economy.

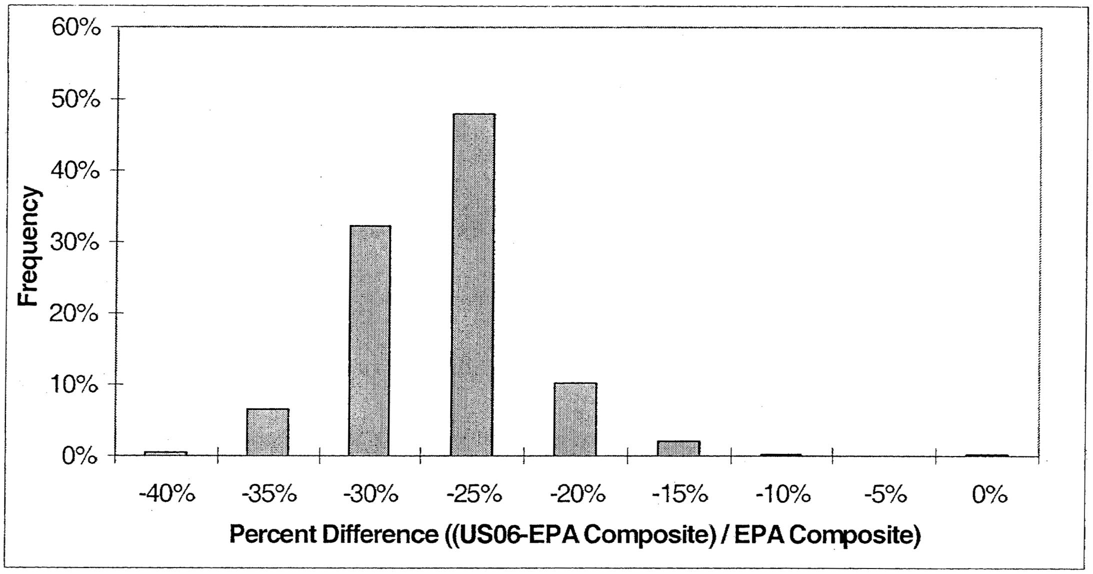
Figure I.B-2. – Air Conditioning Impacts



c. *Aggressive and High-Speed Driving.* The US06 test was designed to address aggressive driving behavior, such as high acceleration rates and high speeds. The US06 test contains both lower-speed but aggressive urban driving and higher-speed highway driving modes. Because of the different driving modes contained on the US06 test, for the purpose of assessing the impacts of high speed and aggressive driving we developed a combination of the city and highway tests which is roughly comparable to that contained in the US06 cycle.

On average, the fuel economy over the US06 cycle was almost 30 percent lower than over the composite FTP and HFET fuel economy. The observed impacts ranged from −44 percent to −25 percent for more than 80 percent of the vehicles. Figure I.B–3 shows the distribution of per vehicle impacts due to the aggressive driving of the US06 cycle. Hybrid vehicles showed a slightly greater impact of aggressive driving on fuel economy than conventional gasoline vehicles (33 percent versus 29 percent, respectively).

Figure I.B-3. – High Speed and Aggressive Driving Impacts



d. *Conclusions.* Many of the vehicles whose fuel economies were most affected by these driving conditions were hybrids and other high mile-per-gallon vehicles. In general, high mpg vehicles will be more sensitive to changes in driving conditions for two reasons. One, because they use relatively little fuel in the first place, any increase in fuel consumption will show up as a relatively larger percentage fuel consumption increase. Two, because of the non-linearity of fuel economy with respect to fuel consumption, an increase in fuel consumption will lower the fuel economy of a high mpg vehicle much more than it will lower the fuel economy of a low mpg vehicle. For example, the fuel consumption increase associated with a 35 mpg rating that actually achieves 30 mpg in the real-world is the same as a 15 mpg rating that actually achieves 14 mpg.

Hybrids, most of which achieve relatively high mpg and therefore share the issues discussed above, also face some additional challenges. Hybrids may well be the most significant powertrain technology innovation driven to market commercialization primarily because of its fuel economy potential. In addition, the nature of hybrid technology (the addition of a battery as a second source of on-board power, sophisticated control systems, sometimes a smaller engine) suggests that fuel economy will likely be more sensitive to certain conditions such as high acceleration and deceleration rates, cold ambient temperatures, etc. Finally, by industry standards, hybrids are a relatively young technology, and there is every reason to believe that as the technology matures, hybrid vehicle fuel economy will become much more robust over a broader range of driver behavior and climate conditions.

This analysis clearly shows that the driving conditions represented by US06, SC03 and Cold FTP tests can have substantial, measurable negative impact on fuel economy. There also is a large amount of vehicle-to-vehicle variation—that is, different vehicles are impacted differently by these factors. These findings call into question the appropriateness of the continued use of the current ''one-size-fits-all'' 10 and 22 percent adjustment factors applied, respectively, to FTP and HFET fuel economy test results. The FTP and HFET tests clearly do not adequately reflect the broad range of conditions that exist in today's real-world driving. The additional emission test cycles incorporate several critical factors that are present in real-world driving, and that can have a significant impact on fuel economy. Thus, these additional emission test cycles need to be brought into the fuel economy test methods, so that the estimates themselves will be more representative of the fuel economy consumers can expect to achieve in the real-world.

C. What New Requirements Are We Proposing?

We are proposing to revise and improve the methods used to determine the city and highway fuel economy estimates by incorporating fuel economy results over a broader range of driving conditions. An overview of this proposal is provided below. Section II provides a detailed explanation of the proposed new test methods, as well as the data and analysis upon which it is based.

In addition, we are proposing minor changes to revise the format and content of the fuel economy label to make the information more useful to consumers. We also are proposing minor changes related to the fuel economy information program, including revising the comparable vehicle classes and adding a new provision for the electronic distribution of the annual Fuel Economy Guide. An overview of each of these proposals follows.

1. Revised Test Methods for Calculating City and Highway Fuel Economy Estimates

Today's proposal would revise the test methods by which the city and highway fuel economy estimates are calculated. We are proposing to replace the current method of adjusting the city (FTP) test result downward by 10 percent and the highway (HFET) test result downward by 22 percent. Instead, we are proposing a new approach that incorporates additional test methods that address factors that impact fuel economy, but are missing from today's tests—specifically, higher speeds, more aggressive driving (e.g., higher acceleration rates), the use of air conditioning, and the effect of cold temperature. The proposed test methods would bring into the fuel economy estimates the test results from the five emissions tests in place today: FTP, HFET, US06, SC03, and Cold FTP. Thus, we refer to this as the ''5-cycle'' method. Under our proposal, rather than basing the city mpg estimate solely on the adjusted FTP test result, and the highway mpg estimate solely on the adjusted HFET test result, each estimate would be based on a ''composite'' calculation of all five tests, weighting each appropriately to arrive at new city and highway mpg estimates. The new city and highway estimates would each be calculated according to separate city and highway ''5-cycle'' formulae that are based on fuel economy results over these five tests. The conditions represented by each test would be ''weighted'' according to how much they occur over average real-world city or highway driving. For example, we have derived weightings to represent driving cycle effects, trip length, air conditioner compressor-on usage, and operation over various temperatures. This methodology is described in detail in Section II.

We also are proposing a downward adjustment to account for effects that are not reflected in our existing five test cycles. There are many factors that impact fuel economy, but are difficult to account for in the test cell on the dynamometer. These include roadway roughness, road grade (hills), wind, tire pressure, heavier loads, hills, snow/ice, effects of ethanol in gasoline, larger vehicle loads (e.g., trailers, cargo, multiple passengers), and others. Current data indicates that these impacts can lower fuel economy from 9 to 13 percent. Thus, we need to account for these factors in our new test methods, as they will lower a driver's fuel economy beyond those factors we are accounting for from our existing test cycles. We are proposing an 11 percent downward adjustment to account for these non-dynamometer effects. Our basis for this downward adjustment factor is detailed in Section II.C.3 and the Draft Technical Support Document.

The 5-cycle approach, including this 11 percent downward adjustment factor to account for non-dynamometer effects, will result in city and highway estimates that reflect average fuel economy. We are proposing to continue to set the city and highway mpg estimates at the average, or mean, level. However, we understand that many drivers expect to achieve or exceed the fuel economy indicated by these mpg estimates. By continuing to set the estimates at the average level, by definition, half of drivers will get worse fuel economy than the label values. We seek comment on whether the city and highway estimates should be set a level that is lower than average—for example, to ensure that 75 percent, or even more, of drivers achieve or exceed the label values.

Because the 5-cycle method is inherently vehicle-specific, the difference between today's values and the new fuel economy estimates could vary widely from vehicle to vehicle. Today's proposed approach would result in city fuel economy estimates that are between 10 to 20 percent lower than today's labels for the majority of conventional vehicles. For vehicles that achieve generally better fuel economy, such as gasoline-electric hybrid vehicles, new city estimates would be about 20 to 30 percent lower than today's labels. The new highway fuel economy estimates would be 5 to 15 percent lower for the majority of vehicles, including hybrids.

Today's proposal would greatly improve the EPA fuel economy estimates, so that they come closer to the fuel economy that consumers achieve in the real-world. However, as discussed previously in this notice, these are still estimates. Even with the improved fuel economy test methods proposed today, some consumers will continue to get fuel economy that is higher or lower than the new estimates.

Under this new 5-cycle approach, some auto manufacturers have expressed concern about the potential for increased test burden. The three additional emission tests that we propose to include in the fuel economy calculation are run today on a much more limited number of vehicle groups than are the FTP and HFET tests. Typically, for every 3–4 FTP and HFET tests conducted, only one US06 or SC03 test is run, and cold FTP testing is even more limited. If we were to require full 5-cycle testing across all vehicle types, the testing demands for the auto industry could increase dramatically, and could trigger the need for a major expansion of their testing facilities.

Thus, we are proposing to implement the new fuel economy test methods in a way that gives the auto industry sufficient lead time to plan for their increased testing needs. This enables us to implement an improved fuel economy label methodology as soon as possible—in the 2008 model year. We also are implementing an approach that mitigates the testing burden where warranted. We have done this in two key ways.

First, for the first three model years (2008 through 2010), we would provide manufacturers with the option of using a scale of adjustments based on an analysis of data developed from the 5-cycle method. This approach, called the mpg-based approach, incorporates the effects of higher speed/aggressive driving, air conditioning use, and colder temperatures, but less directly than the 5-cycle vehicle-specific method. The mpg-based adjustments were derived by applying the 5-cycle formulae to a data set of recent fuel economy test data, and developing a regression line through the data. (See Section II for a full description of this approach). These adjustments differ based on the mpg a vehicle obtains over the FTP (City) or HFET (Highway) tests. In other words, every vehicle with the same mpg on the FTP test would receive the same adjustment for its city fuel economy label. Likewise, every vehicle with the same mpg on the HFET test would receive the same adjustment for its highway fuel economy label. This method of adjustment would not require any testing beyond the FTP/HFET tests already performed today, thus, it can be implemented sooner than the 5-cycle approach as an interim improvement to our fuel economy test methods. However, during this timeframe, manufacturers may choose to run full 5-cycle testing for any of their vehicle models. This approach would provide consumers with more accurate estimates, while allowing the industry the necessary lead time to prepare for the necessary testing under the 5-cycle approach.

Second, when we move to the 5-cycle vehicle-specific approach in model years 2011 and beyond, we are proposing criteria that would select specific vehicle groups for full 5-cycle testing, rather than requiring complete 5-cycle data generation for every vehicle. We believe this approach would result in fuel economy estimates that are generally as accurate as they would be under full 5-cycle testing. In other words, we are only requiring full 5-cycle testing where we can predict with reasonable certainty that the fuel economy results under the 5-cycle method would yield a significantly different result than the mpg-based adjustments.

We propose to establish a tolerance band around the mpg-based city and highway adjustment lines. Manufacturers would be required to calculate a 5-cycle fuel economy estimate for each vehicle group for which 5-cycle data exists for emissions purposes. If the 5-cycle fuel economy estimate for this vehicle group falls below the respective tolerance band around the mpg adjustment line, then the manufacturer would be eligible to use the mpg-based adjustments for each vehicle configuration represented by that set of 5-cycle data. That is, the 5-cycle vehicle group may include within it several vehicle groupings, or specific vehicle model types, for which additional FTP/HFET data is available. The manufacturer would be able to use the MPG line to determine the fuel economy label adjustments for each of these model types with associated FTP/HFET test data. Fuller 5-cycle testing would be required for all vehicles represented by a vehicle group for which the 5-cycle fuel economy is below the tolerance bands. Section II further describes the level of these tolerance bands and how this concept would be implemented. A full discussion of our proposed methodology and results is contained in Section II.

2. Revised Label Format

To make the label more easily understood by consumers, we are also proposing changes to the fuel economy label format specified in the regulations. The proposed changes include updating the look of the label, simplifying its contents, and improving its graphics, among others. The purpose of these changes is to present the fuel economy information in a manner that is easier for the consumer to understand and use. The proposed changes are discussed in detail in Section IV.

3. Revised Comparable Vehicle Classes

The comparable vehicle classes are currently defined in EPA's fuel economy regulations. They are needed to fulfill the EPCA statutory requirement to provide fuel economy information about comparable vehicles on the label.[24] These classes were last revised in 1984. Since that time, there have been some significant changes to vehicle designs which warrant changes to the defined classes. Briefly, we are proposing to add SUV and Minivan classes, and to consolidate some classes which have become less prevalent in the market. This is discussed in more detail in Section V.

4. Minor Changes in Certain Test Procedures

We are proposing minor procedural changes in certain test procedures. First, the US06 drive cycle contains elements of both city and highway types of driving, yet the exhaust sample is collected in only one ''bag,'' yielding one overall fuel economy result. In order to more accurately reflect the city portion of the drive cycle into the city fuel economy estimate, and the highway portion of the US06 into the highway fuel economy estimate, we are proposing a revised test protocol that would require collecting the exhaust sample into two bags, thus providing separate results from the city and highway portions. This has the benefit of more accurately capturing how a vehicle's fuel economy would be impacted over the various types of driving reflected in the cycle, but with very minimal cost impact.

Second, today diesel vehicles are not required to run the cold FTP test since they are currently exempt from the cold carbon monoxide standard. We are proposing that diesel vehicles be required to run this test for 5-cycle fuel economy purposes.

Finally, the current cold FTP test gives manufacturers the option, but does not require them to, run the heater or defroster while performing this test at 20 degrees F. We expect that in most cases in the real world, consumers would indeed be running these accessories in colder temperatures, which will impact their fuel economy. We also understand that some, but not all, manufacturers today do run these accessories during the test. Therefore, to ensure this test most accurately reflects real-world conditions, and to ensure these conditions are run uniformly across manufacturers, we are seeking comment on requiring manufacturers to run the heater and defroster while performing the cold FTP test.

5. Other Fuel Economy-Related Topics

In addition to the proposed fuel economy label calculations and label formats, we are proposing a few other changes related to the fuel economy labels and annual fuel economy booklet. These topics are discussed in Section V.

D. Today's Proposal Does Not Impact or Change CAFE Test Procedures

Today's proposal does not alter the FTE and HFET driving cycles, the measurement techniques or the calculation methods used to determine CAFE. EPCA requires that CAFE be determined from the EPA test procedures in place as of 1975 (or procedures that give comparable results), which are the city and highway tests of today, with a few small adjustments for minor procedural changes that have occurred since 1975.[25] Today's proposal will not adjust the CAFE calculations; the new method for calculating fuel economy label estimates will fall under regulations that are separate from the CAFE regulations (currently, the regulations for calculating CAFE are in 40 CFR 600.501–85 through 513–91).

E. When Will the New Fuel Economy Estimates Take Effect?

We want the public to benefit from the improved information provided by the new fuel economy estimates as soon as possible. Therefore, we propose that these new regulations take effect with the 2008 model year, which will be available for sale at dealers in the fall of 2007. We believe this is the earliest possible date for implementation, since some manufacturers typically begin certifying model year 2008 vehicles as early as late 2006. We also encourage manufacturers to voluntarily utilize these new methods sooner, and are therefore proposing that manufacturers may voluntarily comply with the new regulations as soon as the final regulations are published.

F. How Will EPA Communicate to the Public the Transition Between the Old Label Values and New?

To ensure that the public understands the relationship between the old estimates and the new, EPA plans to conduct extensive public outreach concurrent with the implementation of a final rule. We will provide information about the new estimates and how to use them via web-based information, fact sheets, and other communication methods. This information will be designed to explain all aspects of any new calculation methods, including their impact on label estimates from previous model years.

G. Statutory Provisions and Legal Authority

1. EPCA

The statutory authority for today's proposal is provided by the Energy Policy and Conservation Act (EPCA). Most of the labeling provisions applicable to vehicle labeling and information are found at 49 U.S.C. 32908. This section restricts EPA's requirements for fuel economy labeling to automobiles rated at no more than 8,500 pounds gross vehicle weight. It requires manufacturers of automobiles to attach a fuel economy label to a prominent place on each automobile manufactured in a model year and also requires the dealers to maintain the label on the automobile.[26]

EPCA requires EPA to promulgate regulations to measure and calculate fuel economy.[27] To the extent practicable, EPCA requires that fuel

[24] See 49 U.S.C. 32908(b)(1)(C).

[25] See 49 U.S.C. 32904(c).

[26] See 49 U.S.C. 32908(b)(1).

[27] See 49 U.S.C. 32904(c).

economy tests be carried out with emissions tests performed under section 206 of the Clean Air Act (42 U.S.C. 7525).[28]

EPA's resulting fuel economy regulations are found in 40 CFR Part 600. EPA has broad discretion in determining how to measure and calculate fuel economy for purposes of labeling under 49 U.S.C. 32908(b).[29] The fact that EPA's current fuel economy labeling regulations includes the reporting of separate ''city'' and ''highway'' fuel economy is a result of a series of EPA regulations as discussed in Section I.A. above. Thus, in developing today's proposal (discussed in Section III below), we considered, but ultimately are not proposing, other methodologies for reporting fuel economy.

EPCA imposed some specific requirements for the information to be included on the fuel economy label.[30] Today's proposal retains these items:

a. The fuel economy of the automobile.

b. The estimated annual fuel cost of operating the automobile.

c. The range of fuel economy of comparable automobiles of all manufacturers.

d. A statement that a booklet is available from the dealer to assist in making a comparison of fuel economy of other automobiles manufactured by all manufacturers in that model year.

e. The amount of the automobile fuel efficiency tax imposed on the sale of the automobile under section 4064 of the Internal Revenue Code of 1986 (26 U.S.C. 4064).

f. Other information required or authorized by the Administrator that is related to the information required [within items a. through d.]

EPCA also defines ''fuel economy'' as the average number of miles traveled by an automobile for each gallon of gasoline (or equivalent amount of other fuel) used, as determined by EPA.[31] Thus, today's proposal retains the requirement to report fuel economy as miles-per-gallon.

EPCA requires EPA to prepare a fuel economy booklet containing information that is ''simple and readily understandable.'' [32] It further instructs DOE to publish and distribute the booklet. EPA is required to ''prescribe regulations requiring dealers to make the booklet available to prospective buyers.'' [33] This booklet is more commonly known as the annual ''Fuel Economy Guide.''

EPCA also contains statutory provisions for average fuel economy (known widely as ''Corporate Average Fuel Economy,'' or CAFE).[34] Under these provisions, EPA is required to prescribe testing and calculation procedures to measure fuel economy for each model and calculate average fuel economy for a manufacturer, using the same procedures that were used for 1975 model year passenger automobiles (weighted 55 percent urban cycle and 45 percent highway cycle), or procedures that give comparable results.[35] This requirement does not apply to the fuel economy information manufacturers apply to the fuel economy label required in 49 U.S.C. 32908(b).[36]

EPA is also required to consult with the Federal Trade Commission (FTC), DOT and DOE in carrying out the fuel economy information requirements in EPCA.[37]

2. Energy Policy Act of 2005

Section 774 of the Energy Policy Act of 2005 (EPAct) directs EPA to ''update or revise the adjustment factors in sections 600.209–85 and 600.209–95, of the Code of Federal Regulations, CFR Part 600 (1995) Fuel Economy Regulations for 1977 and Later Model Year Automobiles to take into consideration higher speed limits, faster acceleration rates, variations in temperature, use of air conditioning, shorter city test cycle lengths, current reference fuels, and the use of other fuel depleting features.'' [38]

In today's proposal, the 5-cycle approach changes the adjustment factors by establishing a new method to calculate fuel economy estimates that uses fuel economy results from additional test procedures combined with a changed adjustment factor. The mpg-based approach uses the same test methods as the current fuel economy program (i.e., the FTP and HFET tests), but changes the adjustment factors applied to those test results. These options satisfy the EPAct provisions as follows.

First, the 5-cycle method proposed today directly includes the effects of higher speed limits, faster acceleration rates, variations in temperature, and use of air conditioning by including fuel economy measured during tests that incorporate these features. The mpg-based approach also takes these factors into consideration, but less directly, as it incorporates the effects of these factors by basing the adjustment factor on an analysis of data developed from the 5-cycle method. Under our proposal, we use the mpg-based approach as an interim option to establish an appropriate period of lead time for manufacturers. We also allow its continued use only where the average effects reflected under the mpg-based adjustments (of higher speed/acceleration, air conditioning, and cold temperature) on a specific vehicle configuration would be representative of those measured under actual 5-cycle testing.

Second, we interpret the statute's reference to ''shorter city test cycle lengths'' to mean shorter than the current FTP cycle used to determine city fuel economy. We have addressed that concern in the proposal by weighting in updated factors for ''cold starts'' and ''hot starts'' (where the engine is not warmed up or has been parked for a brief amount of time and then restarted) into the equation for determining city fuel economy. This simulates shorter city test cycle lengths where a vehicle's engine is more frequently shut down and restarted than in the current FTP test. Also, the US06 and SC03 test cycles are physically shorter in length than the FTP (the FTP is about 11 miles in length, whereas the US06 is about 8 miles, and the SC03 is about 3.6 miles.)

Third, we interpret the statutory reference to ''current reference fuels'' to mean the laboratory fuels used to perform the fuel economy tests, and that the underlying concern of Congress was that the high-quality lab fuels would give higher fuel economy than the typical fuel used by consumers. The quality of the laboratory test fuel is specified in EPA regulations for emission compliance.[39] The test gasoline fuel is roughly equivalent to premium, high-octane fuel available at the pump. It is necessary that all vehicles use the same grade of fuel to provide a level playing field for manufacturers to compare the emission compliance results to the federal emission standards, since certain fuel specifications can have an impact on tailpipe emissions. The impact of the higher-octane test fuel on fuel economy is less significant but there are other real-world fuel differences that can have a noticeable impact, as discussed in Section II. For instance, ethanol has a lower energy content than gasoline, and

[28] Id.

[29] EPCA places testing restrictions on corporate average fuel economy (CAFE), discussed below. Today's proposal does not impact those restrictions.

[30] See 49 U.S.C. 32908(b)(2)(A) through (F).

[31] See 49 U.S.C. 32901(a)(10).

[32] See 49 U.S.C. 32908(c).

[33] Id.

[34] See 49 U.S.C. 32902–32904.

[35] See 49 U.S.C. 32904(c).

[36] Id.

[37] See 49 U.S.C. 32908(f).

[38] See Pub. L. 109–58, 119 Stat. 835 (2005).

[39] See 40 CFR 86.113–94.

when blended with gasoline, with all other things being equal, will slightly lower fuel efficiency. Other seasonal variations in fuel composition (*e.g.*, oxygenates in winter fuel) may also cause a slight reduction in fuel economy. EPA is proposing an adjustment factor to account for fuel differences and other fuel-depleting features as described further in Section II.

3. Relationship of Today's Proposal With Other Statutes and Regulations

a. *Automobile Disclosure Act.* A provision in EPCA (at 49 U.S.C. 32908(b)(2)) allows the fuel economy information to be included on the window sticker label of vehicle manufacturing and price information required by the Automobile Disclosure Act at 15 U.S.C. 1232 (the so-called ''Monroni'' label.). To that end, the Federal Trade Commission issued a ''Fuel Guide'' concerning the fuel economy advertising for new automobiles, published in the **Federal Register** at 16 CFR Part 259. This guide refers back to EPA's fuel economy regulations and specifically to how manufacturers are permitted to advertise the city and highway fuel economy of their vehicles.

b. *Internal Revenue Code.* This code contains the provisions governing the administration of the Gas Guzzler Tax.[40] It contains the table of applicable taxes and defines which vehicles are subject to the taxes. The IRS code specifies that the fuel economy to be used to assess the amount of tax will be the combined city and highway fuel economy as determined by using the procedures in place in 1975, or procedures that give comparable results (similar to EPCA's requirements for determining CAFE). Today's proposal does not impact these procedures.

c. *Clean Air Act.* Reference is made in EPCA to the Clean Air Act statute. Specifically, EPCA states that fuel economy shall to the extent practicable include the emissions tests required under Section 206 of the Clean Air Act.[41] Today's proposal incorporates three additional types of emissions tests required under the Clean Air Act for fuel economy testing, as discussed in detail in Section II. We also propose to make several changes to existing emissions tests. These changes are being proposed under the statutory authority of Section 206 of the Clean Air Act, which permits the Administrator to define, and to revise from time to time, the test procedures used to determine compliance with applicable emission standards.

d. *Additional Provisions in the Energy Policy Act of 2005 and Transportation Equity Act of 2005.* This action is expected to have no impact on the alternative motor vehicle federal income tax credits the Internal Revenue Service (IRS) is establishing under Section 1341 of the Energy Policy Act of 2005. IRS is in the process of preparing the final guidance for these new federal income tax credits for consumers who purchase new hybrid, diesel, dedicated alternative fuel, or fuel cell vehicles beginning on January 1, 2006. The Energy Policy Act of 2005 requires EPA to coordinate with and support IRS' implementation of these new tax credits, and EPA is providing input on a number of technical issues. EPA anticipates that the fuel economy values used to help determine tax credit eligibility for light-duty vehicles will be ''unadjusted'' laboratory city fuel economy test values. Accordingly, the changes being proposed today are anticipated to have no impact on the tax credit program.

Similarly, this action is expected to have no impact on the ''HOV Facilities'' regulations EPA is establishing under section 1121 of the Transportation Equity Act of 2005. EPA is in the process of developing proposed regulations to identify low emission and energy-efficient vehicles for the purpose of assisting states administering high-occupancy lane transportation plans. EPA anticipates that the fuel economy values used to identify these vehicles will be the ''unadjusted'' FTP-based fuel economy test values. Accordingly, the changes proposed today are anticipated to have no impact on the HOV facilities program.

II. Description of the Proposed Fuel Economy Label Methodology

The current fuel economy label values utilize measured fuel economy over city and highway driving cycles and adjust these values downward by 10 and 22 percent, respectively, to account for a variety of factors not addressed in EPA's vehicle test procedures. These factors include differences between the way vehicles are driven on the road and over the test cycles, air conditioning use, widely varying ambient temperature and humidity, varying trip lengths, wind, precipitation, rough road conditions, hills, etc. The purpose of the new formulae for city and highway fuel economy labels is to widen the base for the labels to include actual vehicle testing over a wider range of driving patterns and ambient conditions than is currently covered by the FTP and HFET tests.

For example, vehicles are often driven more aggressively and at higher speeds than is represented in the FTP and HFET tests. The incorporation of measured fuel economy over the US06 test cycle into the fuel economy label values would make the label values more realistic. Drivers often use air conditioning in warm, humid conditions, while the air conditioner is turned off during the FTP and HFET tests. The incorporation of measured fuel economy over the SC03 test cycle into the fuel economy label values would reflect the added fuel needed to operate the air conditioning system. Vehicles also often are driven at temperatures below 75 degrees Fahrenheit (F), at which the FTP and HFET tests are performed. The incorporation of measured fuel economy over the cold temperature FTP test into the fuel economy label values would reflect the additional fuel needed to start up a cold engine at colder temperatures.

The proposed vehicle-specific, 5-cycle approach to fuel economy label estimation would incorporate estimates of the fuel efficiency of each vehicle during high speed, aggressive driving, air conditioning operation and cold temperatures into each vehicle's fuel economy label. It would combine measured fuel economy over the two current fuel economy tests, the FTP and HFET, as well as that over the US06, SC03 and cold FTP tests into estimates of city and highway fuel economy for labeling purposes. The test results from each cycle (and in some cases, portions of cycles or emission ''bags'')[42] would be weighted to represent the contribution of each cycle's attributes to onroad driving and fuel consumption. The vehicle-specific, 5-cycle approach would eliminate the need to account for the effect of aggressive driving, air conditioning use and colder temperatures on fuel economy through generic factors (as done today) which may not reflect that particular vehicle's sensitivity to these factors. A generic adjustment would still be necessary to

[40] See 26 U.S.C. 4064.

[41] See 49 U.S.C. 32904(c).

[42] The FTP consists of two parts, referred to in the regulations as the ''cold start'' test and the ''hot start'' test. Each of these parts is divided into two periods, or ''phases': A ''transient'' phase and a ''stabilized'' phase. Because the stabilized phase of the hot start test is assumed to be identical to the stabilized phase of the cold start test, only the cold start stabilized phase is typically run. These ''phases'' are often called ''bags,'' terminology that results from the sample bags in which the exhaust samples are collected. The phases are run in the following order: Cold start transient (Bag 1), cold start stabilized (Bag 2), and hot start transient (Bag 3).

account for factors not addressed by any of the five dynamometer tests. The magnitude of such an adjustment is comparable to today's 10 and 22 percent generic adjustments. Overall, under the vehicle specific 5-cycle approach, each vehicle's label fuel economy would better reflect the capabilities of that vehicle on the road.

Currently, the US06, SC03 and cold FTP tests are only performed on a sub-set of new vehicle configurations. In contrast, for fuel economy purposes, FTP and HFET tests are performed on many more vehicle configurations. In order to minimize the number of additional US06, SC03 and cold FTP tests resulting from this proposal, we are proposing that manufacturers be allowed to estimate the fuel economy over these three tests for vehicle configurations that are not normally tested for emission compliance purposes using the fuel economy measurements that are normally available. This is currently done on a more limited basis for both the FTP and HFET, and is referred to as analytically derived fuel economy (ADFE).[43] We are also proposing that manufacturers be allowed to use the interim approach to fuel economy label estimation, the mpg-based approach, indefinitely when the available 5-cycle fuel economy data indicate that a vehicle's specific 5-cycle fuel economy is very close to that estimated by the mpg-based curve.

Even with these policies, we expect that some manufacturers would have to perform some additional US06, SC03, or cold FTP tests to address differences in vehicle designs which are not covered by the analytical derivation methodology. Other manufacturers may decide to perform additional tests simply to improve accuracy over the analytical derivation methodology. Depending on how manufacturers choose to apply this method, this additional testing could involve the construction of additional test facilities. (Test burden issues are discussed further in Section VI of this preamble.) Therefore, in order to allow sufficient lead-time for the construction of these facilities, we are proposing to allow manufacturers the option of using an alternative, interim set of adjustments through the 2010 model year until the 5-cycle approach becomes mandatory with the 2011 model year. However, a manufacturer can still use the 5-cycle formula prior to the 2011 model year for specific vehicle models, if it so desires.

The interim set of adjustments is termed the ''mpg-based'' adjustment. (See Figure II–1 in the following section for a graphical depiction of these adjustments.) The mpg-based approach is a sliding scale of adjustments which varies according to a vehicle's measured fuel economy over the FTP and HFET tests. The mpg-based adjustment factors were developed from applying the 5-cycle formulae to 423 recent model year vehicles and determining the average difference between the 5-cycle and current city and highway fuel economies. Thus, because the data used to develop the average adjustment factors were derived from 5-cycle fuel economies, the mpg-based adjustment factors include the effect of high speeds, aggressive driving, air conditioning, and colder temperatures. However, they do so based on the impact of these factors on the average vehicle, not the individual vehicle, which is the case with the 5-cycle formulae. For example, for vehicles with FTP fuel economy of 20–30 mpg, the mpg-based approach would adjust the FTP fuel economy downward by 22–24 percent, versus today's 10 percent downward adjustment. Thus, city fuel economy label values under the mpg-based approach tend to be about 13–15 percent lower than today's label values. For vehicles with HFET fuel economy of 25–35 mpg, the mpg-based approach would adjust the HFET fuel economy downward by 29 percent, versus today's 22 percent downward adjustment. Thus, highway fuel economy label values under the mpg-based approach would tend to be about 9 percent lower than today's label values.

As mentioned above, the mpg-based equations described above were developed from the 5-cycle fuel economy estimates for 423 2003–2005 model year vehicles. We propose to update the mpg-based curves periodically using all of the available 5-cycle fuel economy estimates for the previous three or more model years. These revised mpg-based equations would be issued through the publication of an EPA guidance document. EPA would publish the mpg-based equations by January 1 of the calendar year prior to the model year to which the equations first apply (e.g., for model year 2010 fuel economy calculations the equations would be made available before January 1, 2009). In order to keep the mpg-based equations up-to-date and based on recent technology vehicles, EPA would update these equations periodically, but no more than on an annual basis. However, rather than publish the equations applicable to 2008 model year vehicles via guidance, the proposed regulations contain the equations that would be applicable to 2008 model year vehicles, as well as the components of the equations to be utilized for future model year vehicles. We request comment on this updating of the mpg-based equations.

In addition to proposing the mpg-based adjustment factors for the 2008–2010 model years, as mentioned above, we propose to allow use of this method of label estimation to be used for 2011 and later model years for those vehicles which meet certain criteria (discussed in detail below) that indicate that the full 5-cycle testing would not likely result in significantly different fuel economy label values. Each year, a number of vehicles are tested over all five dynamometer test cycles for emission certification purposes (i.e., emission data vehicles). The fuel economy data for the five dynamometer test cycles for each emission data vehicle can be inserted into the 5-cycle formulae and the 5-cycle city and highway fuel economy values determined. Emission data vehicles also undergo testing over the FTP and HFET. Thus, the mpg-based city and highway fuel economy values for each emission data vehicle can also be determined using the available FTP and HFET fuel economy values. The 5-cycle city and highway fuel economy values can be compared to the mpg-based city and highway fuel economy values, respectively, for each emission data vehicle.

The mpg-based line represents the effects of high speed, high acceleration, air conditioning, and colder temperatures of the average new vehicle. Therefore, we believe that it is reasonable to allow continued use of the mpg-based line when the available 5-cycle fuel economy data (from emissions certification testing) indicates that the particular vehicle design reflects at least these average effects. To accomplish this, we defined the lower bound of a tolerance band around the mpg-based line as the criteria for whether the mpg-based line could be used or whether 5-cycle testing would be required. We chose four and five percent as the tolerance bands for the 5-cycle city and 5-cycle highway fuel economy values, respectively. Mathematically, the tolerance line is defined by $Y \times$ mpg-based fuel economy, where Y is 0.96 for city fuel economy and 0.95 for highway fuel economy. In other words, if the 5-cycle city fuel economy value is greater than 0.96 times the mpg-based city fuel economy, all the vehicle configurations

[43] EPA's current policy for analytically derived fuel economy estimates for the FTP and HFET tests is contained in the EPA memorandum entitled, ''Updated Analytically Derived Fuel Economy (ADFE) Policy for 2005 Model Year,'' March 11, 2004, CCD–04–06 (LDV/LDT).

represented by the emission data vehicle (i.e., all vehicles within the vehicle test group) would be eligible to use the mpg-based approach. Similarly, when the 5-cycle highway fuel economy is less than the mpg-based highway fuel economy minus five percent, all vehicle configurations represented by the emission data vehicle would be required to use the vehicle-specific 5-cycle approach. This could be done using ADFE estimates, when appropriate. This approach is appropriate because those vehicles above the upper tolerance band that used the mpg-based line would simply be reducing their fuel economy down to the average level, even though the 5-cycle data indicated better than average performance was likely for that vehicle group. Because of the better-than-average performance, we expect that most manufacturers will want to do complete 5-cycle testing for vehicles likely to be above the upper tolerance band. However, we request comment on whether there may be some inherent variability regarding all outliers above *and* below the tolerance band that would make it desirable to require 5-cycle testing in all of these cases.

If the 5-cycle city fuel economy fell below the mpg-based city fuel economy by more than four percent, but the 5-cycle highway fuel economy did not fall below the mpg-based highway fuel economy by more than five percent, all the vehicle configurations represented by the emission data vehicle would be required to use the vehicle-specific 5-cycle approach for both city and highway fuel economy, since fuel economy values for all five cycles are important in estimating 5-cycle city fuel economy. However, if the 5-cycle highway fuel economy was less than the mpg-based highway fuel economy by more than five percent, but the 5-cycle city fuel economy was not more than four percent lower than the mpg-based city fuel economy, all the vehicle configurations represented by the emission data vehicle would use mpg-based approach to estimate the city fuel economy label. For highway label estimation, all the vehicle configurations represented by the emission data vehicle would use an approximate 5-cycle formula for highway fuel economy which includes vehicle-specific fuel economy measurements for the FTP, HFET and US06 tests, but the values for the SC03 and cold FTP tests could be estimated based on relationships developed from other vehicles. This is appropriate because the impact of the cold FTP test on highway fuel economy is not vehicle-specific, but modeled. Also the impact of the SC03 test on highway fuel economy is very small, particularly compared to that for the US06 test.

The proposed criteria for long term use of the mpg-based approach (5-cycle city fuel economy above −4.0 percent and 5-cycle highway fuel economy above −5.0 percent) are based on the balance of three factors. One, we designed them to be sufficiently large so that simple test-to-test variability would not cause an emission data vehicle to fail the criteria. This was a greater concern for the highway fuel economy comparison, due to the dominance of the US06 fuel economy (which inherently has greater test-to-test variability than the other tests) in the 5-cycle formula. Two, we desired to minimize the potential error in the fuel economy label. Label fuel economy values are rounded to the nearest one mpg. Thus, we desired to keep the difference between the 5-cycle and mpg-based fuel economy values within roughly one mpg, if possible. Three, we desired to avoid additional fuel economy testing that had little impact on the label values.

The four percent tolerance band for city fuel economy is equivalent to roughly 0.6–0.7 mpg on average. Due to the contribution of a number of independent fuel economy measurements in the 5-cycle city fuel economy formula, the effect of test-to-test variability should be much lower than 4.0 percent. Based on the 5-cycle test results of 423 recent model year vehicles, we estimate that 90 percent of all emission data vehicles would meet the 4.0 percent. Thus, we believe that this criterion adequately satisfies the three factors mentioned above.

The five percent tolerance band for highway fuel economy is equivalent to roughly 1.1 mpg on average. Thus, it is slightly higher than the typical error associated with rounding. However, due to the dominant contribution of the US06 fuel economy in the 5-cycle highway fuel economy formula, and the fact that this test tends to have relatively high variability, we are concerned that test-to-test variability could be on the order of 3.0 percent in the 5-cycle highway fuel economy formula. We estimate that 75 percent of all emission data vehicles would meet the 5.0 percent. Thus, again, we believe that this criterion adequately satisfies the three factors mentioned above.

Overall, allowing the continued use of the mpg-based approach would reduce the number of additional SC03 and cold FTP tests by about 90 percent and reduce the number of additional US06 tests by about 75 percent indefinitely. We request comment on the continued use of the mpg-based approach beyond the 2010 model year and on the 4.0 and 5.0 percent criteria for its use.

Section II.A presents the proposed interim mpg-based formulae and the proposed vehicle-specific 5-cycle formulae for city and highway fuel economy label values. Section II.B describes how these formulae would be applied to develop labels for specific grouping of vehicles. Section II.C describes how the 5-cycle formulae were derived. Section II.D describes how the mpg-based formulae were derived. Section II.E describes how the current city and highway fuel economy values would change under the proposed formulae.

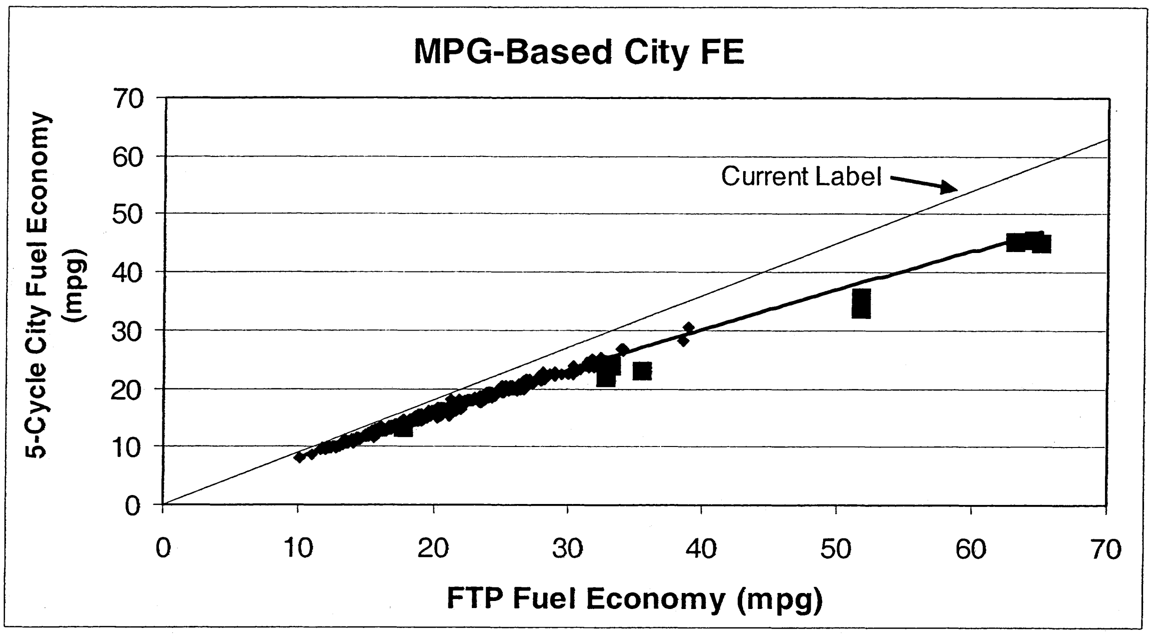
A. Proposed Fuel Economy Label Formulae

Currently, manufacturers test their vehicles over two dynamometer tests in order to develop their fuel economy label values: the FTP or city test and the HFET or highway test. Fuel economies measured over these two tests are multiplied by 0.90 and 0.78, respectively. These ''adjusted'' fuel economies are then sales-weighted using procedures outlined in Subpart D of Part 600 of Title 40 of the Code of Federal Regulations (CFR) to develop fuel economy label values by model type.

Under today's proposal, we would replace the 0.90 and 0.78 factors with new factors which are not simply constants. For model years 2008–2010, a manufacturer would have the option of using two distinct methodologies to calculate the city and highway fuel economy values for any specific test vehicle. One approach is called the mpg-based approach or formula, since the city and highway label values are based on the fuel economy (or MPG) measured over the FTP and HFET, respectively. The other approach is called the vehicle-specific 5-cycle approach, since the city and highway label values are based on the test results of five test cycles, the FTP, HFET, US06, SC03 and cold FTP. Beginning with the 2011 model year, we propose that manufacturers would use the vehicle-specific 5-cycle method, but that the mpg-based approach could still be used by qualifying vehicles. Below we present the specific equations under the two approaches which would be used to convert fuel economies measured over the dynamometer cycles into city and highway fuel economy values prior to sales weighting. We are not proposing any changes to the methods for combining city and highway fuel economy values for specific vehicles into label values for a model type.

The formulae for the 5-cycle approach are, as indicated by its name, based on the fuel economy measurements over the five test cycles (FTP, HFET, US06, SC03 and cold FTP). Both approaches also include an additional downward adjustment to represent effects impossible to incorporate in laboratory dynamometer testing. However, the formulae for the mpg-based approach are also based on fuel economy measurements over the five test cycles. The difference is the set of 5-cycle fuel economy measurements that are used. Under the vehicle-specific 5-cycle approach, the fuel economy measurements over the 5 dynamometer test cycles would all be performed on (or estimated for) a specific vehicle in the current model year. Under the mpg-based approach, historic fuel economy data over the 5 test cycles would have been analyzed to produce a fleet-wide average relationship between (1) FTP fuel economy and 5-cycle city fuel economy, and (2) HFET fuel economy and 5-cycle highway fuel economy. Under the mpg-based approach, a specific vehicle's city and highway fuel economy labels are based on this fleet-wide average relationship, as opposed to that vehicle's own results over the 5 test cycles. In other words, every vehicle with the same measured FTP fuel economy would receive the same city fuel economy label value. Likewise, every vehicle with the same measured HFET fuel economy would receive the same highway fuel economy label value. Figure II–1 shows the 5-cycle city fuel economy for 423 recent model year vehicles and the mpg-based city fuel curve which has been developed from these data. The horizontal axis is the measured FTP fuel economy.

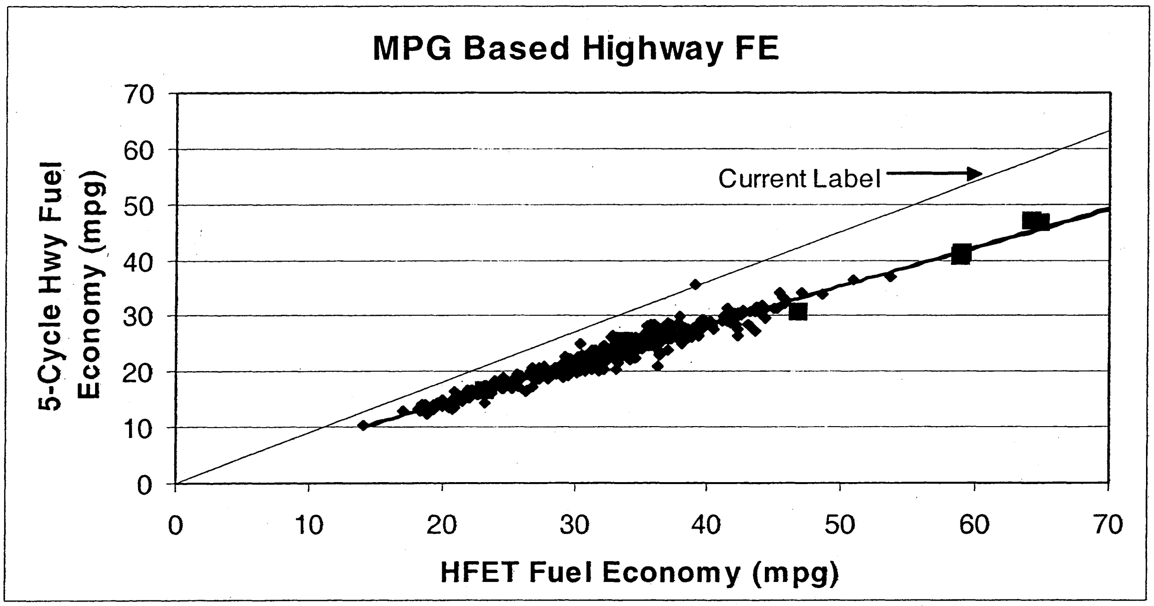
Figure II-1. – MPG-Based City Fuel Economy Curve



Application of the 5-cycle approach to these vehicles would have produced the city fuel economy values indicated by the diamonds in the plot. (The nine hybrid vehicles are indicated by large squares.) Application of the mpg-based formula to these vehicles would have produced city fuel economy values by reading a number off of the curved line in the plot.

Figure II–2 shows the 5-cycle highway fuel economy for the same 423 recent model year vehicles and the mpg-based highway fuel economies which have been developed from these data. The horizontal axis is the measured HFET fuel economy.

Figure II-2. – MPG-Based Highway Fuel Economy Curve



Both Figure II–1 and II–2 include several data points which are represented by large squares. These are vehicles which incorporate hybrid technology. Hybrids appear to fall well below the mpg-based curve for city fuel economy, but not for highway fuel economy. This issue will be discussed in more detail below.

Given that both approaches utilize the 5-cycle fuel economy formulae in some fashion, it is useful to begin this section with a description of how the fuel economy measured over the 5 test cycles are combined to represent onroad city and highway fuel economy. Then we will describe how the fleet-average formulae for the mpg-based approach were derived from these 5-cycle fuel economy estimates.

The 5-cycle formulae are derived from extensive data on real-world driving conditions, such as driving activity, temperatures, air conditioner operation, trip length, and other factors. In this section and in the Draft Technical Support Document, we fully describe the basis for developing these formulae. We seek comment on all aspects of the formulae and the underlying data upon which they are based. We also encourage interested parties to submit any additional data that would be relevant in our final analysis. Further, we want to ensure the 5-cycle approach continues in future years to reflect updated conditions impacting real-world fuel economy. Therefore, we encourage the public to submit any such data in the future so that EPA may assess such new information and evaluate the need for changes to this approach over time.

Since our goal is to develop a consistent, objective approach that applies to all vehicles, we have assumed that all types of vehicles are driven and maintained similarly, and we have proposed to weight the five driving cycles and apply non-dynomometer adjustments in the same way for all types of vehicles. However, if data showed that a specific type of vehicle is driven or maintained very differently, and this impacted fuel economy significantly (*e.g.*, an unusually low incidence of aggressive driving, A/C usage, etc.), then one might consider different weights or adjustment factors on this basis. We seek comment on any data that would inform whether unique weighting factors or non-dynomometer adjustments should be considered for specific vehicle technologies (*e.g.*, hybrids or diesels). For example, hybrids may be purchased preferentially by people whose driving patterns take advantage of their performance characteristics, and hybrid owners may be more conscious of driving techniques (such as mild braking) that improve fuel economy. Even if this were the case today, this difference would not necessarily persist as hybrids become more prevalent in the fleet. Moreover, it is not clear how such vehicle technology-specific factors can or should be reflected in EPA's fuel economy test methods or calculations. We seek comment on the contribution of such factors to the on-road fuel economy experience of consumers, and on the relevance of these factors to the fuel economy label. We also seek comment on the extent to which such unique factors might reduce the perceived objectivity of the fuel economy estimates if they presume differences in driving behavior.

1. MPG-Based Approach (Available in 2008–2010 Model Years)

Under the mpg-based approach, the city fuel economy value would be calculated as follows:

Equation 1:

$$\text{City FE} = \frac{1}{\left(0.002549 + \dfrac{1.2259}{\text{FTP FE}}\right)}$$

where

FTP FE = the fuel economy in miles per gallon of fuel during the FTP test conducted at an ambient temperature of 75 °F.

This value is normally a sales-weighted average of the vehicle models included in the ''fuel economy grouping'' (e.g., model type) as defined in 40 CFR 600.002–93.

Likewise, the highway fuel economy value would be calculated as follows:

Equation 2:

$$\text{Highway FE} = \frac{1}{\left(0.000308 + \dfrac{1.4030}{\text{HFET FE}}\right)}$$

where

HFET FE = fuel economy in mile per gallon over the HFET test.

This value is normally a sales-weighted average of the vehicle models included in the ''fuel economy grouping'' (e.g., model type) as defined in 40 CFR 600.002–93.

The rationale for the various constants in Equations (1) and (2) is described in Section II.B.

2. Vehicle-Specific 5-Cycle Approach (Applicable to 2011 and Later Model Years and Optional in Prior Model Years)

Under the vehicle-specific 5-cycle approach, the city fuel economy value would be calculated as follows:

$$\text{City FE} = 0.89 \times \frac{1}{(\text{Start FC} + \text{Running FC})}, \text{ where}$$

$$\text{StartFC (gallons per mile)} = 0.330 \times \left(\frac{(0.76 \times \text{StartFuel}_{75} + 0.24 \times \text{StartFuel}_{20})}{3.5} \right)$$

where,

$$\text{Start Fuel}_x \text{ for vehicles tested over a 3-bag FTP} = \frac{3.59}{\text{Bag 1 FE}_x} - \frac{3.59}{\text{Bag 3 FE}_x}$$

or,

$$\text{Start Fuel}_x \text{ for vehicles tested over a 4-bag FTP} = \frac{7.5}{\left(\frac{3.59}{\text{Bag 1 FE}_x} + \frac{3.91}{\text{Bag 2 FE}_x} \right)} - \frac{7.5}{\left(\frac{3.59}{\text{Bag 3 FE}_x} + \frac{3.91}{\text{Bag 4 FE}_x} \right)}$$

where

Bag y FE_x = the fuel economy in miles per gallon of fuel during the specified bag of the FTP test conducted at an ambient temperature of 75 ° or 20°

F. The rationale for the various constants in the equations is described below in Section II.B. Likewise,

$$\text{Running FC} = 0.70 \times \left[\frac{0.48}{\text{Bag } 2_{75} \text{ FE}} + \frac{0.41}{\text{Bag } 3_{75} \text{ FE}} + \frac{0.11}{\text{US06 City FE}} \right] + 0.30 \times \left[\frac{0.5}{\text{Bag } 2_{20} \text{ FE}} + \frac{0.5}{\text{Bag } 2_{20} \text{ FE}} \right] + 0.133 \times \frac{21.5}{19.9} \times \left[\frac{1}{\text{SC03 FE}} - \left(\frac{0.61}{\text{Bag } 3_{75} \text{ FE}} + \frac{0.39}{\text{Bag } 2_{75} \text{ FE}} \right) \right]$$

where

US06 FE = fuel economy in mile per gallon over the US06 test,

HFET FE = fuel economy in mile per gallon over the HFET test,

SC03 FE = fuel economy in mile per gallon over the SC03 test.

Vehicles tested over a 4-bag FTP would substitute the fuel economy over Bag 4 for Bag 2 in the above equation.

Under the vehicle-specific 5-cycle formula, the highway fuel economy value would be calculated as follows:

$$\text{Highway FE} = 0.89 \times \frac{1}{\text{Start FC} + \text{Running FC}}, \text{ where}$$

$$\text{StartFC (gallons per mile)} = 0.330 \times \left(\frac{0.76 \times \text{StartFuel}_{75} + 0.24 \times \text{StartFuel}_{20}}{60} \right)$$

$$\text{Running FC} = (1.012) \times \left[\frac{0.79}{\text{US06 Highway FE}} + \frac{0.21}{\text{HFET FE}} \right] + 0.133 \times 0.377 \times \left[\frac{1}{\text{SC03 FE}} - \left(\frac{0.61}{\text{Bag } 3_{75} \text{ FE}} + \frac{0.39}{\text{Bag } 2_{75} \text{ FE}} \right) \right]$$

where the various symbols have the same definitions as described under the formula for the vehicle-specific 5-cycle city fuel economy value.

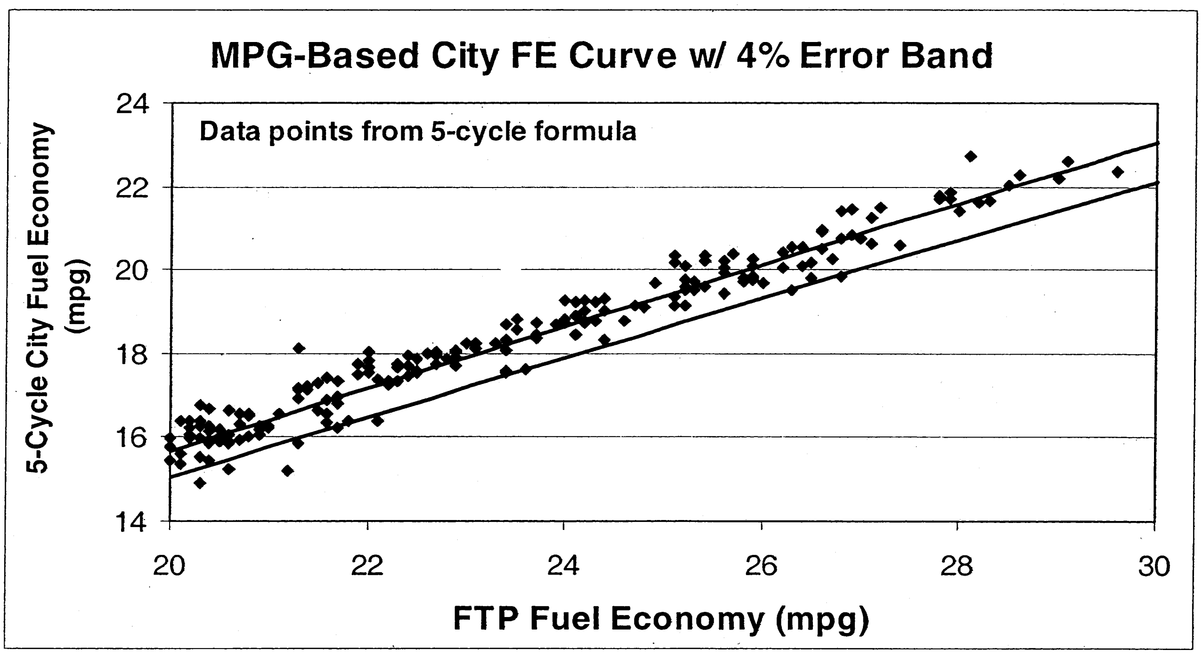
B. Application of the Formulae To Develop Fuel Economy Labels for Specific Vehicles

We are not proposing any major changes to the way that vehicle configurations are grouped for fuel economy labeling purposes. For model years 2008–2010, when the mpg-based formulae are applicable, there would be no change in the procedure by which specific vehicle labels are developed.[44] Since the mpg-based formulae are based solely on the current fuel economy test cycles, no additional tests would need to be conducted. Only the effective adjustment factors would be modified.

Starting with the 2011 model year, vehicle manufacturers would first utilize their available 5-cycle fuel economy testing of emission data vehicles to determine which test groups could utilize the mpg-based approach and which would have to use the vehicle-specific 5-cycle approach. The test groups for which their emission data vehicles passed the 4.0 percent and 5.0 percent criteria described above would face no additional testing requirements. Just as in 2008–2010, the mpg-based formulae would be applied to fuel economy values measured over the FTP and HFET already being performed and city and highway label values determined.

Figure II–3 shows how the 4.0 percent criterion would work for city fuel economy.

Figure II-3. – MPG-Based City Fuel Economy Curve with +/-4 Percent Tolerance Band



The upper line in the figure is the mpg-based formula for city fuel economy. The lower line represents a difference of 4.0 percent from city fuel economy based on the mpg-based formula. The points shown in Figure II–3 represent city fuel economy of emission data vehicles estimated by the 5-cycle fuel economy formula. The model types represented by emission data vehicles whose 5-cycle city fuel economy values fall above the lower line would be allowed to use the mpg-based approach for that model year. The model types represented by emission data vehicles whose 5-cycle city fuel economy values fall below the lower bounding line would be required to use the 5-cycle approach for that model year. Implicit in this proposal is that manufacturers would be allowed to use the mpg-based approach for a particular test group if the 5-cycle fuel economy for an emission data vehicle exceeded the mpg-based curve by more than the 4.0 or 5.0 percent criteria on the high side, since this would result in a lower fuel economy label value.

The test groups for which their emission data vehicles did not pass the 4.0 percent and 5.0 percent criteria described above could face some additional testing requirements. All the vehicle sub-configurations contained in these test groups would require fuel economy values over all five cycles for

[44] See 40 CFR 600 and relevant EPA guidance.

use in the 5-cycle city and highway fuel economy formulae. The city and highway label values produced by the 5-cycle fuel economy formulae would then be averaged and sales-weighted just as they are today. However, the fuel economy values over the five test cycles could be generated in either of two ways in most instances. One way would be to test the vehicle over the US06, SC03 and cold FTP tests (the FTP and HFET tests already being performed under current requirements). The other way would be estimate fuel economy values over the US06, SC03 and cold FTP tests analytically (i.e., ADFEs) from testing of a similar vehicle over these three cycles. Specifically, we propose to allow manufacturers to estimate the effect of differences in inertial test weight, road load horsepower and N/V ratio (the ratio of engine revolutions to vehicle speed when the vehicle is in its highest gear). A procedure to estimate the effect of these three vehicle parameters on FTP and HFET fuel economy has already been developed. We plan to work with manufacturers to develop analogous formulae for the US06, SC03 and cold FTP tests. We would implement these estimation procedures using agency guidance, as is currently done for FTP and HFET fuel economy.

It is possible for the 5-cycle fuel economy values to meet the above criteria for either city or highway fuel economy, but not the other. If the 5-cycle fuel economy values for a specific emission data vehicle are more than four percent below the mpg-based estimate for city fuel economy, but no more than five percent below the mpg-based estimate for highway fuel economy, all the vehicle configurations represented by that emission data vehicle would be required to use the 5-cycle formulae in complying with the fuel economy label requirements for both city and highway fuel economy. All five cycles play a significant role in the 5-cycle city fuel economy formula. Once the five tests have been performed for the city estimate, there is little reason not to use the same information to derive the highway fuel economy estimate.

We propose a different approach for the opposite situation. If the 5-cycle fuel economy values for a specific emission data vehicle are no more than four percent below the mpg-based estimate for city fuel economy, but more than five percent below the mpg-based estimate for highway fuel economy, all the vehicle configurations represented by that emission data vehicle would be allowed to use the mpg-based formulae in deriving the city fuel economy label value. The highway fuel economy value, however, would be based on an alternative, simplified 5-cycle formula as opposed to the full 5-cycle highway fuel economy formula. This alternative 5-cycle highway formula would be based on fuel economy values over the FTP, HFET and US06 tests. The impact of the SC03 and cold FTP tests is relatively small in the 5-cycle highway fuel economy formula, as explained in the Draft Technical Support Document.

This approach requires that we develop a simplified 5-cycle highway fuel economy formula which is consistent with the full 5-cycle formula. We developed this simplified formula using estimates of the average impact of the SC03 and cold FTP test results on 5-cycle highway fuel economy. In both cases, we estimated this average impact by regressing the impact of these test cycles on the 5-cycle highway fuel economy for the 423 vehicles in our certification database against fuel economy values which would be available from FTP, HFET and US06 testing. This analysis (described in detail in the Draft Technical Support Document) results in the following alternative calculation for highway fuel economy.

$$\text{Alternative Highway FE} = 0.89 \times \frac{1}{\text{Start FC} + \text{Running FC}}, \text{ where}$$

$$\text{StartFC} = 0.33 \times \frac{(0.004774 + 1.1377 \times \text{StartFuel}_{75})}{60.0}, \text{ where}$$

$$\text{StartFuel}_{75} = 3.59 \times \left(\frac{1}{\text{Bag 1 FE}_{75}} - \frac{1}{\text{Bag 3 FE}_{75}} \right), \text{ and}$$

$$\text{Running FC} = \left[1.0 + (0.04 \times 0.3)\right] \times \left[\frac{0.79}{\text{US06 Highway FE}} + \frac{0.21}{\text{HFET FE}} \right] + \left[0.377 \times 0.133 \times \left(0.004254 + \frac{0.15931}{\text{US06 FE}} \right) \right]$$

We expect that the continued use of the mpg-based approach and the development of analytical estimation procedures for US06, SC03 and cold FTP fuel economy would allow manufacturers to avoid the vast majority of additional tests that would have been required if every vehicle currently tested over the FTP and HFET tests had to be tested over the US06, SC03 and cold FTP tests. The option to use the mpg-based approach after 2010 should alone eliminate 90 percent of the potential need for additional SC03 and cold FTP testing and 75 percent of the potential need for US06 testing. At the same time, we expect that there would be some need for additional testing when the available estimation procedures mentioned above do not apply. For example, the current estimation procedures for FTP and HFET fuel economy address changes in axle ratio, tractive road load horsepower and inertia test weight. Differences involving changes in transmission design, engine displacement, turbo-charging, etc., require actual testing. We expect that a similar situation would exist with the estimation of US06, SC03 and cold FTP fuel economy.

We request comment on the appropriateness of the continued use of the mpg-based approach beyond the 2010 model year. We also request comment on the appropriateness of the 4.0 and 5.0 percent tolerance bands for city and highway fuel economy, respectively. We also seek comment on alternative approaches that may employ concepts similar to the tolerance band, or other ways of extrapolating fuel economy test results to a broader group of vehicle configurations. We specifically request comment on an approach which would employ tighter criteria (*e.g.*, a tolerance of 3 percent) that would allow the use of the mpg-based approach beyond 2010 model year, but which would include other aspects which would avoid full 5-cycle testing of all the model types which failed to pass the criteria. For example, failing the initial criteria might require the manufacturer to generate fuel economy data over the US06, the least expensive of the three additional cycles. City and highway fuel economy values could then be calculated using three cycles (the FTP, HFET, and US06), and tested with additional criteria (*e.g.*, comparison to a tolerance band around the appropriately generated mpg-based line) to assess whether the mpg-based approach could be used or whether full 5-cycle testing would be required.

C. Derivation of the Proposed 5-cycle Fuel Economy Formulae

1. Five-Cycle Fuel Economy Estimates

The purpose of the 5-cycle fuel economy formulae is to best represent city and highway fuel economy in the U.S. using the test results from the 5 test cycles. To the fullest extent possible, we desire to account for the effect of seasonal and geographical variations on automotive fuel economy, as well as the different driving habits of individual drivers. As described in Section I., we chose to base the fuel economy label values on 5 vehicle emission and fuel economy tests which are already being performed. This maximizes the use of fuel economy information that is already currently being collected, while at the same time minimizes the costs associated with the proposal, as described in more detail below in Section VI. The five current emission and fuel economy tests and their key aspects are described below in Table II–1. Actual second by second descriptions of these driving cycles can be found in Section 86 of Title 40 of the Code of Federal Regulations.

TABLE II–1.—KEY FEATURES OF THE FIVE CURRENT EMISSION AND FUEL ECONOMY TESTS

Test	Driving	Ambient temperature	Engine start	Acces-sories
FTP	Low speed	75 °F	Cold and hot	None.
HFET	Mid-speed	75 °F	Hot	None.
US06	Aggressive; low and high speed	75 °F	Hot	None.
SC03	Low speed	95 °F	Hot	A/C on.
Cold FTP	Low speed	20 °F	Cold and hot	None.

We have highlighted in bold the distinctive features of the five current vehicle tests. The FTP, HFET and US06 are all performed at an ambient temperature of 75 °F. Each test consists of a distinctive driving pattern. In addition, the FTP test consists of three distinct measurements, called bags. Bags 1 and 3 consist of the exact same driving pattern, but Bag 2 consists of a different pattern. Given that separate emission measurements are already made for each bag, we considered each bag of the FTP to be its own driving cycle. In addition, as discussed in Section V, the US06 cycle includes both low and high speed driving. We are proposing that separate emission measurements be made for these two types of driving, again providing separate estimates of fuel use for these two driving patterns. Therefore, we have available fuel economy estimates for five distinct driving patterns:

(1) Bags 1 and 3 of the FTP,
(2) Bag 2 of the FTP,
(3) HFET,
(4) the city portion of US06 and
(5) the highway portion of US06.

We propose to combine the results of these five tests to represent typical city and highway driving patterns. (The separation of the US06 test into two distinct sections is discussed further below.)

The FTP and the cold FTP are the only tests which include a cold start (i.e., an engine start after an overnight soak); the fuel needed to warm up the engine at 75 °F is taken from the FTP results. The SC03 test is the only test to be performed with the air conditioning system operational. Therefore, its results are used to augment the fuel economy from the five driving pattern tests for the fuel needed to operate air conditioning. The cold FTP is the only test performed at a temperature below 75 °F. Therefore, its results are used to represent the additional fuel needed to warm up an engine after a cold start, as well as any fuel needed to operate a warmed up engine, at colder temperatures.

As implied above, we estimate the fuel needed to start and warm up the engine separately from fuel used to operate the engine after start-up, or running fuel use. This is consistent with the approach taken in EPA emission models, such as MOBILE6.2 and MOVES. In terms of a mathematical formulae,

Total fuel use = start fuel use + running fuel use

and,

$$\text{Overall fuel economy} = \frac{1}{\text{start fuel use} + \text{running fuel use}}$$

We describe the estimation of start fuel use in Section II.B.1 and the estimation of running fuel use in Section II.B.2. In Section II.B.3, we discuss other aspects of driving which are not addressed by the dynamometer tests and which are addressed by applying an overall, or off-test adjustment factor to the city and highway fuel economy formulae. The reader is referred to Chapter II of the Draft Technical Support Document for a more detailed discussion of each of the inputs to the fuel economy formulae.

1. Start Fuel Use

For a specific vehicle, the fuel needed to warm up the engine depends primarily on two factors:

(1) The ambient temperature at which the vehicle has been sitting, and

(2) the length of time which the vehicle has been sitting since it was last used (commonly referred to as soak time).

Emissions during engine start up have been studied for some time. Most recently, estimates of start fuel use as a function of ambient temperature were made for use in EPA's new emission inventory model, MOVES (*MO*tor *V*ehicle *E*mission inventory *S*ystem).[45] The relationship between start fuel use relative to that at 75 °F at other ambient temperatures is as follows:[46]

Start Fuel Use Relative to that at 75 °F =

1 + 0.01971 × (Ambient Temperature − 75) + 0.000219 × (Ambient Temperature − 75)²

As will be seen below, we do not need an absolute estimate of start fuel use, simply an estimate of start fuel use relative to some specified ambient condition, such as 75 °F, which is the nominal temperature of the FTP test.

MOVES does not yet include the effect of soak time on start fuel use. Therefore, we obtained a relationship between start fuel use and ambient temperature which was developed by the California Air Resources Board for use in their emission inventory model, EMFAC2000.[47] EPA utilizes the results of this study in our current emission model, MOBILE6.2, to estimate the effect of soak time on regulated emissions during start-up. The equation for fuel use versus soak time (in minutes) relative to the fuel use after a 12 hour soak is as follows:

For soaks of 90 minutes or less:

$$\text{Start Fuel Use} = 0.00433672 \times \text{Soak Time} - 0.000002393 \times (\text{Soak Time})^2$$

For soaks greater than 90 minutes:

$$\text{Start Fuel Use} = 0.25889542 + 0.0014848 \times \text{Soak Time} - 0.0000006364 \times (\text{Soak Time})^2$$

As is assumed in EMFAC2000 and MOBILE6.2, we assumed that these relationships are independent of ambient temperature.

In order obtain the combined effect of ambient temperature and soak time, we multiplied the two above equations together, as follows:

For soaks of 90 minutes or less:

$$\text{Start Fuel Use} = \lfloor 0.00433672 \times \text{Soak Time} - 0.000002393 \times (\text{Soak Time})^2 \rfloor \times [1 + 0.01971 \times (\text{Ambient Temperature} - 75) + 0.000219 \times (\text{Ambient Temperature} - 75)^2]$$

For soaks greater than 90 minutes:

$$\text{Start Fuel Use} = \lfloor 0.25889542 + 0.0014848 \times \text{Soak Time} - 0.0000006364 \times (\text{Soak Time})^2 \rfloor \times [1 + 0.01971 \times \text{Ambient Temperature} - 75) + 0.000219 \times (\text{Ambient Temperature} - 75)^2]$$

The hot and cold starts contained in the standard and cold temperature FTP tests occur after 10 minute and 12 hour soaks, respectively. The above equations relating the effect of soak time on start fuel use indicate that the start fuel use after a 10 minute soak is only 4 percent of that after a 12 hour soak. The above equation relating the effect of temperature on start fuel use indicates that start fuel use at 20 °F is 2.75 times that at 75 °F. Combining these effects, the start fuel use after a 10 minute soak at 20 °F is about 11 percent that of a 12 hour soak at 75 °F. Thus, the start fuel use after the hot starts of both standard and cold temperature FTP tests are relatively small compared to that of a cold start at 75 °F.

In contrast to the cold start after a 12 hour soak, the hot starts for Bag 3 of the standard and cold temperature FTP tests and the US06, SC03 and HFET tests occur after only a 10 minute soak. The above equation indicates that the fuel use for a hot start is only 4 percent of that for a cold start.

In order to estimate start fuel use throughout the U.S. under average ambient conditions, we need estimates of the soak times for typical vehicle operation, as well as the ambient temperature at start up. The amount of time a vehicle has sat prior to start up varies dramatically depending on the time of day at which it is started. For example, for vehicles started up at 6 a.m., nearly all have sat idle overnight. However, for vehicles started at noon, most have been driven in the past 4–5 hours. Ambient temperature varies significantly during the day. Thus, it is more accurate to evaluate start fuel use by hour of the day rather than simply at the daily average temperature. Ambient temperatures also vary dramatically across the U.S., as does the distribution of vehicle miles traveled (VMT). Therefore, we combined estimates of vehicle starts and prior soak times by hour of the day with estimates of ambient temperature and VMT by county in order to reflect the effects of both soak time and ambient temperature on start fuel use.

We obtained estimates of each of these input parameters from EPA's MOBLE6.2 and MOVES emission models. The draft MOVES2004 model includes estimates of ambient temperature by hour of the day for each month of the year for each county in the U.S. These estimates were obtained from the National Weather Service and represent 30-year averages. The draft MOVES2004 model includes estimates of vehicle miles traveled (VMT) by vehicle type for every county in the U.S. during 2002. We used these estimates to determine the percentage of VMT by cars and light trucks in each county. MOBILE6.2 includes estimates of the frequency distributions of vehicle soak times by time of day, as well as the frequency distribution of vehicle starts by hour of the day. Draft MOVES2004 also includes estimates of VMT by month of the year for the nation as a whole.

We first estimated the effect of soak time on start fuel use by hour of the day. These estimates ranged from a low of 0.25 of an overnight soak at 2 p.m. to a high of 0.68 of an overnight soak at 6 a.m. This makes sense, as most vehicles being started at 6 a.m. in the morning have sat overnight, while most vehicles being started in the middle of the afternoon have been used in the past few hours. These estimates are independent of temperature, because the temperature during any particular hour is assumed to be constant.

In order to estimate start fuel use across the nation throughout the year, we calculated the start fuel use for each hour of the day by month for each county in the U.S. and then weighted each estimate by the relative number of starts occurring in each hour of the day and by the relative amount VMT in each month and county. Finally we summed the weighted start fuel use estimates across all hours of the days, months and counties and found the average.

The average start fuel use resulting from this process was 0.4665 of an overnight soak at 75 °F. We can simulate this average start fuel use with a variety of combinations of hot and cold starts at 20 °F and 75 °F. For example, the level of start fuel use is equal to a 0.4665 weighting of the cold start fuel use in Bag 1 of the FTP at 75 °F and no weighting of the start fuel use at 20 °F.

---

[45] A draft of MOVES2004 was released for public comment on Dec. 31, 2004.

[46] Koupal, J., and L. Landman, E. Nam, J. Warila, C. Scarbro, E. Glover, R. Giannelli. MOVES2004 Energy and Emissions Report—Draft Report. U.S. Environmental Protection Agency, No. EPA420–P–05–003, March 2005, pp 57–63. Web site: *http://www.epa.gov/otaq/models/ngm/420p05003.pdf.*

[47] California Air Resources Board. Public Meeting to Consider Approval of Revisions to the State's On-Road Motor Vehicle Emissions Inventory—Technical Support Document. California Environmental Protection Agency, March 2000. See Section 6.7 (Start Correction Factors). Web site: *http://www.arb.ca.gov/msei/on-road/doctable_test.htm.*

Or, this level of start fuel use is also equal to a lower weighting of the cold start fuel use in Bag 1 of the FTP at 20 °F and no weighting of the start fuel use at 75 °F. In order to select a single combination which best incorporated the measured start fuel use at both 20 °F and 75 °F, we evaluated start fuel use only as a function of soak time and time of day, assuming temperature was constant throughout the day. We found that the typical start fuel use was 0.330 times that of a cold start (12 hour soak). We then determined that a weighting of 0.24 for a cold start at 20 °F and 0.76 for a cold start at 75 °F, combined with an overall weighting of 0.330 for cold starts produced the same level of start fuel use as 0.4665 times a cold start at 75 °F, or the average level of start emissions estimated to occur in-use.

In terms of the use of the FTP test results, Bag 3 contains the start fuel use after a 10-minute soak, and Bag 1 contains the start fuel use after a 12 hour soak. Other aspects of Bag 1 and Bag 3 are the same (i.e., the vehicle is driven exactly the same, only the soak time prior to start up differs). As indicated above, however, the start fuel use after a 10 minute soak can be assumed to be negligible compared to that after the 12 hour soak.[48] This means that the difference between fuel use in Bag 1 and Bag 3 is the start fuel use following a 12 hour soak. Thus, the average start fuel use in the U.S. is 0.24 times 0.330 times the difference between fuel use in Bag 1 and Bag 3 of the cold temperature FTP plus 0.76 times 0.330 times the difference between fuel use in Bag 1 and Bag 3 of the standard FTP at 75 °F.

Hybrids are tested over what is commonly referred to as a 4-bag FTP test, with Bag 4 consisting of a Bag 2 repeated after Bag 3. In this case, the cold start fuel use would be determined exactly as described above. However, these four bags can also be combined into two bags, with Bag 1 consisting of a typical Bag 1 and Bag 2 and Bag 2 consisting of a typical Bag 3 and Bag 4. In this case, cold start fuel use would be determined from the difference in fuel use between Bags 1 and 2 of the 2-bag FTP test.

This estimate of start fuel use is in terms of total fuel use per start. In order to combine this with running fuel use in terms of gallons per mile, start fuel use must be divided by the average trip length. We based our estimate of the average trip length in the U.S. on the National Household Travel Survey (NHTS). The NHTS was performed in 2001 and statistically surveyed approximately 26,000 households in the U.S. This survey represents the sixth in a series of surveys dating back to 1969. (The name of the survey has changed a few times and the precise survey methods have varied to some degree.) NHTS found that the average trip taken using a personal vehicle in the U.S. was 9.8 miles long. This estimate excludes very long trips, such as those taken on vacations, as well as commercial trips, such as those by taxi cabs. Based on the survey questionnaire, we believe that the survey also excludes brief stops (e.g., those at gas stations or convenience stores), as well as extremely short trips (e.g., moving a vehicle out of a driveway to allow another vehicle to exit, moving from one shopping center to another just across the street). Using trip information from instrumented vehicles in Baltimore and Spokane (described in more detail below), about 27 percent of all trips fall into one of these two categories. Thus, we believe that a more precise estimate of trip length, and one that is more consistent with our estimate of the fraction of cold starts described above, is 7.7 miles (9.8 miles divided by 1.27).

This trip length of 7.7 miles includes all driving, both city and highway oriented. NHTS does not attempt to split driving into city and highway categories. Therefore, additional information was needed to perform this split. As will be described in more detail below, we estimate that 43 percent of all U.S. driving falls under our definition of city driving, while 57 percent falls into the highway driving category. The highway fuel economy label assumes no cold starts (i.e., it is based solely on the HFET, which is a hot start test), except insofar that the effect of a cold start is included in the 22 percent adjustment factor. Since even long trips have a beginning and often begin with a cold start, we assumed that the average highway trip had a length of 60 miles. This is somewhat arbitrary. However, once trip length is over 20 miles, start fuel use has very little impact on fuel economy. Still, the inclusion of some start fuel use in the highway fuel economy estimate makes this estimate more realistic. Assuming an average trip length of 60 miles for highway driving, the average length of a city trip must be 3.5 miles for the overall average to be 7.7 miles. Using these two estimates of average trip length allows us to convert fuel use per engine start into fuel use per mile.

The total volume of fuel used in either Bag 1 or Bag 3 of the FTP can be determined by dividing the number of miles of driving during these portions of the test (3.59 miles for either bag) by the fuel economy measured during that bag. Thus, the equation for fuel use per start at either 20 °F or 75 °F is as follows:

For vehicles tested over either a 3-Bag FTP or 4-Bag FTP:

$$\text{Start Fuel}_x \left(\text{gallons of fuel}\right) = \frac{3.59}{\text{Bag 1 FE}_x} - \frac{3.59}{\text{Bag 3 FE}_x}$$

For vehicles tested over either a 2-Bag FTP:

$$\text{Start Fuel}_x \left(\text{gallons of fuel}\right) = \frac{7.5}{\text{Bag 1 FE}_x} - \frac{7.5}{\text{Bag 2 FE}_x},$$

where x is either 20 °F or 75 °F.

The equation for start fuel use in terms of gallons per mile is:

For city driving:

[48] The Draft MOVES2004 model also assumes that start fuel use after a hot start is negligible.

$$\text{StartFC}(\text{gallonspermile}) = 0.330 \times \left[\frac{(0.76 \times \text{StartFuel}_{75} + 0.24 \times \text{StartFuel}_{20})}{3.5} \right]$$

For highway driving:

$$\text{StartFC}(\text{gallonspermile}) = 0.330 \times \left[\frac{(0.76 \times \text{StartFuel}_{75} + 0.24 \times \text{StartFuel}_{20})}{60.0} \right]$$

2. Running Fuel Use

Running fuel use depends primarily on how the vehicle is driven and the use of fuel to power accessories. Of the latter, air conditioning is the most significant and the primary accessory addressed in the emission and fuel economy dynamometer tests. Once the vehicle is warmed up, ambient temperature has only a modest effect on fuel use.

The five dynamometer tests include four distinct driving cycles, or patterns of driving. In addition, the FTP and US06 cycles (the latter as proposed to be modified) each include two distinct driving patterns. Two basic characteristics of these driving patterns are depicted in Table II–2: average speed and a basic measure of the average power required by the engine.

TABLE II–2.—DRIVING CHARACTERISTICS OF THE CURRENT DYNAMOMETER TESTS

Cycle	Average speed	Average power [A]
FTP (Bags 2 and 3)	19.6	40.9
FTP: Bag 3	25.6	53.6
FTP: Bag 2	16.1	33.8
HFET	48.2	34.9
US06	48.0	104.3
US06: City Bag	21.5	152.9
US06: Highway Bag	61.0	78.2
SC03 (run with air conditioning on)	21.4	49.2
Cold Temperature FTP (same driving cycle as FTP)	19.6	40.9

[A] Power defined as velocity times the change in velocity per second during cruise or accelerations. Power is set equal to zero during decelerations and not considered in the determination of average power.

The FTP and the cold temperature FTP both involve the same driving cycle, just at different ambient temperatures. Thus, their average speeds and power are identical, both for the total cycle and for each bag of emissions measured. The FTP and SC03 involve distinct, but similar driving cycles. Both are low speed cycles having similar average speeds and power levels. As the SC03 test is only run with the air conditioning on and all the other tests are run with air conditioning off, it is not possible to isolate the effect of the driving cycle differences between the FTP and SC03 tests directly. Thus, this leaves five distinct driving patterns which can be used to represent typical U.S. driving: Bag 2 of the FTP, Bag 3 of the FTP, HFET, City Bag of US06 and Highway Bag of US06.

As shown in Table II–2, both Bags 2 and 3 of the FTP are low speed cycles, but their average power requirements differ by a factor of 1.7. As will be seen below, it is useful to consider each bag separately in simulating typical city and highway driving.

The current US06 test currently consists of 600 seconds of driving and the emissions are collected in one bag (i.e., one single collection of pollutants emitted during the test). Thus, the fuel economy result is over the entire cycle. The US06 driving cycle consists of 5 hills, or 5 driving segments which begin and end with the vehicle at idle. All but the second and third hills consist of relatively low speed driving, while the second hill reaches 71 mph and the third hill reaches 80 mph. Therefore, in terms of predicting fuel economy, it is useful to separate the low speed driving from the high speed driving. For practical reasons, when separating the city into ''city'' and ''highway'' portions, we grouped the second hill with the four low speed hills in the city bag and the highway bag consists of the relatively long third hill. Overall, seconds 0–131 and 496–600 of the cycle would comprise the city bag and seconds 132–495 would comprise the highway bag. The description of the hills within US06 and their designation is summarized in Table II–3 below.

TABLE II–3.—SPLIT OF US06 CYCLE INTO CITY AND HIGHWAY PORTIONS

Hill	Portion of driving cycle (cumulative seconds)	Maximum speed (mph)	Designation
1	0–43	44.2	City.
2	44–134	70.7	City.
3	134–499	80.3	Highway.
4	500–563	29.8	City.
5	564–600	51.6	City.

As described in the Introduction, driving at an average speed below 45 mph is defined as city driving, while that above 45 mph is defined as highway driving. We obtained a description of average U.S. driving from the Draft MOVES2004 motor vehicle emissions model. This description included a distribution of vehicle speeds and levels of vehicle specific power. Using the definition of city and highway driving, we separated the MOVES description of driving into city and highway categories. We then performed a linear regression to estimate what two combinations of the five driving cycles or bags best fit average U.S. city and highway driving patterns, respectively. The results are two sets of cycle combinations in terms of time spent driving. These are shown in Table II–3. We then used the average speeds of the various cycles and bags to convert these to combinations to a mileage basis. The combinations of cycles found to best represent onroad driving in terms of both time spent driving and mileage driven are shown in Table II–4.

TABLE II–4.—WEIGHTING FACTORS FOR THE FIVE DYNAMOMETER CYCLES (PERCENT)

Cycle	City driving		Highway driving	
	Time (percent)	Mileage (percent)	Time (percent)	Mileage (percent)
Bag 3 FTP	32	41	0	0
Bag 2 FTP	60	48	0	0
HFET	0	0	25	21
US06 City	8	11	0	0
US06 Hwy	0	0	75	79

From the results shown in Table II–4, over 90 percent of the time spent in city driving, and nearly 90 percent of the mileage, is best explained by Bags 2 and 3 of the FTP cycle. Roughly 80 percent of both driving time and mileage of highway driving is best explained by the highway portion of the US06 cycle. These findings confirm that the FTP (the current basis for the city fuel economy label) is still generally representative of most low speed driving in the U.S. However, the relatively low speed and mild accelerations of the HFET (the current basis for the highway fuel economy label) is not representative of higher speed driving in the U.S.

These results also confirm the separation of the two types of driving contained in the US06 cycle. Only the city portion of US06 appears in the description of city driving and only the highway portion of US06 appears in the description of highway driving. At the same time, the relative weights for Bags 2 and 3 in the description of city driving are similar to that implicit in the FTP, which is 52 percent and 48 percent, respectively.

As mentioned above, the fuel use over the three dynamometer cycles, when combined using these weighting factors, best matches the fuel use which would occur during typical city and highway driving. The weighting is performed in terms of fuel use, or fuel consumption per mile. For example, fuel use during city driving is 0.48 times the multiplicative inverse of the fuel economy measured over Bag 2 of the FTP cycle plus 0.41 times the multiplicative inverse of the fuel economy measured over Bag 3 of the FTP cycle plus 0.11 times the multiplicative inverse of the fuel economy measured over the city bag of the US06 cycle.

$$\text{Funning fuel use (city)} = \frac{0.48}{\text{FE Bag 2}} + \frac{0.41}{\text{FE Bag 3}} + \frac{0.11}{\text{FEUS06}_C}$$

$$\text{Funning fuel use (highway)} = \frac{0.21}{\text{FE HFET}} + \frac{0.79}{\text{FEUS06}_H}$$

These estimates of running fuel use accounts for a wider variety of city and highway driving patterns than the FTP and HFET cycles alone. However, these combinations of fuel use still do not include any fuel use related to air conditioning or cold temperature. Fuel use related to air conditioning is estimated using the SC03 test. As shown in Table II–2, the driving pattern contained in the SC03 test is similar to that of the FTP, but not identical.

Using the MOVES2004 methodology for modeling fuel use, we estimated the combination of Bags 2 and 3 of the FTP which would match the fuel use over the SC03 cycle with the air conditioning turned off. This combination is 0.39 times the fuel consumption over Bag 2 and 0.61 times the fuel consumption over Bag 3. Thus, we propose to estimate the incremental fuel use due to the operation of the air conditioner as the difference in fuel use measured over the SC03 versus this combination of fuel use over Bags 2 and 3 of the standard FTP.

This difference in fuel use between the two tests provides a direct estimate of the impact of air conditioning use for the conditions present during the SC03 test. The SC03 test is performed at 95 °F and 40 percent relative humidity. The test only lasts 10 minutes and the vehicle is pre-heated with radiant lamps for 10 minutes prior to the test. Thus, the air conditioning compressor is generally engaged throughout the entire test. As shown in Table II.–2., the speed of the vehicle during the SC03 test is also relatively low, at an average speed of 21.5 mph. Of course, onroad, vehicles operate at different speeds and ambient temperatures and the compressor may not be engaged 100 percent of the time, particularly during longer trips. All three of these factors can affect the impact of air conditioning on fuel economy. We therefore adjust the estimate of the impact of air conditioning on fuel use from the SC03 test in three ways to account for these three factors.

The largest factor is portion of driving time during which the compressor is actually engaged to cool inlet air to the vehicle. The Draft MOVES2004 model contains an algorithm which estimates the percentage of time which the compressor is engaged as a function of ambient temperature and humidity. This algorithm was developed from the direct measurement of air conditioning operation of 20 vehicles in Phoenix, Arizona during the summer and fall of 1992.[49] The algorithm considers both the frequency that the system is turned on by the driver and the frequency that the compressor is engaged once the system is turned on. We combined this algorithm with long term average meteorological conditions for each county in the U.S. to estimate the percentage of driving time during which the compressor was engaged under those conditions. We considered both diurnal and seasonal temperature variations, as well as variations in the amount of driving performed throughout the day and across seasons. We estimate that drivers have the air conditioning turned on 23.9 percent of the time on average across the U.S., and the compressor is engaged 15.2 percent of the time.

We then adjusted this latter percentage to account for reduced compressor loads at temperatures less than 95 °F and higher loads above 95 °F.[50] Again this was done for each county in the U.S., accounting for diurnal and seasonal temperature and driving differences. From this, we estimate that the average load of the air conditioning compressor in-use is about 87 percent of that at 95 °F (i.e., during the SC03 test). Thus, the average load of the compressor in-use is the same as 13.3 percent (15.2 percent × 0.87) of the load experienced during the SC03 test.

Finally, the impact of air conditioning on fuel economy varies with vehicle driving pattern. Most air conditioning compressors are belt-driven by the engine. The efficiency of both the engine and compressor varies with engine speed and load. This variation is difficult to model, as the speed and load of engines in various vehicles varies dramatically based on the vehicle's drivetrain design, even over the same driving cycle. Therefore, we assume that the efficiency of the engine and air conditioning compressor implied in the SC03 test applies to other types of driving, as well. However, a more basic effect related to driving pattern is that the faster a vehicle is moving, the shorter the amount of time that the vehicle needs to be cooled while it travels a specific distance. Other factors being equal, this reduces the amount of energy needed to cool the vehicle per mile of travel. Therefore, for a specific set of ambient conditions, we assume that the impact of air conditioning on fuel use is constant with driving time (i.e., fuel use in terms of gallons per hour is constant). This means that the excess fuel use due to operating the air conditioner varies inversely proportional to vehicle speed. In other words, at low vehicle speeds, like that of the SC03 test, excess fuel use is relatively high on a per mile basis. At high vehicle speeds, like that of highway driving, the excess fuel use due to operating the air conditioner is relatively low on a per mile basis. We confirmed this assumption by testing five vehicles over a variety of test cycles at EPA's Ann Arbor laboratory with both the air conditioning turned on and off. The results of this test program and an analysis of the data are described in the Draft Technical Support Document.

The air conditioning compressor is also often engaged when the defroster is turned on to keep the windshield from fogging up. The air conditioning dehumidifies the air and excesses the effectiveness of the defroster. Today's proposal does not include a specific weighting for demisting activity. We lack a direct estimate of the frequency that the defroster is turned on or the compressor is engaged during demisting. Due to the fact that the defroster tends to be operated at lower ambient temperatures than the air conditioner, the load on the engine is generally much lower than that during summertime air conditioning. Thus, the impact of demisting on fuel economy is likely much smaller than that of summertime air conditioning.

Given the above, the impact of air conditioning on running fuel use is estimated as 13.3 percent of the difference between fuel use per mile over the SC03 and a combination of Bags 2 and Bag 3 of the FTP times 21.5 mph and divided by the average speed of either city or highway driving. Based on the descriptions of city and highway driving from Draft MOVES2004, the average speeds are 19.9 mph and 57.1 mph, respectively. Thus, the excess fuel use due to air conditioning operation is:

$$\text{For city driving} = 0.133 \times \left(\frac{21.5}{19.9}\right) \times \left[\frac{1}{\left(\begin{array}{c}\text{Fuel economy}\\ \text{over the SC03 test}\end{array}\right)} - \frac{1}{\left(\frac{0.39}{\text{Fuel economy over Bag 2}} + \frac{0.61}{\text{Fuel economy over Bag 3}}\right)}\right]$$

[49] Koupal, J. W. Air Conditioning Activity Effects in MOBILE6 (M6.ACE.001). U.S. Environmental Protection Agency, No. EPA420–R–01–054, November 2001. *Website: http://www.epa.gov/otaq/models/mobile6/r01054.pdf.*

[50] Nam, Edward K., ''Understanding and Modeling NO_X Emissions From Air Conditioned Automobiles,'' 2000, SAE #2000–01–0858.

$$\text{For highway driving} = 0.133 \times \left(\frac{21.5}{57.1}\right) \times \left[\frac{1}{\left(\begin{array}{c}\text{Fuel economy}\\ \text{over the SC03 test}\end{array}\right)} - \frac{1}{\left(\frac{0.39}{\text{Fuel economy over Bag 2}} + \frac{0.61}{\text{Fuel economy over Bag 3}}\right)}\right]$$

Finally, we have to add the impact of colder ambient temperatures on running fuel use. We can obtain a direct estimate of the impact of colder ambient temperatures on running fuel use by comparing the fuel use over the standard and cold temperature FTP tests. By focusing on Bag 2 of each FTP test, we exclude the impact of cold temperature on start up fuel use, which was already addressed in Section II.B.1 above. For hybrid vehicles, which are tested over the bag 2 driving cycle twice (the first time as Bag 2 and the second time as Bag 4), we propose to harmonically average the fuel economies from Bags 2 and 4.

We considered including Bag 3 in the determination of the effect of cold temperature on running fuel use. Bag 3 includes some higher speed driving, so its inclusion broadens the overall driving pattern included in the estimate. This would particularly improve the representativeness of the estimate for highway driving. However, Bag 3 begins with a hot start, unlike Bag 2 which simply follows directly after Bag 1 with no engine shut-off and restart in between. At 75 °F, a hot start requires a negligible volume of additional fuel use. However, at 20 °F, even a hot start can require some excess fuel use. Thus, including the difference between Bag 3 fuel use at 20 and 75 °F in the estimate of the impact of cold temperature on running fuel use could also include some excess fuel use related to engine warm up, as well. Available data indicate that the relative impact of operation at 20 °F versus 75 °F is nearly identical for the two bags (10 percent for Bag 2 and 11 percent for Bag 3). However, the fuel economy over Bag 3 is lower than over Bag 2, so the absolute difference in fuel use between 20 °F and 75 °F is actually lower in Bag 3 than Bag 2. We request comment on whether the impact of cold temperature on running fuel use should only involve Bag 2 or should involve both Bags 2 and 3.

Neither MOBILE6.2 nor MOVES2004 include correlations of the effect of ambient temperature on running fuel use. However, as just described, the impact of colder ambient temperatures on running fuel use is small (i.e., 10 percent over a drop in temperature of 55 °F). We believe that the additional fuel use is primarily due to the loss of heat to the cooler ambient air, higher friction in the slightly cooler moving parts, as well as slight changes in the properties of the cooler intake air and air fuel mixture during combustion. All of these changes are expected to be gradual and fairly linear. Therefore, we assume that the excess fuel use increases linearly as temperatures decrease below 75 °F. Above 75 °F, we assumed that there was no further reduction in running fuel use. (This latter assumption was confirmed as part of the five vehicle test program described above.) We also assume that the excess fuel use is independent of driving pattern. In other words, the excess fuel use is the same for city and highway driving on an absolute basis. We request comment on assuming that the excess running fuel use due to colder temperatures is independent of driving pattern on a relative basis (i.e., in percentage terms).

Using the same meteorological and VMT inputs described above related to start fuel use, we estimate the average temperature in the U.S. at which driving occurs is 58.7 °F. This temperature is 70 percent of the way from 75 °F to 20 °F. Thus, any excess fuel use associated with operation at 20 °F should be weighted by 100 percent minus 70 percent, or 30 percent.

Given the fact that over 80 percent of city driving is represented by Bags 2 and 3 of the FTP, we decided to use the fuel economy measured during Bags 2 and 3 of the cold FTP directly to represent the fuel economy of city driving at 20 °F. We repeated the regression of the VSP distribution of city driving from Draft MOVES2004 against the VSP distributions of just Bags 2 and 3. The best fit produced a 50/50 weighting of the two bags. Thus, we propose to represent the fuel economy of city driving at 20 °F by a 50/50 harmonic average of the fuel economy over Bags 2 and 3 of the cold FTP. Mathematically, then, for city driving:

$$\text{Excess fuel use due to colder temperatures} = 0.3 \times \left[\left(\frac{0.5}{\text{Bag } 2_{20} \text{ FE}} + \frac{0.5}{\text{Bag } 3_{20} \text{ FE}}\right) - \left(\frac{04.1}{\text{Bag } 3_{75} \text{ FE}} + \frac{0.48}{\text{Bag } 2_{75} \text{ FE}} + \frac{0.11}{\text{US06 City FE}}\right)\right]$$

Highway driving occurs at higher speeds than those typical of the cold FTP. We conducted a detailed review of past test programs which evaluated the impact of colder temperatures on fuel economy at highway driving speeds. This review is described in the Draft Technical Support Document. There, we concluded that the effect of cold temperature on fuel economy at city driving speeds could overestimate the effect at higher speeds. Thus, we decided not to use the fuel economy measured over the cold FTP directly to represent the impact of cold temperature on highway fuel economy. Instead, we believe that it is more prudent at this time to simply assume that running fuel use at 20 °F at highway speeds is 4 percent greater than that at 75 °F. Thus, mathematically, for highway driving:

$$\text{Excess fuel use due to colder temperatures} = 0.3 \times 0.04 \times \left[\frac{0.21}{\text{HFET FE}} + \frac{0.79}{\text{US06 Highway FE}} \right]$$

Combining the estimates of running fuel use at 75 °F without the air conditioning system running with the estimate of excess fuel use of running the air conditioning system and the estimate of excess fuel use due to colder ambient temperatures produces the following formulae for running fuel use: For city driving:

$$\text{Running Fuel Use} = 0.70 \times \left[\frac{0.48}{\text{Bag } 2_{75} \text{ FE}} + \frac{0.41}{\text{Bag } 3_{75} \text{ FE}} + \frac{0.11}{\text{US06 City FE}} \right] + 0.30 \times \left[\frac{0.5}{\text{Bag } 2_{20} \text{ FE}} + \frac{0.5}{\text{Bag } 2_{20} \text{ FE}} \right] + 0.133 \times \frac{21.5}{19.9} \times \left[\frac{1}{\text{SC03 FE}} - \left(\frac{0.61}{\text{Bag } 3_{75} \text{ FE}} + \frac{0.39}{\text{Bag } 2_{75} \text{ FE}} \right) \right]$$

For highway driving:

$$\text{Running Fuel Use} = (1 + 0.30 \times 0.04) \times \left[\frac{0.79}{\text{US06 Highway FE}} + \frac{0.21}{\text{HFET FE}} \right] + 0.133 \times \frac{21.5}{57.1} \times \left[\frac{1}{\text{SC03 FE}} - \left(\frac{0.61}{\text{Bag } 3_{75} \text{ FE}} + \frac{0.39}{\text{Bag } 2_{75} \text{ FE}} \right) \right]$$

3. Adjustment Factor for Non-Dynamometer Effects

Fuel economy estimated using the five current dynamometer tests can account for many factors, including vehicle design, driving pattern, trip length, cold temperature and air conditioning. However, there are still a large number of factors which affect vehicle fuel economy that cannot be addressed by dynamometers tests. These include roadway roughness, road grade (hills), fuel quality, large vehicle loads (e.g., trailers, cargo, multiple passengers), wind, precipitation, to name just a few. Even when a factor is addressed by a dynamometer test, such as driving pattern or air conditioning, the effect can only be approximated, as all realistic driving patterns cannot possibly be included in a test having a reasonable length of time. Nor can all the possible ambient conditions affecting air conditioner operation be tested. Thus, any estimate of in-use fuel economy derived from the five dynamometer tests is necessarily approximate, both with respect to factors addressed directly by the tests and those which are not.

The impacts of a number of these factors on onroad fuel economy relative to that measured on a dynamometer is possible to estimate, while others are difficult to estimate. One factor which can be estimated is fuel quality. EPA's certification test fuel contains no oxygenates, while commercial gasoline contains significant volumes of ethanol and methyl tertiary butyl ether (MTBE). Both ethanol and MTBE contain less energy per gallon, so vehicles operating on fuel containing these oxygenates tend to achieve lower fuel economy, generally in proportion to the reduction in the energy content of the finished gasoline. For example, the driver of a vehicle operating on gasoline containing ten percent ethanol by volume would experience a 3.5 percent decrease in fuel economy compared to gasoline not containing any ethanol or other oxygenate. We expect the nation's gasoline supply to contain roughly 5.4 billion gallons of ethanol by 2008. This is equivalent to 37 percent of the nation's gasoline supply containing 10 percent ethanol by volume. Thus, by 2008, we expect commercial gasoline on average to contain about 1.2 percent less energy per gallon than EPA test fuel. Thus, this difference in energy content means that onroad fuel economy will be about 1.2 percent less than that estimated using the 5-cycle formulae described in the previous section. This effect could increase beyond 2008 as more ethanol is used in the nation's gasoline supply.

Another factor which can be estimated is tire pressure. In February 2001, NHTSA conducted a survey of the tire pressure of in-use vehicles. Tire pressures were measured on over 11,500 vehicles at 24 locations throughout the U.S. The results of the study and our analysis of the data are described in the Draft Technical Support Document. We found that the tires of the average car were under-inflated by 1.1 pounds per square inch (psi), while those on light trucks were under-inflated by 1.9 psi. Using estimates of the effect of tire pressure on fuel economy presented by NHTSA, we estimate that the fleet-wide effect of under-inflation is 0.5 percent.

Another factor which can be estimated, though more approximately, is wind. Wind affects vehicular fuel economy in two ways. First, aerodynamic drag is proportional to the square of vehicle speed (i.e., the higher the vehicle speed, the faster aerodynamic drag increases for a given increase in speed). Thus, increasing wind speed by 1 mph increases aerodynamic drag, and thus, reduces fuel economy, more than the effect of decreasing wind speed by 1 mph. Second, both the effective area of a vehicle and its drag coefficient increases as the true wind direction moves to either side from head-on. Basically, vehicles are designed to move forward through the air, not sideways. Thus, any side wind increases drag and decreases fuel economy. Based on a distribution of wind speeds (yielding an average wind speed in the U.S. of 9.4 mph), we estimate that these two effects reduce onroad fuel economy on average by 5–6 percent.

Several other factors are still relevant to a 5-cycle fuel economy estimate, namely altitude, road grade, road surface, road curvature, brake drag, wheel alignment, tire switching, and vehicle load. EPA estimated the impact of these factors to be 8 percent at the time of the 1984 label adjustment rule.

We have reduced the impact of road surface from 4 percent to 1–3 percent due to increased urbanization and road paving which has occurred since that time. Thus, we estimate these other factors to reduce onroad fuel economy by 5–7 percent. Combining this estimate with those of fuel quality, tire pressure and wind produces an overall downward effect of 11–15 percent.

As described further in Section II.E below, we also compared the 5-cycle fuel economy values to fleet-wide estimates of fuel economy made by FHWA for 2002 and 2003, after we made several adjustments to improve the comparability of the two estimates. The 5-cycle fuel economy values best match the FHWA-based estimates when we include a factor of 0.88–0.91 in the 5-cycle fuel economy formulae (i.e., a reduction of 9–12 percent due to factors not addressed by the 5-cycle formulae). We propose to average these two ranges (i.e., the 9–12 percent range based on FHWA, and the 11–15 percent range based on the analysis of non-dynamometer effects discussed above) and account for these factors by including a factor of 0.89 in the 5-cycle city and highway formulae (i.e., a reduction of 11 percent in both city and highway fuel economy).

D. Derivation of the MPG-Based Approach

The mpg-based approach to fuel economy label adjustments utilizes the results of applying the 5-cycle formulae to all vehicles for which we were able to gather fuel economy data for all five dynamometer cycles. We requested that all manufacturers submit to us all their available fuel economy data for vehicles which had been tested over at least one of the US06, SC03 or cold FTP tests. We combined this data with our own fuel economy data to develop a database of 423 recent model year vehicles which had been tested over all five cycles. We applied the above 5-cycle formulae to these vehicles. We then developed a relationship between the 5-cycle city and highway fuel economies and the city and highway fuel economies using the current adjustment factors, respectively.

We evaluated two options for developing this relationship. One option plotted 5-cycle fuel economy versus fuel economy using the current adjustment factor. The other option plotted the inverse of 5-cycle fuel economy (i.e., fuel consumption) versus the inverse of fuel economy using the current adjustment factor. As indicated from the description of the 5-cycle fuel economy formulae, most of the modeling of fuel economy is performed in terms of fuel consumption (i.e., gallons of fuel burned per mile versus miles traveled per gallon of fuel burned). While both types of plots produce relationships with a high degree of correlation, the plots in terms of fuel consumption are linear, while those in terms of fuel economy are non-linear. Given that the linear relationship is simpler and the degrees of correlation are essentially the same, we are proposing to base the mpg-based adjustments on the correlations in terms of fuel consumption. However, the label values themselves would remain in terms of fuel economy, as required by EPCA. We request comment on the use of the correlations performed in terms of fuel consumption versus those performed in terms of fuel economy. Both approaches are described in detail in the Draft Technical Support Document.

Figures II–5 and II–6 show the relationship between the inverse of 5-cycle city (or highway) fuel economy (i.e., fuel consumption) versus the inverse of FTP (or HFET) fuel economy. Figure II–5 shows city fuel consumption, while Figure II–6 shows highway fuel consumption.

Figure II-5. – MPG-Based City Fuel Consumption Regression

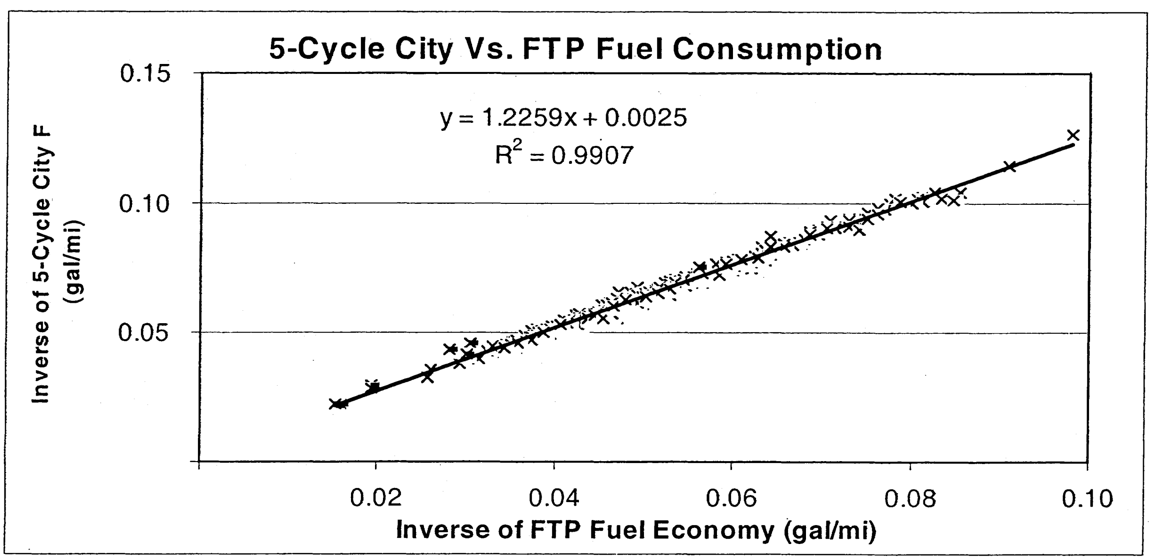
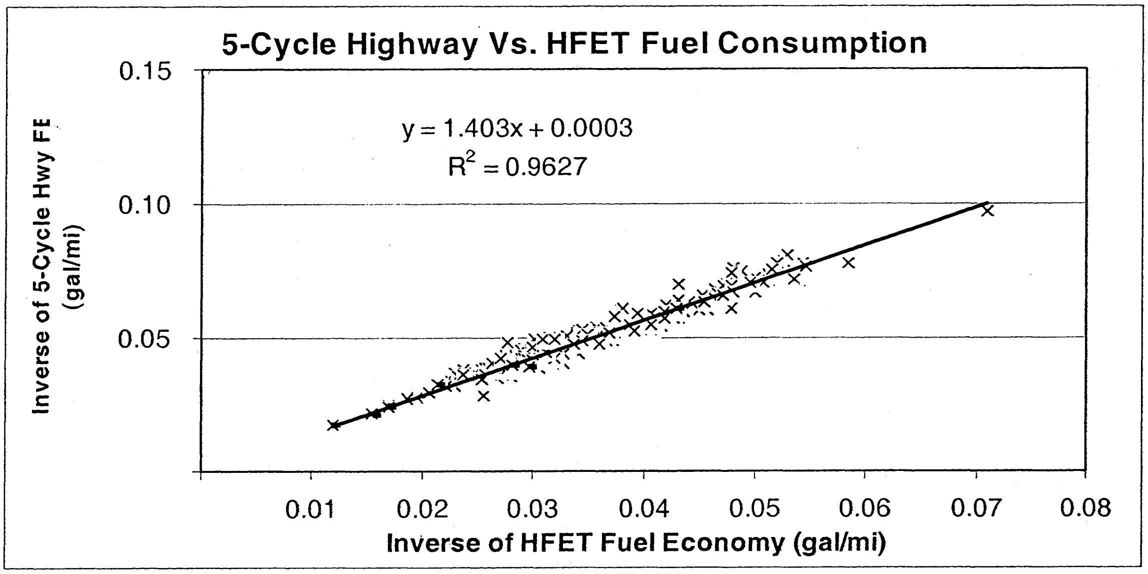


Figure II-6. – MPG-Based Highway Fuel Consumption Regression



The results of regressing 5-cycle fuel consumption versus fuel consumption over the FTP or HFET are shown in the above figures. In terms of fuel economy:

$$\text{MPG Based City FE Label Value} = \frac{1}{\left(0.002549 + \frac{1.2259}{\text{FTP FE}}\right)}$$

$$\text{MPG Based Highway FE Label Value} = \frac{1}{\left(0.000308 + \frac{1.4030}{\text{HFET FE}}\right)}$$

The standard deviation of the difference between the mpg-based equations and the 5-cycle fuel economies are 2 percent for city and 5 percent for highway. These differences are roughly equivalent to 0.5 mpg for city fuel economy and 1–2 mpg for highway fuel economy. Thus, while the mpg-based equations represent much of the difference in fuel economy represented by the 5-cycle formulae, differences between the fuel efficiency of individual vehicles on the order of 0.5–2 mpg are muted by the mpg-based approach.

As mentioned above, the mpg-based equations described above were developed from the 5-cycle fuel economy estimates for 423 2003–2005 model year vehicles. We propose to update the mpg-based curves annually using all of the available 5-cycle fuel economy estimates for the previous three model years. EPA would publish the mpg-based equations for the upcoming model year's labels by March 1 of the previous year (i.e., by March 1, 2007 for the 2008 model year).

E. Effect of the New Formulae on Fuel Economy Label Values

The impact of today's proposal on city and highway fuel economy label values was assessed using the same database of 423 late model year vehicles used to develop the mpg-based adjustments above. Table II–5 presents the results of this comparison for all 423 vehicles, as well as various sub-sets of vehicles.

TABLE II–5.—EFFECT OF 5-CYCLE FORMULAE ON CITY AND HIGHWAY FUEL ECONOMY LABELS

	City			Highway			Combined *		
	Current (mpg)	5-cycle (mpg)	Percent change	Current (mpg)	5-cycle (mpg)	Percent change	Current (mpg)	5-cycle (mpg)	Percent change
Hybrids	42	32	−23	41	37	−9	41	34	−16
Diesels	26	23	−13	35	31	−11	30	27	−9
Conventional vehicles									
12 Highest FE	30	26	−15	36	33	−8	33	30	−10

TABLE II–5.—EFFECT OF 5-CYCLE FORMULAE ON CITY AND HIGHWAY FUEL ECONOMY LABELS—Continued

	City			Highway			Combined *		
	Current (mpg)	5-cycle (mpg)	Percent change	Current (mpg)	5-cycle (mpg)	Percent change	Current (mpg)	5-cycle (mpg)	Percent change
12 Lowest FE	11	10	−11	15	14	−8	12	12	−6
Average	19	16	−13	25	22	−9	21	19	−8

* Combined fuel economy for Current MPG is based on weighting of 55%/45% city/highway, respectively.
Combined fuel economy for 5-Cycle MPG is based on weighting of 43%/57% city/highway, respectively.

As can be seen from Table II–5, use of the 5-cycle formulae would reduce both current city and highway fuel economy label values. For conventional vehicles, city and highway fuel economy values would be reduced an average of 13 percent and 9 percent, respectively. The reduction in city fuel economy label values for higher than average fuel economy vehicles would be slightly higher, while that for lower than average fuel economy vehicles would be slightly lower. The reduction in highway fuel economy label values varies only slightly.

The impact on hybrid vehicles would be greater, averaging a 23 percent reduction for city fuel economy and 9 percent for highway fuel economy. This greater impact occurs primarily because a number of the fuel efficient aspects of hybrid vehicles produce their maximum benefit under conditions akin to the FTP and HFET tests, and are somewhat less beneficial during aggressive driving, colder ambient temperatures and when the air conditioner is turned on. However, these vehicles would still remain among the top fuel economy vehicles.

There is one diesel vehicle in our 5-cycle fuel economy database. The impact of the 5-cycle formulae on this one diesel is very similar to that for the average conventional, gasoline-fueled vehicle.

The impact of the mpg-based formulae would be very similar on average to those shown in Table II–5 above for conventional vehicles. This is not surprising, since the mpg-based formulae are based essentially on the average results of the 5-cycle formulae. However, the mpg-based formulae would increase the city fuel economy of hybrid vehicles slightly, as indicated in Table II–6. This occurs because there are only 9 hybrid vehicles in the database, compared to 413 gasoline-fueled, conventional vehicles. The mpg-based regression of city fuel economy, therefore, represents essentially the impact of the 5-cycle formulae on conventional vehicles, which is less than that for hybrids. The mpg-based regression of highway fuel economy is essentially the same for conventional and hybrid vehicles.

TABLE II–6.—EFFECT OF MPG-BASED FORMULAE ON CONVENTIONAL AND HYBRID FUEL ECONOMY

	City			Highway		
	Current (mpg)	MPG-based (mpg)	Percent change	Current (mpg)	MPG-based (mpg)	Percent change
Conventional	19	16	−13	25	22	−9
Hybrids	42	34	−18	41	37	−10

F. Comparison to Other Onroad Fuel Economy Estimates

In the 1984 label adjustment rule, EPA was able to compare fleetwide estimates of a variety of city and highway fuel economy label options to a number of independent estimates of onroad fleet fuel economy. In the late 1970's and early 1980's, EPA and several auto manufacturers had collected onroad fuel economy estimates from tens of thousands of drivers which could be compared to the EPA city and highway fuel economy labels. The fleetwide combined EPA fuel economy estimate could also be compared to onroad fuel economy based on estimates of total VMT and total fuel consumption from the Federal Highway Administration (FHWA). EPA primarily used the driver-based fuel economy estimates to develop the current 10 percent and 22 percent adjustments to fuel economy over the FTP and HFET, respectively.

Repeating this type of comparison is more complicated today than it was in 1984. First, 5-cycle fuel economy estimates are not available for the current car and light truck fleet. Emission standards based on the US06 and SC03 tests just began to be phased in with the 2001 model year. Also, these tests are only performed on a limited number of vehicle configurations. Second, studies of driver-based fuel economy similar to those available in 1984 have not been performed of late. At the same time, as mentioned in the Introduction above, a number of consumer organizations have begun conducting their own fuel economy tests. Several governmental organizations have been monitoring onroad fuel economy, focused particularly on new hybrid technology. While the findings of these various organizations were compared to the current EPA label fuel economy values in the Introduction, here they will be compared to the 5-cycle and mpg-based fuel economy estimates.

We begin with a comparison of the 5-cycle fuel economy values with the fleetwide fuel economy estimates developed by FHWA. Because we do not have fuel economy data for all vehicles over all 5 dynamometer cycles, and therefore cannot develop a 5-cycle fuel economy estimate for the current onroad fleet directly, this comparison requires a three-step process.

The first step in this process compares fleetwide fuel economy estimates based on EPA's current fuel economy labels to the FHWA estimate of onroad fuel economy. The second step in this process is to compare combined city-highway fuel economy using the 5-cycle formulae to that using the current EPA city and highway label procedures. This comparison is performed for vehicles for which we have 5-cycle fuel economy data. We will assume that this relationship also applies to those vehicles for which we do not have 5-cycle data. The third step evaluates changes in FTP and HFET test procedures which accompanied the implementation of the US06 and SC03 testing requirements. The most important change was the removal of a 10 percent increase in tractive road load horsepower which was intended to represent the use of air conditioning in the summer. This effectively increased fuel economy label values with no accompanying change in onroad fuel economy. The vehicles assessed by FHWA were nearly all tested with the 10 percent adjustment in road load, while those in the 5-cycle certification database were not. Therefore, this difference needs to be accounted for when connecting the results of the two previous comparisons.

Overall, the difference between 5-cycle fuel economy and FHWA onroad fuel economy is the combination of the percentage differences from the three comparisons:

(1) Current EPA label fuel economy (with 10 percent road adjustment) to FHWA onroad fuel economy,

(2) 5-cycle fuel economy to current EPA label fuel economy (without 10 percent road load adjustment), and

(3) the effect of the removal of the 10 percent road load adjustment.

FHWA publishes fleet-wide estimates of onroad fuel economy for cars and light trucks in their annual Highway Statistics publication.[51] We will focus on the combined estimates for cars and light trucks here, since various states use different criteria to distinguish between the two vehicle classes. At the same time, the criteria used to distinguish between cars plus light trucks and other vehicles are very consistent. The FHWA definition of light trucks (actually 4-tire, 2-wheel trucks) includes some vehicles which EPA classifies as heavy-duty vehicles. We have adjusted the FHWA estimates upward to provide a more direct comparison. After this adjustment, the FHWA-based estimate of fleet-wide onroad fuel economy for cars and light trucks is 20.3 mpg for 2002 and 20.5 mpg for 2003.

We used the EPA MOBILE6.2 in-use emission model to calculate fleet-wide average EPA combined fuel economy label values for these two years. For both years, average label fuel economy was 21.1 mpg. Thus, for 2002 and 2003, the FHWA-based onroad fuel economy was 4 percent and 3 percent lower than the current combined EPA label value, respectively. Thus, the result of the first step in this process is an indication that the current labeling formulae, based on FTP and HFET testing with the 10 percent road load adjustment, could be over-estimating onroad fuel economy by 3–4 percent.

Moving to the second step, in Table II–5 above, we presented city and highway fuel economy label values using both current and 5-cycle formulae for 423 2003–2005 model year vehicles. The FHWA estimates apply to all driving, both city and highway. Therefore, we are primarily interested in combined city-highway fuel economy values. Also, we are using FHWA estimates for the 2002 and 2003 calendar years, as these are the most recent available. The number of hybrid vehicles on the road was negligible during this timeframe. Therefore, we will only use the 5-cycle fuel economy estimates for the 414 non-hybrid vehicles in our database. There is no need to perform this comparison separately for the mpg-based formulae, since the average fuel economy from the 5-cycle and mpg-based formulae are identical for non-hybrid vehicles.

The combined fuel economy using the current label formulae is a 55/45 harmonic weighting of the current city and highway fuel economy labels. The average combined fuel economy using the current EPA label values for these 414 vehicles is 20.9 mpg. However, it is important to note that the FTP and HFET testing upon which these values are based were performed without the 10 percent increase in road load horsepower to account for air conditioning and other accessories. For the proposed 5-cycle formulae, combined fuel economy is a 43/57 harmonic weighting of the 5-cycle city and highway fuel economies. This city/highway split for the 5-cycle fuel economies is based on:

(1) The assumption that driving generally less than 45 mph is city driving and that above 45 mph is highway driving, and

(2) the description of onroad driving patterns contained in MOVES.

We seek comment on any other data that may indicate what constitutes city and highway driving. The mathematical formula for converting the 5-cycle city and highway fuel economy values into an estimate of average onroad fuel economy is as follows:

$$\text{Average onroad fuel economy} = \frac{1}{\left[\dfrac{0.43}{\text{5-cycle City FE}} + \dfrac{0.57}{\text{5-cycle Highway FE}}\right]}$$

The average combined 5-cycle fuel economy using this formula for the 414 conventional vehicles is 19.2 mpg, which is 8 percent lower than that based on the current label values. This is the result of the second step in the process.

Moving to the third step, prior to the implementation of the Supplemental FTP standards and the running of the US06 and SC03 tests, EPA approximated the occasional load on the engine of the air conditioner and other accessories by increasing the tractive road load horsepower setting on the dynamometer by 10 percent of each vehicle's normal road load. This increase was equivalent to increasing the rolling resistance of the tires and aerodynamic drag of moving the vehicle through the air by 10 percent. When the explicit testing of emissions with the air conditioning system turned on during the SC03 test, EPA removed this 10 percent adjustment on the FTP and HFET tests. This was appropriate for emissions testing, given the direct measurement of emissions with the air conditioning on during the SC03 test. However, since the fuel economy over the SC03 test is not included in the calculation of the fuel economy label values, the removal of the 10 percent adjustment during FTP and HFET testing effectively increased the city and highway label values with no accompanying change in onroad fuel economy.

Using a detailed model of a vehicle's energy use on the road (please see the Draft Technical Support Document for details), we estimate that removing the 10 percent adjustment in road load increased fuel economy over the FTP and HFET by 2 percent and 5 percent, respectively. Decreasing the FTP and

[51] U.S. Department of Transportation, Federal Highway Administration. Highway Statistics 2003. See Table VM–1. Web site: *http://www.fhwa.dot.gov/policy/ohim/hs03/htm/vm1.htm.*

HFET fuel economy values for the 414 conventional vehicles in our 5-cycle certification database by these amounts decreased combined EPA fuel economy on average by 3 percent. The average combined fuel economy using the current label formulae decreased from 20.9 mpg to 20.2 mpg. Thus, instead of decreasing the current combined label value by 8 percent, when considered in terms of test procedures effective for the 2002–2003 onroad fleet, the 5-cycle formulae only decrease label fuel economy by an average of 5 percent. This 5 percent decrease represents the combined effects of steps 2 and 3 in our process.

Overall, then, from step 1, the current label values over-estimate onroad fuel economy per FHWA (with some adjustments by EPA) by 3–4 percent, while the 5-cycle formulae decrease current label values (of the 2002–2003 fleet) by 5 percent. Thus, the proposed 5-cycle formulae should move the combined fuel economy label values to within 1–2 percent of a comparable estimate of fleetwide fuel economy using FHWA techniques.

Next, several governmental and non-governmental organizations perform their own fuel economy assessments. Of these, the American Automobile Association (AAA) and Consumer's Union (CU) have tested the greatest number of vehicles. Oak Ridge National Laboratory (ORNL) has recently begun a program where drivers can submit their own fuel economy measurements via the Internet. Argonne National Laboratory (ANL) has also been operating an extensive hybrid demonstration project for a few years as part of DOE's Freedom Car project.

Each of these estimates of onroad fuel economy have their relative strengths and weaknesses. The strengths of the non-governmental organization testing include the fact that the vehicles are tested on actual roads, usually in traffic and under real environmental conditions. The primary weaknesses of this testing include:

(1) The fact that the driving patterns involved are not typically published, so they may or may not be representative of average U.S. driving,

(2) Vehicles are tested throughout the year, so some vehicles are tested in hot weather and others in cold weather and some under moderate conditions, and

(3) In some cases, the actual test procedures used to measure the volume of fuel consumed during the test are not described, leaving some doubt as to their accuracy. Still, because of the public interest in these estimates, we believed that they should be considered here.

Consumer Report recently published their fuel economy estimates for 303 2000–2005 model year vehicles. Consumer Report makes three fuel economy measurements: one for city driving, one for highway driving and one for a 150-mile trip. They also publish a combined fuel economy value which is a harmonic average of the three fuel economy measurements.

We were able to match 151 of these vehicles with those in our 5-cycle fuel economy database. For these 151 vehicles, we compared Consumer Report's city, highway and combined fuel economy measurements to the analogous current EPA label, 5-cycle and mpg-based fuel economy estimates. The results show that the Consumer Report city fuel economy values are well below both the current label or 5-cycle label values, though the difference for the 5-cycle values are half those of the current label values. The reverse is true for highway fuel economy. The current EPA combined label values average 10 percent higher than the Consumer Report values. However, the average of the combined 5-cycle values is only 1 percent higher than the average combined Consumer Report fuel economy.

More specifically, the vehicles tested by Consumer Report include 6 hybrid vehicles. We have 5-cycle fuel economy estimates for five of these vehicles. A comparison of the Consumer Report, current EPA label and 5-cycle label fuel economy values shows that the current combined EPA label fuel economy values average 27 percent higher than the combined fuel economy measured by Consumer Report. The difference between EPA and Consumer Report combined fuel economy decreases dramatically with the 5-cycle approach. On average, the EPA 5-cycle combined fuel economy is only 5 percent higher than that measured by Consumer Report. This is slightly higher than the zero percent difference found for non-hybrids. Thus, the vehicle-specific 5-cycle approach appears to reflect some of the factors measured with Consumer Report testing which are missed by the current fuel economy tests (FTP and HFET). As expected, the differences increase with the mpg-based approach, since the mpg-based adjustments are based essentially on non-hybrid vehicle results. Additional discussion and analysis of the Consumer Reports data can be found in the Draft Technical Support Document.

As discussed above, AAA also develops its own fuel economy estimates. In their 2004 report, AAA presented their test results and the EPA label values for 163 models. As AAA only develops a single fuel economy estimate for each vehicles (i.e., no separate city or highway estimates), we compared their estimates to a combined mpg-based fuel economy value. As discussed above, the mpg-based city fuel economy was weighted 43 percent and the highway value was weighted 57 percent. We did not compare the 5-cycle fuel economy values to the AAA estimates due to the relatively low number of models which were in both the AAA and EPA certification fuel economy database.

The average mpg-based combined fuel economy for the 163 vehicles was 2 percent higher than the average AAA fuel economy. The combined mpg-based fuel economy was higher than the AAA estimate for 91 models and lower for 71 models. The two estimates matched for one model. These comparisons are quite similar to those between the current label fuel economy values and the AAA values. However, the mpg-based fuel economy more closely matches those of AAA for the two hybrids in the AAA database. For the Insight and Prius, the current combined EPA fuel economy values exceed those of AAA by 6–8 percent. The combined mpg-based fuel economy values straddle the AAA estimates, one being one percent higher and the other being two percent lower.

The ORNL Your MPG data discussed in Section I are similar in nature to the much larger databases analyzed for the 1984 label adjustment rule. Drivers measure their own fuel economy and provide a perceived split of their driving into city and highway categories. The strength of this type of data is the fact that the vehicle is being operated by the owner or regular driver in typical use. The weaknesses are the unknown representativeness of the sample, the unknown nature of the technique used by the owner/driver to measure fuel economy and the short time period over which fuel economy is generally assessed (e.g., a couple of tanks full). In the particular case of the ORNL database, its current size is still small (2544 estimates of fuel economy for 1794 vehicles) compared to those available in 1984, though it is growing daily.

We compared the fuel economy estimates submitted to the ORNL website with the mpg-based fuel economy values. We did not attempt to estimate 5-cycle fuel economy values for these vehicles, as we lacked 5-cycle fuel economy data for most of the vehicles. However, on average for non-hybrid vehicles, the mpg-based values match the 5-cycle values. We combined the mpg-based city and highway values using each driver's estimate of the percentage which was city and highway. If a driver did not provide an estimate of the breakdown of their driving pattern, we assumed that their driving was 43 percent city and 57 percent highway. We also conducted separate comparisons for conventional gasoline vehicles, hybrids and diesels. The results are shown in Table II–9 below.

TABLE II–9.—YOUR MPG VERSUS CURRENT EPA LABEL FUEL ECONOMY

Fuel economy (mpg)				
Vehicle type	Number of estimates	Your MPG	MPG-based EPA combined label: vehicle city/hwy weighting	Difference from MPG-based (%)
Conventional Gasoline	2315	23.7	23.4	1.3
Hybrid Gasoline	239	46.1	47.1	−2.2
Diesel	88	41.0	38.8	5.7

As can be seen, diesels appear to perform the best with respect to their mpg-based fuel economy values, outperforming the proposed mpg-based combined label by 5.7 percent. Conventional gasoline vehicles also appear to slightly outperform the mpg-based label values by 1.3 percent. Hybrids are the only category to fall short, but do so by a small margin of 2.2 percent.

The Department of Energy has overseen the real world operation of a number of electric hybrid vehicles for a period of years. The Advanced Vehicle Testing Activity (AVTA), conducted jointly by the Idaho National Laboratory (INL) and the National Renewable Energy Laboratory (NREL), has been benchmarking hybrid electric vehicle performance as part of the FreedomCAR & Vehicle Technologies Program. The strength of the FreedomCAR program testing of hybrid vehicles lies in the fact that the vehicles are operated on the road over long term periods similar to what consumer-purchased vehicles experience, albeit often in commercial applications. Over a million miles of operation have been assessed and careful fuel consumption and mileage records are kept. The weaknesses are that some of the vehicles are in commercial use (e.g., company pool vehicles) for accelerated mileage accumulation and that the vehicles are operated exclusively in the Southwest, mainly Phoenix, Arizona and surrounding areas. Nevertheless, the vehicles are operated just as any other vehicle would be in that application and the vehicles are subject to all of the environmental and roadway factors which affect the fuel economy of typical vehicles, such as winds, rough roads, hills, traffic congestion, etc. Because of the limited geographic area of the program, the vehicles are more likely to experience hot temperatures and air conditioning use than cold temperatures.

The vehicles' operators report mileage and fuel usage to FreedomCAR which posts the monthly and cumulative fuel economy of each electric hybrid fleet on a monthly schedule.[52] Therefore, seasonal changes in fuel economy can be observed. The results of the fleets are shown in Table II–10.

TABLE II–10.—FREEDOMCAR HYBRID FLEET CUMULATIVE VERSUS EPA COMBINED LABEL FUEL ECONOMY

Vehicle	Accumulated mileage	Fleet size	Fuel economy (mpg)				Difference (%)		
			Onroad	EPA combined label A			Current	5-cycle	MPG-based
				Current	5-cycle	MGP-based			
2001 Honda Insight	417,000	6	45.2	61.0	51.5	52.6	35	14	16
2002 Toyota Prius	458,000	6	41.0	48.6			19		
2003 Honda Civic	378,000	4	37.6	46.3	38.0	40.0	23	1	6
2004 Toyota Prius	102,000	2	44.4	54.6	45.9	46.0	23	3	4
2004 Chevrolet Silverado 2wd	21,000	1	18.5	18.8			2		
2004 Chevrolet Silverado 4wd	28,000	1	17.7	16.9	14.9	15.3	−5	−16	−14
2005 Ford Escape 2wd	28,000	1	28.1	33.6			20		
2005 Ford Escape 4wd	29,000	1	25.5	29.9	24.1	25.9	17	−5	−2
2005 Honda Accord	62,000	2	27.6	32.3	26.3	29.1	17	−5	5
2005 Lexus RX400h	20,000	2	26.3	28.1	24.8	24.8	7	−6	−6
Average	154,000	2.6	31.2	37.0	32.2	33.4	16	−2	2

A Current combined is a 55/45 weighting of city/highway fuel economy. 5-cycle combined is a 43/57 weighting of city/highway fuel economy, as explained further in this section.

As can be seen, EPA's current label formulae over-estimate the onroad fuel economy achieved by all but one of the hybrid vehicle fleets. It should be noted that the values for current combined fuel economy are those from EPA's certification database and are not the official label values. The official label values are even higher due to differences between the worse case vehicles tested over the Supplemental FTP cycles and the average vehicle sold. The largest shortfall was 35 percent for the Honda Insights. The Chevrolet Silverado was the only model which

[52] *http://energy.inel.gov/x-web/other/framed.shtml?http://avt.inel.gov*.

exceeded the current label value of the test vehicle in our certification database. This is likely related to the fact that its hybrid design includes limited fuel economy targeted features. Except for the Chevrolet Silverado, the onroad fuel economy for each fleet never exceeded either the city or highway fuel economy label. This indicates that regardless of whether the vehicles were driven predominantly in city or highway driving modes, other real world factors reduced onroad fuel economy beyond that captured in the FTP and HFET and the current 10 percent and 22 percent adjustment factors.

Table II–10 also presents combined fuel economy values using the proposed 5-cycle and mpg-based formulae for those vehicles for which we have 5-cycle fuel economy data. The proposed combined 5-cycle label values exceed onroad fuel economy for three out of seven models, while the proposed mpg-based values do so for five out of seven models. The average of the differences is very small in both cases. On average, the combined 5-cycle value is 2 percent lower than those measured onroad. However, as mentioned above, the specific vehicles in our 5-cycle database tend to be worse case. For example, the current official label values exceed those shown in Table II–10 by 3 percent. If we increased the combined 5-cycle values commensurately, they would exceed the onroad values by 1 percent. Thus, while both of the proposed approaches do a much more reasonable job at predicting the onroad fuel economy achieved in the DOE FreedomCar program than the current label formulae, the proposed 5-cycle formulae appear to be particularly accurate when compared to the FreedomCar experience.

When analyzing monthly reported fuel economy, large seasonal fluctuations in fuel economy were observed on most of the hybrid fleets. The seasonal fluctuations are especially noticeable on the fleets that had been in service for over one year. The fuel economy during the hot and often humid summer weather months when heavy air conditioning usage could be expected was as much as 15 mpg lower than observed fuel economy during mild Phoenix area winter months. Fuel economy over the SC03 air conditioning test for the three hybrids with the highest rated fuel economy shown in Table II–10 (Prius, Insight and Civic) tends to be 15–20 mpg lower than that over the FTP. No cold weather operation similar to northern states or the Cold FTP (20 °F) was reported which would likely have resulted in further shortfalls.

The FreedomCAR program is continuing to accumulate mileage on all of the 2004 and 2005 models listed above. While the time in service and accumulated mileage is relatively low compared with the original fleets that have completed service, the initial results support similar substantial shortfall likely due to the same real world factors not currently captured during the FTP or HFET.

III. What Major Alternatives Were Considered?

As explained in Section I, the current city and highway test results for fuel economy are adjusted downward by 10 and 22 percent, respectively, to derive the current fuel economy label values. One possible approach that we evaluated would be to simply revise these adjustment factors, presumably to further ''discount'' the test results, to achieve results that more closely mirror real-world fuel economy. However, this is a fundamentally flawed approach that does not solve the problems with the current fuel economy estimates.

There is little doubt that revising the current adjustment factors could result in city and highway fuel economy values that better approximate real-world values on average across the U.S. vehicle fleet. This approach might be more accurate for certain vehicle models. However, the fundamental problem with this approach is that it ignores the variation in how different vehicle models respond to factors that impact fuel economy. As we discussed in Section I, there is a wide variation in how different vehicles respond to factors such as the use of air conditioning, cold temperature operation, and higher speeds and accelerations. For example, in our database of about 420 vehicles, operation on the city test cycle at 20 degrees F resulted in fuel economy that was anywhere from 0 to 40 percent worse than fuel economy achieved on the same test cycle at 75 degrees F. Because there are now additional tests in place (for emissions compliance) that have the ability to measure a vehicle's fuel economy over this wider range of driving operation, we have an opportunity to design the new fuel economy label methodology in a way that relies on these test results, and is thus inherently more vehicle-specific. In this way, our fuel economy test methods would yield results that are not only more accurate across the fleet, but also more reflective of the fuel economy consumers can expect to achieve from a given vehicle in the real-world.

IV. Revisions to the Fuel Economy Label Format and Content

In addition to our proposal to revise the methods for calculating the ''city'' and ''highway'' mpg estimates, we are proposing revisions to the way these estimates and the other information on the label are presented to the consumer.

Our goal is to improve the label format and content so that consumers more readily understand and use it. To gain a better understanding of how consumers are using the current fuel economy label, we conducted a series of focus groups in five cities around the country in March 2005. The input received from the participants confirmed some of our perceptions about weaknesses of the current label, and also brought up some constructive suggestions for improvements that we could address. The contractor that conducted the focus groups issued a report to EPA of their findings, which is included in the docket for this proposed rulemaking.[53]

In the focus groups, we clearly heard that people are very familiar with the big, bold City and Highway estimates on the label. We tested whether consumers preferred to see the estimates continue to be expressed as City and Highway mpg values or replacing the City and Highway designations with a fuel economy range. Consumers agreed that the City and Highway distinction is useful information and wanted it to remain intact. Consumers had a very strong negative reaction to a range, and indicated it was not something they could easily compare to other cars. Thus, we are proposing to retain the City and Highway mpg estimates. As discussed in Section I, our new test methods are designed to reflect the average fuel economy, so the City and Highway mpg estimates on the label will reflect the fuel economy expected to be achieved by half of drivers. We seek comment on whether the average is the appropriate value for the large, bold, City and Highway estimates. In other words, we invite comment on whether it would be more appropriate to capture a greater proportion of consumers' experience by using a lower fuel economy estimate, for example, an estimate that would capture 75 percent, or even a greater percentage, of drivers' experience.

Further, the consumer focus groups indicated that people are not noticing or reading the current ''fine print'' range of fuel economy expressed on today's label. Yet, we believe it is important to

[53] PRR, Inc. ''EPA Fuel Economy Label Focus Groups—Report of Findings,'' prepared for EPA by PRR Inc., March 2005.

continue to report an expected fuel economy range in smaller print, in addition to the City and Highway mpg estimates, so that consumers can better understand how much their fuel economy in actual driving can vary from the estimate. To accompany the City and Highway mileage estimates, we propose to express the range of expected fuel economy as a 10th percentile to a 90th percentile fuel economy. In that way, the range represents 80 percent of driving experience—10 percent of drivers may get fuel economy below the lower end of the range, and 10 percent may get fuel economy greater than the higher end. We seek comment on other approaches to expressing the expected fuel economy range on the label. For example, we ask for comments on whether this range should be wider to capture even more of drivers' experience, such as a 5th percentile to a 95th percentile, which would capture 90 percent of all drivers' fuel economy experience.[54]

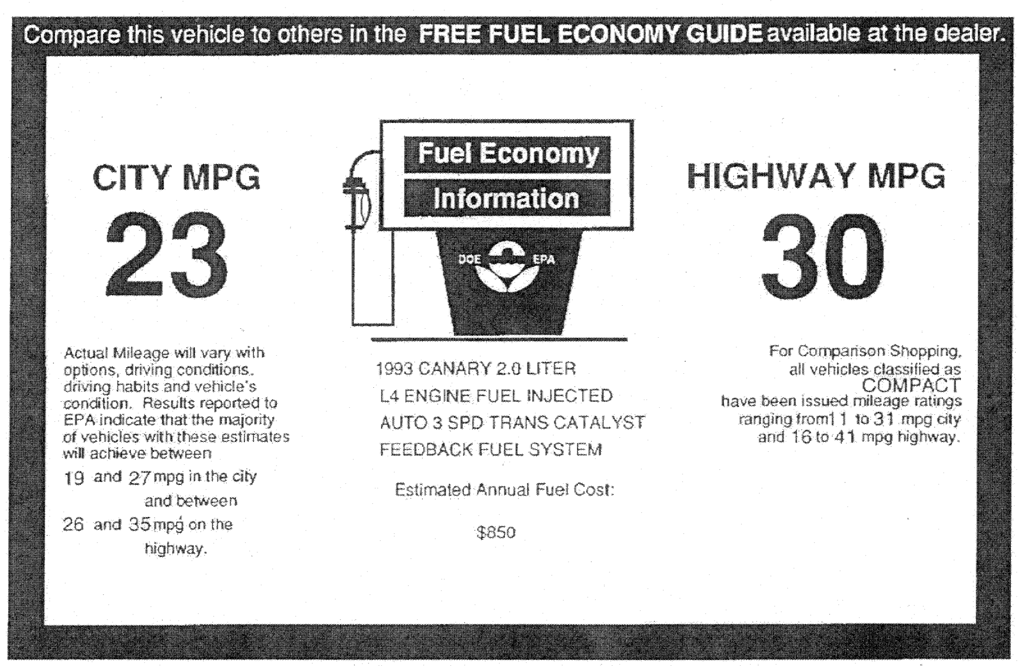
Finally, we are interested in commenters' feedback on what additional information could be made available either in the annual Fuel Economy Guide or the *www.fueleconomy.gov* Web site, administered jointly by EPA and DOE. We recognize that some of the ideas we are presenting here may become too much information to include on the label itself. We would like to make additional information available to those consumers who are most interested in more detail, and the Fuel Economy Guide, or www.fueleconomy.gov Web site, may be good places to include such information. Some have suggested the idea of a fuel economy calculator on the Web site, that would enable consumers to calculate an estimated fuel economy that is more tailored to their specific driving conditions. A similar tool already exists on the Web site in the form of a calculator to estimate individualized annual fuel costs, based on specific cost and mileage data input by the user. A fuel economy calculator could be designed that would allow the user to input their specific driving conditions, such as the amount of time spent with air conditioning on, what climate they live in, how much driving is done under higher speed/aggressive driving conditions, etc. These inputs could go into an algorithm that would estimate the fuel economy for a specific vehicle under the conditions input by the user. For instance, drivers in areas of climactic extremes may want to know the fuel economy impact of driving exclusively in those conditions. EPA requests comments on the merits of adding such a calculator to the fueleconomy.gov Web site, and welcomes further input on how such a tool might best be designed.

Based on input from the focus groups, as well as our own observations from implementing the fuel economy labeling program for the past 20 years, we are proposing to revise the fuel economy label as discussed below. For a point of reference, a sample of the current Fuel Economy Label is provided below, followed by four proposed label formats on which we are requesting comment. Sample A takes a more traditional approach by preserving some of the ''look and feel'' of the current label. Samples B and C are graphical updates and offer different ways of presenting the same information. Sample D has the same look as Sample B, but presents a different option for illustrating the comparable class information. One benefit of adopting a less traditional look is to signal to consumers that the new label design coincides with our new way of calculating the fuel economy estimates.

We are planning to conduct a series of focus groups after evaluating the public comments received on these label designs, to assure that the final design will be understood and useful for consumers. More details about this proposal are in section VIII.B below.

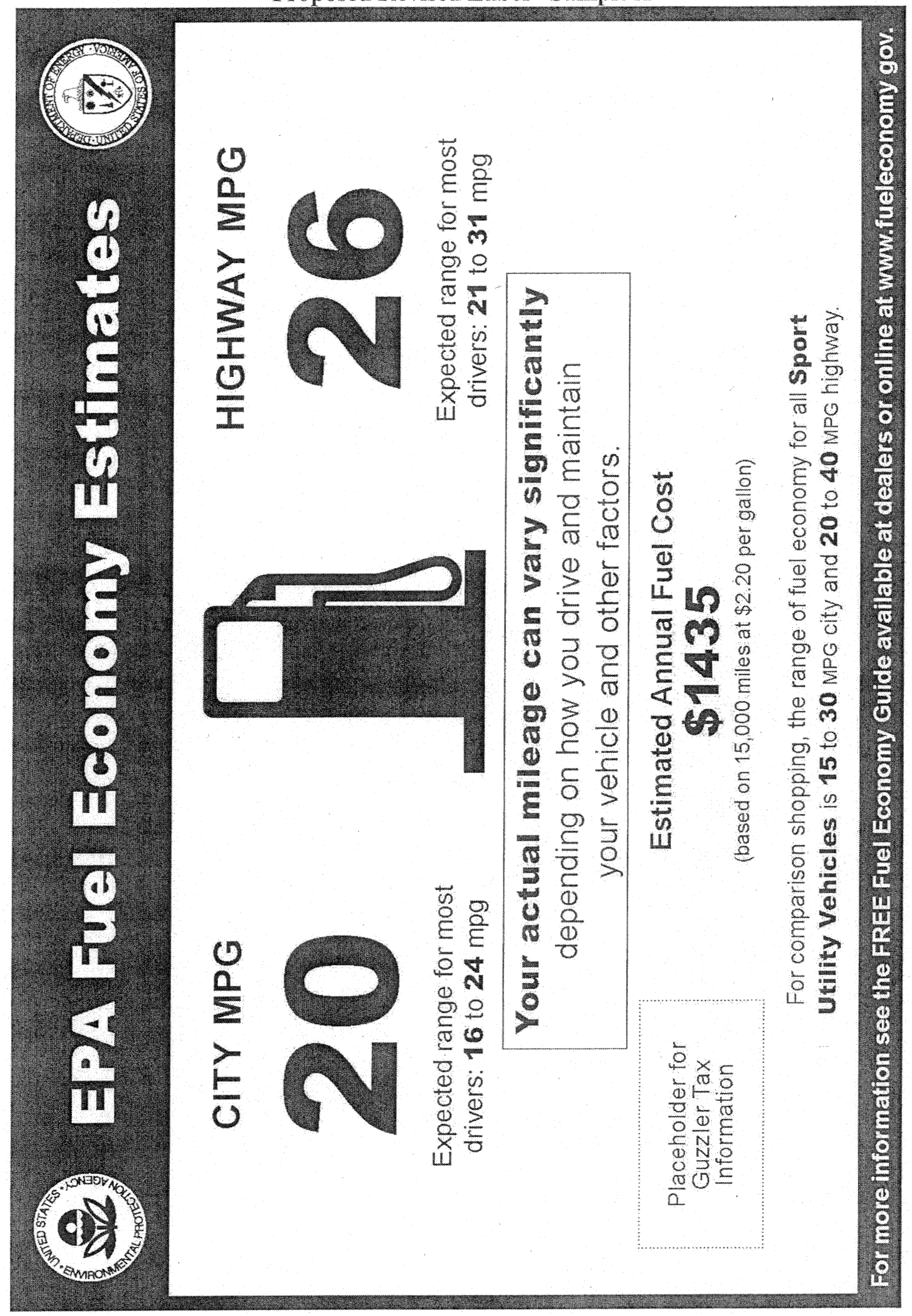
BILLING CODE 6560–50–P

Current Label



[54] Based on the assumption of a normal distribution and available data that allows us to estimate the standard deviation, the 10th and 90th percentiles are equal to the mean ±17 percent, and the 5th and 95th percentiles are equal to the mean ±21 percent.

Proposed Revised Label - Sample A



Proposed Revised Label - Sample B

EPA Fuel Economy Estimates

CITY MPG **20**

EXPECTED RANGE FOR MOST DRIVERS
16 TO **24** MPG

HIGHWAY MPG **26**

EXPECTED RANGE FOR MOST DRIVERS
21 TO **31** MPG

Your actual mileage can vary significantly depending on how you drive and maintain your vehicle and other factors.

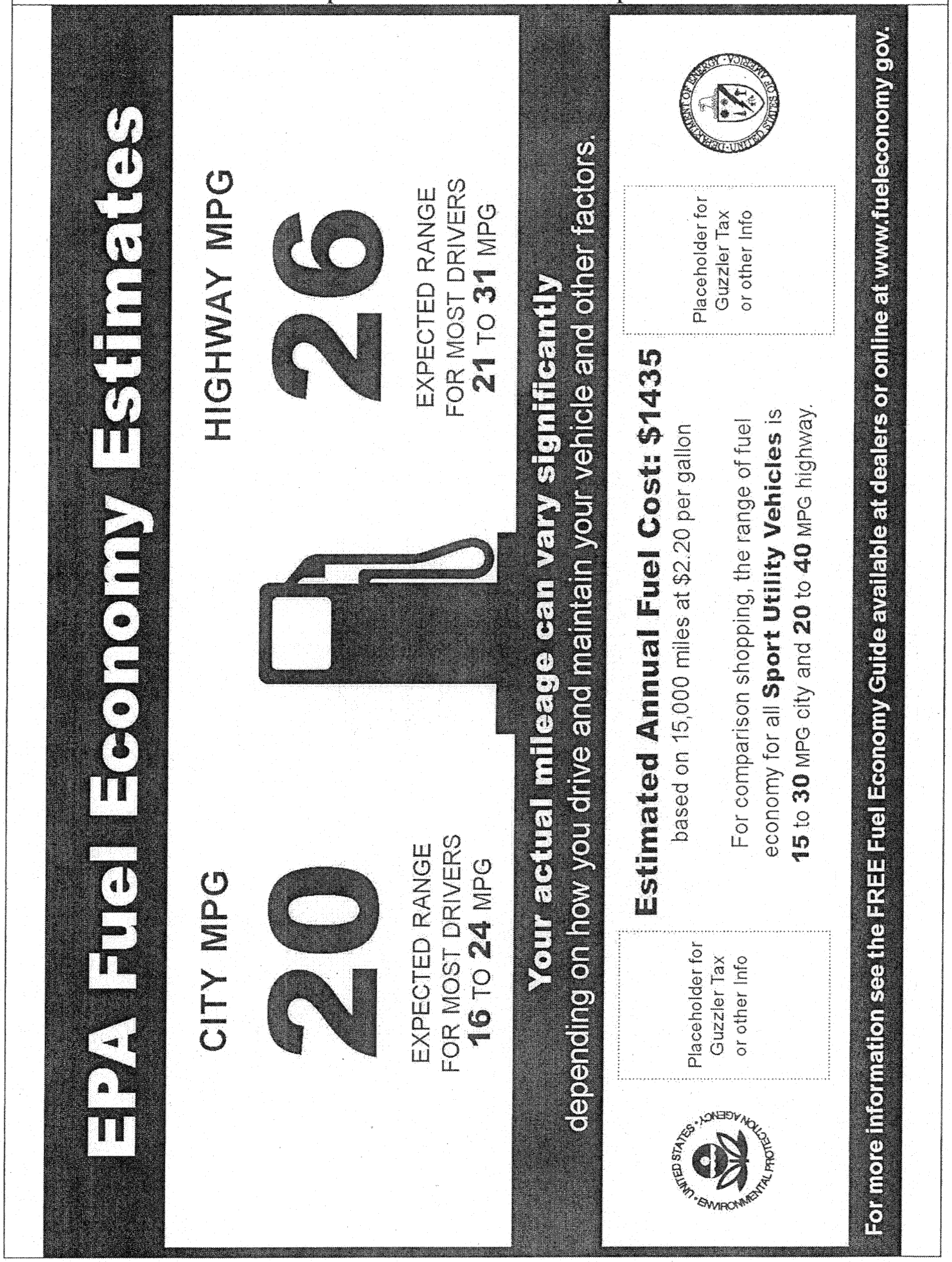
Estimated Annual Fuel Cost: $1435
based on 15,000 miles at $2.20 per gallon

For comparison shopping, the range of fuel economy for all **Sport Utility Vehicles** is **15** to **30** MPG city and **20** to **40** MPG highway.

Placeholder for Guzzler Tax
or Alternative Fuel Information

For more information see the FREE Fuel Economy Guide available at dealers or online at www.fueleconomy gov.

Proposed Revised Label - Sample C



Proposed Revised Label - Sample D

EPA Fuel Economy Estimates

CITY MPG **20** EXPECTED RANGE FOR MOST DRIVERS **16** TO **24** MPG

HIGHWAY MPG **26** EXPECTED RANGE FOR MOST DRIVERS **21** TO **31** MPG

Your actual mileage can vary significantly depending on how you drive and maintain your vehicle and other factors.

Estimated Annual Fuel Cost: $1435
based on 15,000 miles at $2.20 per gallon

Combined fuel economy for this vehicle
23
22 ▼ **40**
Range of combined fuel economy for all **Compacts**

Placeholder for Guzzler Tax
or Alternative Fuel Information

For more information see the FREE Fuel Economy Guide available at dealers or online at www.fueleconomy gov.

BILLING CODE 6560–50–C

A. Estimated Annual Fuel Cost

The EPCA statute requires the label to include the estimated annual fuel cost. EPA's current regulations specify that this information just include the dollar amount, but gives manufacturers the option to also include the per-gallon fuel costs and annual miles driven (i.e., to explain how annual fuel costs were derived). However, most manufacturers do not take that option, so most labels include only the cost number. It was clear from the focus group research that consumers care a lot about this information but currently do not find it adequate. They desired more information about how this cost was determined, including the assumed per-gallon fuel costs and miles-per-year driven. Therefore, we are proposing to require this information on the label in addition to the estimated annual fuel cost. The per-gallon fuel costs and annual miles driven will be that which EPA provides to manufacturers each year via guidance letters.[55] Providing per-gallon fuel costs each year through guidance ensures that the information stays as current as possible while still providing a common basis to allow comparisons of annual fuel cost information across all vehicles. The fuel economy basis on which the estimated annual fuel costs are determined would be the adjusted combined fuel economy (as determined by the proposed weighting of 43 and 57 percent for city and highway, respectively, as discussed in Section II). The label information is proposed to read: ''Estimated Annual Fuel Costs = $XXXX (based on XX,XXX miles at $X.XX per gallon).'' We also seek comment on whether the label text should include the combined fuel economy number as part of the derivation for Estimated Annual Fuel Cost.

B. Fuel Economy of Comparable Vehicles

The EPCA statute requires the label to include the fuel economy of comparable vehicles. This requirement was intended to help car shoppers compare the fuel economy of similar vehicles. EPA's current regulations require that the label include the following statement: ''For comparison shopping, all [vehicles/trucks] classified as [insert category as determined in § 600.315] have been issued mileage ratings ranging from __ to __ mpg city and __ to __ mpg highway.'' Based on the focus group research, it appears that car buyers do not notice this statement since it appears in small print and has lengthy text. Some perceived it as ''fine print,'' and thus less important. There are two ways to address these concerns. The first would shorten the statement to lessen its ''fine print'' look. The sample labels A through C above contain a revised statement as follows: ''For comparison shopping, the range of fuel economy for all [INSERT COMPARABLE CLASS] is __ to __ MPG city and __ to __ MPG highway.''

After completion of the focus groups, we considered another option for presenting the fuel economy of comparable vehicles that might aid consumers by replacing the ''fine print'' text with a graphic representation. This approach would use combined fuel economy as the comparison basis (versus separate city and highway comparisons), to simplify the fuel economy values presented. Combined fuel economy has not previously appeared on the label, but is used as an input to calculate the estimated annual fuel costs. The graphic presentation is similar in concept to DOE's ''EnergyGuide'' label, which has been effectively used for years to illustrate where an electrical appliance falls on an energy-usage comparison scale. Therefore, we believe this visual may be familiar to consumers. A sample label with the graphical presentation of comparable fuel economy appears in the Sample D label above. The graphic would replace the text regarding comparable class fuel economy. We request comment on the merits of this graphical concept for depicting the fuel economy of comparable class vehicles, and whether it would enhance consumers' understanding.

In addition, we welcome comment on whether it would be useful to include additional information, either on the label or a Web site, that would give consumers a better understanding of how a given vehicle's fuel economy compares with the range of fuel economy of other vehicle classes. This may be particularly useful for those consumers shopping for cars across vehicles classes (e.g., SUVs vs. large sedans). However, including this much information on the label may be problematic due to space limitations. The annual Fuel Economy Guide already includes graphical information on the fuel economy range for all comparable classes, so that consumers can identify where a given vehicle fits within these ranges. We welcome input on whether additional information on comparable class fuel economy would be useful, and if so, how best to present that information in a user-friendly way for consumers.

Another change that will help improve the usefulness of this information to consumers is to revise the comparable vehicle class categories themselves, since they have not been updated in twenty years. A discussion of proposed changes to the comparable vehicle classifications is in Section V below.

*C. ''Your mileage will vary * * *'' Range of Expected Fuel Economy Information*

The current label has a statement explaining why actual fuel economy will vary from the EPA estimates, and gives an expected range of fuel economy for that vehicle, determined by ±15 percent of the city and highway estimates. While not statutorily required to be on the label, as discussed in Section I above, EPA included it in the 1984 fuel economy rule since many drivers would not precisely achieve the estimated fuel economy. EPA agrees that it is important to emphasize on the label that the city and highway numbers are estimates and do not necessarily reflect the actual fuel economy a driver can expect at any given time. Providing the range of expected city and highway fuel economy on the label gives the consumer a better understanding of what fuel economy they can expect across a wider spectrum of real-world driving conditions. The current label format does this in a single statement that gives a few reasons why mileage will vary, as well as the range of expected city and highway fuel economy. Unfortunately, this information is often disregarded by car buyers. Similar to the comparable class information, focus group participants viewed this information as ''fine print,'' and as a sort of disclaimer. Once they had taken the time to consider it, the focus groups understood why actual in-use fuel economy may vary from the estimates, and concluded that this type of information was useful.

To improve consumer comprehension, the proposed statement has been reworded and reformatted to be more noticeable. The proposed text for presenting the range of expected fuel economy is ''Your actual mileage can vary significantly depending on how you drive and maintain your vehicle and other factors.'' We propose to place the range of expected fuel economy underneath (or on the side of, depending on the label) the actual city and highway estimates to provide

[55] The estimated annual fuel costs are derived from information provided by DOE's Energy Information Administration. Separate costs are determined for regular and premium gasoline, diesel, CNG, LPG, ethanol (E85), electricity and hydrogen. See EPA's Guidance Letter CCD–05–11 in the Docket for this rulemaking for an example of how EPA transmits this information to manufacturers.

consumers with a clearer understanding of the fuel economy they can expect to achieve on the road. We request comments on the effectiveness of this format in conveying this message, as well as on the specific wording of this statement.

D. Other Format Changes

Based on the focus group research, the current label would benefit from some graphic updating. In the sample labels, we have included a more modern-looking fuel pump. Many focus group participants did not understand that EPA was the source of the fuel economy estimates (many thought that the auto manufacturers or dealers were responsible). Once they did, they thought the association with the government added credibility to the ratings. We believe that more prominent government logos (EPA and DOE), will make it clearer to consumers that these Agencies are responsible for the fuel economy estimates. The web link to the EPA–DOE Fuel Economy Guide Web site, *www.fueleconomy.gov,* has also been added so that interested consumers may obtain additional information related to fuel economy.

V. Other Related Proposals

A. Comparable Class Categories

The EPCA statute requires that the label contain ''the range of fuel economy of comparable automobiles of all manufacturers,'' but does not specify what constitutes ''comparable automobiles.''[56] Therefore, EPA has discretion to interpret how to best define these categories. The comparable class categories in place today are the same as those established in 1976.[57] Cars were split according to size based on their interior volume (with one exception), and trucks were split according to their utility and GVWR into the following groups:

Cars: Two-seater; mini-compact; compact sedan; medium sedan; large sedan; station wagon.

Trucks: Small pickup truck; standard pickup truck; van; special purpose vehicle.

Clearly, the U.S. vehicle fleet looks significantly different that it did nearly 30 years ago. Since the time these classes were created, there have been many vehicle design changes that are not reflected in the above class designations. For example, the sport utility vehicle (SUV)—one of the most popular vehicle types today—does not even have its own class designation. The same is true for minivans. Another trend in vehicle design is vehicles that defy classification in design and utility. Known commonly as ''crossover'' vehicles, they do not fit neatly into any of EPA's existing classifications. All of the above shortcomings have limited the usefulness of the comparable vehicle fuel economy information on the label. Having more clearly-defined classes that reflect the current market will improve the usefulness of this information on the label. There are several challenges with assigning comparable class categories: we need to accommodate a dynamic market of changing vehicle designs; the categories should be as objective as possible and not rely upon subjective qualities that are difficult to define (such as ''luxury'' or ''sporty''); and there should be enough classes to allow consumers to differentiate, but not so many as to cause confusion.

The following discussion explains the specific issues associated with the existing comparable classes, and how we propose to address them. It should be noted that the comparable vehicle categories are used only for fuel economy labeling, and in no way determine if a vehicle is a ''passenger vehicle'' or ''nonpassenger vehicle'' for the purpose of CAFE compliance. That determination is made by DOT–NHTSA.

1. Create New Classes for SUVs and Minivans

The ''Special Purpose Vehicle'' class was created to contain vehicles that had off-road capability and other features that weren't covered by the pickup truck or van category. Since it was first created, the ''special purpose vehicle'' class has come to include two widely-popular, high-selling, but very different, vehicle types—SUVs and minivans. EPA and DOE have recognized the evolution of these two classes informally by including them in the annual Fuel Economy Guide as subdivisions of the ''special purpose'' vehicle class. The determination of these classes was left to individual manufacturer's discretion.[58] However, these subdivisions are not used on the fuel economy label because EPA's current regulations have clear instructions that manufacturers must use the comparable classes as defined by those regulations. This means a consumer looking at the label on an SUV will see the range of fuel economy for all ''special purpose vehicles.'' We believe it is appropriate to update the comparable class regulations by creating separate classes for SUVs and minivans. We are also proposing to revise the ''special purpose vehicle'' class to capture vehicles that do not fit into any other category.

Minivan: Minivans have not neatly fit into EPA's ''Van'' class due to the way vans are defined in the regulations: ''* * * any light truck having an integral enclosure fully enclosing the driver compartment and load carrying device, and having no body sections protruding more than 30 inches ahead of the leading edge of the windshield.''[59] Minivans generally do not meet the last criterion, thus they have been placed in the ''Special Purpose Vehicle'' class. In general, minivans are smaller than full-size vans, and have rear seats that are designed to be easily removable or stowable. Taking those distinguishing characteristics into account, we are proposing that minivans be defined as vehicles which are designed primarily to carry no more than eight passengers having an integral enclosure fully enclosing the driver, passenger, and load-carrying compartments, with a total interior volume at or below 180 cubic feet and rear seats readily removed or folded to floor level to facilitate cargo carrying.

SUV: Sport Utility Vehicles likewise do not fit into the ''van'' class because of the 30 inch protuberance criterion. The class of vehicles which may be closest in design to the SUV is a station wagon, defined in the regulations as ''* * * a passenger automobile with an extended roof line to increase cargo or passenger capacity, cargo compartment open to the passenger compartment, a tailgate, and one or more rear seats readily removed or folded to facilitate cargo carrying.'' The most significant difference is that SUVs are ''nonpassenger automobiles.''[60] The proposed definition of SUVs is a nonpassenger automobile with an extended roof line to increase cargo or passenger capacity, cargo compartment open to the passenger compartment, and

[56] See 49 U.S.C. 32908.

[57] See 41 FR 49752, November 19, 1976.

[58] EPA Guidance Letter VPCD–99–08, June 23, 1999, provides guidance to manufacturers on using SUV and minivan designations.

[59] See 40 CFR 600.002–93.

[60] ''Nonpassenger automobile'' is a term used in EPCA and by EPA's current comparable class definitions. It includes vehicles which do not fall under the EPCA definition of passenger automobiles and that are ''capable of off-highway operation that the Secretary decides by regulation (A) has a significant feature (except 4-wheel drive) designed for off-highway operation; and (B) is a 4-wheel drive automobile or is rated at more than 6,000 pounds gross vehicle weight.'' The DOT regulations that further define the distinguishing features of these vehicles are found at 49 CFR 523.5(a). It should be noted that the methods of classification of ''nonpassenger automobiles'' or ''light trucks'' for the purpose of creating comparable vehicle classes for fuel economy labeling are not related to those used to administer the federal emission compliance requirements.

one or more rear seats readily removed or folded to facilitate cargo carrying.

2. Redefine ''Small Pickup Truck'' Class

Pickups are currently divided into ''small'' and ''standard'' categories, with ''small'' pickups distinguished from ''standard pickup truck'' by GVWR (greater than 4500 lbs is ''standard''). For the past several years, no vehicles certified have been classified as ''small pickup trucks.'' To provide better comparable classes for pickup trucks, we are proposing to increase the weight limit distinguishing small and standard standard pickups to 6000 pounds GVWR. Pickups less than 6000 pounds GVWR would be considered ''small'' and those at or above would be considered ''standard.''

3. ''Crossover'' Vehicles

These are vehicles that may not fit neatly into one classification. Examples are SUVs or station wagons that may have characteristics of both classes. Our policy in that regard has been to work with the manufacturer to determine which of the prescribed comparable classes the vehicle is most appropriate. We are concerned that by defining specific parameters for crossover classes, we will be building obsolescence into our regulation. Our preference is to retain our current policy in which manufacturers propose to EPA which of the existing comparable classes their ''crossover'' vehicles best fit, with the caveat that if they advertise within-class fuel economy it must be with the selected class. We request comments on whether we should continue this policy for crossover vehicles or whether we should create a new class.

EPA requests general comments on the proposed modifications to comparable classes, and also welcomes comments on other possible ways to classify vehicles for comparison purposes. Comments should address how the classifications will be useful for the consumer who is comparison shopping.

B. Electronic Distribution of Dealer-Supplied Fuel Economy Booklet

A statutory provision in EPCA requires car dealers to provide to consumers a copy of the annual fuel economy booklet (Fuel Economy Guide).[61] Historically, DOE has printed and sent copies of the Guide to dealers at government expense, although this is not an EPCA requirement. At the time that these EPA regulations were written, the internet was non-existent, and personal computers were not readily available. Today's proposal modifies the ways in which the Fuel Economy Guide can be distributed by giving dealers the option to provide it electronically. There are a number of ways that this can happen. Dealers can present the Guide on an on-site computer that customers can view, or they can provide them with a diskette or CD containing the Guide, or they can print paper copies directly from the government Web site that has the Guide (*www.fueleconomy.gov*). These methods are superior to the current hard-copy method for a number of reasons. First, it spares the government the large expense of printing many thousands of copies and mailing them to dealers. Second, it allows consumers to have more up-to-date information. The deadline for manufacturers to provide fuel economy data for inclusion in the annual printed Guide is generally October of the calendar year prior to the model year (*e.g.* the deadline for the 2005 Guide was October, 2004). In reality, some manufacturers are not able to meet this deadline, due to late introduction of models or other timing issues, so those vehicles will not appear in the printed Guide, which is printed only once per year. However, the electronic version on the Guide posted on the internet is updated regularly to include new models. Thus consumers can get more accurate information from the internet than from the printed Guide. This method has been used on a trial basis for the 2004 and 2005 model years with much success, and EPA is today proposing to codify the electronic dissemination of the Guide. This change would be effective with the 2008 model year. EPA has consulted with DOE on this topic and DOE concurs it would be an effective means of providing information to car buyers.

C. Testing Provisions

1. Testing Requirements for Vehicles Currently Exempt From Certain Emission Tests

Certain vehicles are currently exempt from some of the emission tests that we are including in the 5-cycle method. In order to use the 5-cycle method for these vehicles, additional fuel economy testing provisions are necessary.

a. *Alternative-Fueled Vehicles.* There are two types of alternative-fueled vehicles: (1) Flexible-fuel vehicles (FFVs; also known as dual-fueled or bi-fueled vehicles) that can operate on gasoline or diesel and/or some alternative fuel (i.e., ethanol, methanol, etc.), and (2) dedicated alternative fueled vehicles that operate only on some alternative fuel.

FFVs are subject to the SFTP and Cold CO emission standards and test requirements, but only when operating on gasoline. Therefore, we propose that the fuel economy label values of FFVs when operating on gasoline be determined using the same mpg-based or 5-cycle approaches applicable to dedicated gasoline or diesel fueled vehicles and, thus, additional testing for US06, SC03 and Cold FTP while operating on alternative fuel would not be required. In addition, although the fuel economy values when operating on an alternative fuel are not required to be reported on the label, they are included in the annual Fuel Economy Guide. Accordingly, we propose that the city and highway fuel economy label values must reflect the same adjustment factors relative to FTP and HFET fuel economy, respectively, developed using the applicable mpg-based or 5-cycle approach for gasoline. In other words, if the city FTP fuel economy is 24 mpg for operation on gasoline and the calculated label value using the mpg-based or 5-cycle approach is 20 mpg, then the city label value for operation on alternative fuel would be the FTP fuel economy measured when the vehicle is operated on alternative fuel multiplied by the ratio of 20 over 24.

Dedicated alternative-fueled vehicles are exempt from the SFTP and Cold CO emission standards according to 40 CFR 86.1810(i)(4) and 40 CFR 86.1811–04(g). As a result, these vehicles will not have the SFTP and Cold CO fuel economy data needed to determine 5-cycle fuel economy values. We propose that manufacturers of dedicated alternative-fueled vehicles be able to use the mpg-based approach in 2011 and beyond, as well during 2008–2010 in order to avoid conducting additional tests for fuel economy reasons only. Since the mpg-based approach uses fuel economy values measured in terms of miles per gallon of gasoline or diesel fuel, the fuel economy of dedicated alternative fuel vehicles must be expressed in terms of its gasoline equivalent prior to using the mpg-based formula. Currently, all dedicated alternative-fueled vehicle fuel economy values are expressed in terms of gasoline equivalent. In this case, the fuel economy values for a dedicated alternative vehicle expressed in gasoline equivalents can be directly determined using the mpg-based approach. However, if the fuel economy values for a dedicated alternative vehicle is expressed in alternative fuel equivalents, then, the fuel economy in terms of miles per gallon of the alternative fuel would be adjusted by

[61] See 49 U.S.C. 32908(c)(3).

the ratio of the mpg-based value to the FTP or HFET value, as applicable, just as described above for FFVs.

We are also proposing that manufacturers of dedicated alternative-fueled vehicles may optionally use the 5-cycle approach at their discretion. In this case, all the fuel economy values used in the formulae would be expressed in terms of operation on the alternative fuel. If this option is used, the manufacturer would be required to conduct all applicable 5-cycle test procedures and use both the 5-cycle city and highway calculation methods to determine fuel economy label values.

b. *Diesel Vehicles.* Diesel fuel vehicles are not currently subject to Cold CO emission standards and, thus, do not have a 20 degree Fahrenheit (F) FTP fuel economy result to use in the 5-cycle based approach. Therefore, beginning with the 2008 model year for certification diesel vehicles, we are proposing that a 20 degree F FTP be performed for the purpose of collecting fuel economy data. Accordingly, for a 20 degree FTP only, the manufacturer must use a #1–D (winter-grade) diesel fuel as specified in ASTM D975–04c ''Standard Specification for Diesel Fuel Oils'' [62] and that complies with 40 CFR Part 80,[63] where the level of kerosene added shall not exceed 20 percent. Alternatively, manufacturers may use, with EPA approval, a manufacturer-specified diesel fuel in lieu of conventional diesel fuel under alternate test procedure provisions in 40 CFR § 86.113–94, where the level of kerosene added shall not exceed 20 percent. We request comment on these proposed winter-grade diesel fuel specifications.

We expect that the impact of extending the cold FTP test requirement to light-duty diesel vehicles will be very small, given that there are so few diesel vehicles currently certified. In model year 2006, for example, only five diesel light-duty vehicles were certified for sale in the U.S. Further discussion of how we evaluated this requirement in our estimated cost impacts is contained in Section VI.

2. Modifications to Existing Test Procedures

To ensure that the 5-cycle method is reflective of real-world operating conditions, there are a few minor procedural changes that need to be made to certain existing emission tests procedures. First, we are proposing minor procedural changes in the US06 tests, as described below. Second, we are seeking comment on the issue of requiring manufacturers to run the heater and/or defroster during the cold FTP test. Third, we are proposing to codify the existing practice, which has been done through special test procedure provisions, of requiring four-bag FTP measurements for gasoline-electric hybrid vehicles.

a. *Revisions to US06 Bag Measurements*. The US06 drive cycle contains elements of both city and highway driving, yet the exhaust sample is collected in only one sample, or ''bag.'' In order to more accurately reflect the city portion of the drive cycle into the city fuel economy estimate, and the highway portion of the cycle into the highway fuel economy estimate, we are proposing a revised test protocol that would require collecting the exhaust sample into two bags. This has the benefit of more accurately capturing how a vehicle's fuel economy would be impacted over the various types of driving reflected in the cycle, but with very minimal cost impact.

In assessing the split of US06 into two bags, we undertook a test program to determine that it was technically feasible to do so, and that it would not have a significant impact on emission results for compliance purposes. To do this, we evaluated the effects of conducting a US06 split-phase emissions test versus the current US06 single-phase emission test on ten vehicles at EPA's National Vehicle and Fuel Emissions Laboratory (NVFEL) in Ann Arbor. Based on this evaluation, the US06 split-phase sampling methodology was shown to be feasible for fuel economy purposes and required only initial software reprogramming for the revised sampling periods and minimal hardware changes to enable the emissions analyzers to perform US06 split-phase emission testing. In addition, creating a US06 split-phase sampling period did not result in any significant difference in criteria pollutant emissions results. The full report on this US06 split phase evaluation program is available in the docket.[64] Our proposed changes to the US06 test procedure to incorporate the split-phase sampling are found in the proposed regulations at 40 CFR 86.159–08. We have also accounted for any additional costs to manufacturers in making the necessary changes to their testing equipment and data collection software in our cost analysis discussed in Section VI. We estimate these costs to be minimal.

b. *Heater/Defroster Usage During the Cold FTP*. The current Cold FTP conducted at 20 degrees F includes the option to use the heater and/or defroster.[65] While we understand that some manufacturers today are using the heater and/or the defroster during the Cold FTP, it is not mandatory and therefore subject to inconsistent usage across manufacturers and vehicle lines. We expect that, in the real-world, it would be highly unusual for drivers not to use the heater/defroster when the temperature is cold, including at 20 degrees F experienced during the Cold FTP. In order to more closely reflect real world operation, and to ensure a level playing field across manufacturers and vehicle lines when performing this test, we are seeking comment on requiring that manufacturers operate the heater and/or defroster during the Cold FTP.

To better understand the potential impact of heater and/or defroster usage on fuel economy at cold temperatures, we attempted to determine the fuel economy impacts of heater and defroster usage at 20 degrees F. In order to quantify the impact of heater and/or defroster usage on fuel economy, we conducted testing through the Southwest Research Institute (SwRI). This program measured the impacts of heater and defroster operation on fuel economy for three vehicles during a 20 degree Cold FTP. We compared the fuel economy results with heater/defroster operational with the results of the heater/defroster non-operational on each vehicle. The Cold FTP fuel economy with the heater/defroster on was significantly lower than that with the heater/defroster off, ranging from −6.0 percent (~1 mile per gallon lower on a non-hybrid vehicle) to −17.9 percent (~8 miles per gallon lower on a hybrid vehicle). We did not observe a significant impact on CO or other measured emissions as a result of the use of the heater/defroster on the Cold FTP. The results of this test program indicated that different vehicles were impacted more than others, suggesting that it would be important to capture the impact on fuel economy of heater

[62] ASTM International Specification D975–04C ''Standard Specification for Diesel Oil Fuels'' (November 1, 2005) describes the seven grades of diesel fuel oils suitable for various types of diesel engines. This specification is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of subcommittee D02.E0 on Burner, Diesel, Non-Aviation Gas Turbine, and Marine Fuels.

[63] 40 CFR Part 80—Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engines and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements: Final Rule and Regulation of Fuels and Fuel Additives: Fuel Quality Regulations for Highway Diesel Fuel Sold in 1993 and Later Calendar Years.

[64] Mitcham, A. & Fernandez, A., ''Feasibility of Revising the US06 Test Cycle into a Split Phase Sampling Test Procedure'' U.S. EPA, Office of Transportation & Air Quality, 2005.

[65] See 40 CFR 86.230–94(f).

and defroster use during cold conditions. The full report of this test program is contained in the docket.[66]

Since heater and defroster operation can have an additional impact on fuel economy beyond cold temperature operation, and since these accessories are used in the real-world at cold temperatures including 20 degrees F, we are seeking comment on how this condition should be captured in the fuel economy label estimates. Specifically, we are seeking comment on requiring the use of heater/defroster during the Cold FTP, rather than to continue to allow it as an option only.

There are many approaches for how the heater and defroster usage could be incorporated into the Cold FTP test procedures, including specifying appropriate fan speed settings, timing of turning on the heater/defroster during the test, and accounting for various vehicle climate control designs. One concept that we have considered is as follows. This concept would involve starting the test with the airflow directed to the windshield for optimal defrosting, the airflow source set to outside air (not recirculation), and the air temperature set to high. Approximately two minutes into the test, the fan speed could be turned to maximum and left there for the duration of the test. This would mimic typical driver behavior in that we expect many drivers typically would not turn the fan to maximum until the engine is producing some level of heat, which most vehicles will do within a couple minutes of driving. Automatic climate control systems could be set to achieve an inside air temperature of 72 degrees F, and the fan speed, if independently selectable, would be operated as described above. Vehicles with multiple zones (either driver and passenger, or front and rear) could be required to operate the controls for all zones as described above. We anticipate that some climate control systems might not be compatible with these instructions, and to address these we could allow a manufacturer to request the use of special test procedures, subject to EPA approval. We seek comment on this possible concept for how heater/defroster usage could be specified in the cold FTP procedure, as well as comments on alternative approaches.

c. *Gasoline-Electric Hybrid Vehicle Testing Provisions.* The FTP consists of two parts, referred to in the regulations as the ''cold start'' test and the ''hot start'' test. Each of these parts is divided into two periods, or ''phases'': a ''transient'' phase and a ''stabilized'' phase. Because the stabilized phase of the hot start test is assumed to be identical to the stabilized phase of the cold start test for conventional vehicles, only the cold start stabilized phase is typically run. These ''phases'' are often called ''bags,'' terminology that results from the sample bags in which the exhaust samples are collected. The phases are run in the following order: cold start transient (Bag 1), cold start stabilized (Bag 2), and hot start transient (Bag 3). The virtual hot start stabilized phase (Bag 4) is accounted for in the emission and fuel economy results mathematically by including Bag 2 twice in the calculation.

Because gasoline-electric hybrid vehicles have two energy sources that can be combined in many ways, EPA and manufacturers recognized that the assumption regarding the equivalence of the stabilized phases of the hot and cold start tests may not be valid for hybrid vehicles. Consequently, we have been requiring vehicles with gasoline-electric hybrid systems to perform the complete set of four phases of the FTP, under existing provisions in the regulations that allow special test procedures. However, rather than continue to do this under the special test procedures, we believe it is appropriate to codify this practice in the testing regulations. Additionally, the 5-cycle formula for gasoline-electric hybrid vehicles requires the four phases of the FTP as inputs for these vehicles. Therefore, we are proposing to require that gasoline-electric hybrid vehicles conduct all four phases of the FTP for both emissions and fuel economy testing. We propose that four bags be required for all tests using the FTP, including the cold temperature FTP, for those vehicles defined as hybrid electric vehicles. We request comment on this proposal, and on whether use of the phrase ''hybrid electric vehicle'' is sufficient to describe and identify vehicles for which the four-bag FTP would be required.

D. Voluntary Fuel Economy Labeling for Vehicles Exceeding 8500 Pounds GVWR

The EPCA statute explicitly excludes automobiles weighing over 8500 pounds GVWR from fuel economy labeling requirements.[67] However, over the past several years there has been a growing market for these heavier vehicles, which fall into a number of utility classes, such as SUVs, pickups, and vans (including heavier versions of such models as Hummer, Ford Excursion, Chevy Silverado and Dodge Ram). We believe that consumers would be interested in using fuel economy estimates for these vehicles when comparison shopping. The rising fuel prices of recent times certainly have increased consumer awareness of the costs associated with owning a vehicle.

We encourage auto manufacturers of vehicles weighing over 8,500 pounds to voluntarily provide fuel economy information for these vehicles, and we request comments on the value of such a voluntary program and how it could be implemented.

E. Consideration of Fuel Consumption vs. Fuel Economy as a Metric

EPCA defines fuel economy as ''* * * the average number of miles traveled by an automobile for each gallon of gasoline (or equivalent amount of other fuel) used, as determined by the Administrator under section 32904(c) of this title.'' Thus, EPA's fuel economy information program has always expressed fuel efficiency in miles per gallon. It is a metric that Americans have come to know and understand.

Notwithstanding this requirement, a few auto manufacturers have suggested that it may be more meaningful to express fuel efficiency in terms of consumption (e.g., gallons per 100 miles) rather than in terms of economy (miles per gallon). A fuel consumption metric is currently used in Canada and in Europe. Fuel consumption numbers speak directly to the amount of fuel used, to which a consumer can relate in terms of cost when filling up.

A fuel consumption metric also directly reflects the impacts of fuel economy variations in very fuel efficient vehicles. Consumers that are disappointed that their highly-rated vehicle may have fuel economy that is 5 mpg lower than expected may have fewer concerns if they saw that a 5 mpg difference for that vehicle really amounts to very little difference in actual fuel consumption (and, therefore, cost at the pump) compared with a 5 mpg difference in a vehicle with a lower mpg rating. For example, a very fuel-efficient vehicle at 60 miles per gallon will burn 1.67 gallons per 100 miles, whereas a vehicle achieving 5 mpg less, at 55 miles per gallon, will burn 1.82 gallons per 100 miles, an increase in consumption of only 0.15 gallons every 100 miles. On the other hand, a less fuel-efficient vehicle at 25 miles per gallon will burn 4 gallons every 100 miles, whereas a vehicle achieving 5 mpg less, at 20 mpg, will burn 5 gallons per 100 miles, an increase of consumption of 1 gallon every 100 miles.

[66] Fernandez, A. & Mitcham, A., ''Fuel Economy Impacts of Interior Heater/Defroster Usage on Conventional and Hybrid Gasoline powered Vehicles'', U.S. EPA, Office of Transportation & Air Quality, 2005.

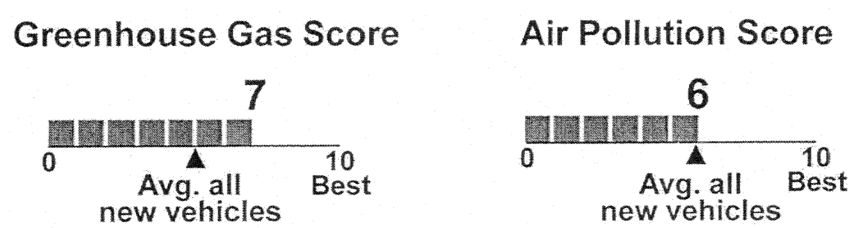
[67] See 49 U.S.C. 32908(a)(1).

The ''estimated annual fuel cost'' information on the label is actually based on a fuel consumption metric: the cost of X number of gallons consumed over 15,000 miles. Thus we believe the inclusion of the estimated annual fuel cost on the label is already a valuable metric for consumers, which relates directly to fuel consumption. Given that we are obligated statutorily to report fuel economy in terms of miles per gallon, we cannot change the metric on the fuel economy label. Moreover, we believe it would be a long-term educational process for consumers to begin to relate to the fuel consumption metric of gallons per mile. There may be an option to also provide additional fuel consumption information in the annual Fuel Economy Guide.

Our experience is that consumers are very comfortable with the miles-per-gallon estimates given on the label. We are concerned that consumers would not understand a different fuel efficiency metric and, without a long-term, comprehensive public awareness campaign, it would be very confusing to the public. We also understand that some manufacturers plan to pursue some public outreach and education in regard to using the fuel consumption metric. At this time we view presenting fuel consumption information on the vehicle label as a future, long-term effort. We request comments on the gallons-per-mile fuel consumption metric, and how it could be best used and presented publicly, including comments on whether it should be included in the Fuel Economy Guide.

F. Environmental Information on Fuel Economy Labels

For a number of years, EPA has presented fuel economy and emissions information about vehicles in the form of a 0–10 rating system on the Green Vehicle Guide Web site (*www.epa.gov/greenvehicles*). This information has been well-received (over 50 million ''hits'' to date) and apparently well-understood by consumers, judging from feedback about this site and third-party market research comparing interest in and comprehension of such information. Some have suggested that adding similar information to the fuel economy label would provide the consumer with a more complete picture of the overall environmental performance of that vehicle and provide a more graphical way to make vehicle-to-vehicle comparisons. It would also complete the information loop by allowing consumers to identify the vehicles on the dealer lot that match those on the Web site with the environmental criteria they are seeking. This would be useful because many vehicle models are available in multiple versions that receive different Air Pollution and Greenhouse Gas scores, and it is often difficult for the consumer to identify these variations when buying a vehicle. When conducting the focus group research discussed in Section IV above, participants were shown examples of fuel economy labels that included environmental ratings (for Air Pollution and Greenhouse Gas) and asked for their impressions. Although there was some confusion due to the newness of the information, there was general agreement that it could be useful in the future. At this time, we are not proposing to require environmental ratings on fuel economy labels. However, we are considering implementing a voluntary environmental labeling program and request comments on this subject. An example of how the environmental scores could look is below:



VI. Projected Impacts of the Proposed Requirements

A. Information and Reporting Burden

The information and reporting burden associated with this rule occurs within the context of EPA's motor vehicle certification program. Current regulations require manufacturers to submit fuel economy information to EPA in conjunction with this program. Manufacturers must submit an application for emission certification prior to production. The application describes the major aspects of the proposed product line, technical details of the emission control systems, and the results of tests to indicate compliance with the emissions limitations. The application and supporting test results are reviewed and, if appropriate, a certificate of conformity is issued.

Some of the product information used to verify emission compliance is also used, in conjunction with additional tests and projected sales, to establish fuel economy ratings. Currently, the pertinent emissions tests for fuel economy purposes are the FTP and the HFET. The vehicles that are tested for emissions purposes and for fuel economy purposes are overlapping but not identical classes: because fuel economy ratings are based on the sales-weighted fuel economy ratings, different vehicles may sometimes be tested to determine an appropriate average so that its ratings accurately reflect the entire fleet.

The fuel economy ratings used to comply with the labeling requirements for new vehicles (40 CFR Part 600, Subpart D) are listed by model type. These ratings are computed as the sales weighted harmonic mean of the ''base levels'' within each model type, which in turn are calculated as the sales weighted harmonic mean of the configurations/sub-configurations within each base level. The criteria for determining a configuration, sub-configuration, and base level are set forth in the regulations. This procedure is intended to ensure that the most representative fuel economy values are posted on new vehicles. New vehicles are sold and therefore labeled and rated by the manufacturer's model designation rather than the categories that correspond to the test groups and fuel economy vehicles that are used for generating fuel economy data.

No changes are contemplated by this rulemaking in the methodology for the sales-weighted calculations based on configurations of vehicles summarized in the preceding paragraph. That methodology would simply be extended to the additional test cycles that would be included in calculating the label values under the five-cycle proposal. For example, US06, SC03, and Cold FTP data would be grouped and sales weighted in the same way that FTP and HFET data are now. The system for reporting and calculating the resultant fuel economy label values would be the same as that currently in use. Likewise, the requirement for manufacturers to publish the fuel economy information on the labels of new vehicles would be the same as the current requirements. Consequently, the purely reporting burdens are those associated with updating information formats and databases to comply with the new fuel economy computations.

To the extent that information costs are taken to include new capital costs associated with gathering the information under the rule, as is the case for purposes of the Paperwork Reduction Act, these costs must also be considered. These information burdens corresponding to the various parts of the proposal are discussed below. Additional details are given in the Draft Technical Support Document.

1. Incorporation of Other Driving Conditions Into the City and Highway Fuel Economy Label Calculations

The proposal would require calculation of fuel economy values based on the five-cycle formulae beginning with model year 2011 for some engine families. As discussed in detail elsewhere in this preamble, for model years 2008 through 2010, manufacturers may use the mpg-based calculation for the five-cycle fuel economy values or they may conduct voluntary testing. For model year 2011 and after, if the five-cycle city and highway fuel economy values for an emission data vehicle group are within 4 percent and 5 percent of the mpg-based regression line, respectively, then all the vehicle configurations represented by the emission data vehicle (e.g., all vehicles within the vehicle test group) would use the mpg-based approach. Vehicles within a test group falling outside the 5 percent tolerance band for highway fuel economy values would be required to conduct US06 tests; those falling outside the city fuel economy band would be required to conduct SC03, US06, and Cold FTP tests. In addition, we expect that some of these vehicles falling outside the tolerance level may be eligible to estimate fuel economy for a given test through the application of analytically derived fuel economy (ADFE) values. Some data is currently available for vehicles that have conducted all five tests; based on this data, EPA has estimated the number of vehicles for which additional testing would be required because they fall outside the 4 and 5 percent bands, as discussed below.

We have prepared a range of burden estimates for this analysis and the discussion will mention minimum and maximum burden scenarios. These low and high estimates are intended to provide EPA's estimate of the outer boundaries of the likely testing and information costs, and EPA solicits comments on the basis of these estimates, including the number of additional tests and costs for performing those tests and additional tests that will be likely under the proposal.

a. *Testing Burden for 2008 through 2010 Model Years.* EPA estimates no additional tests during MY 2008 through MY 2010 based on the fact that the mpg-based fuel economy estimates will be available for all manufacturers. No additional testing would be required because manufacturers simply apply the mpg-based scale of adjustments to the same FTP and HFET test results that they otherwise would conduct for the fuel economy labeling program. While manufacturers have the option of conducting and reporting full five-cycle test results, such tests are not required, and most manufacturers have indicated it is unlikely they will do so. This cost analysis is limited to burdens that are mandated by the proposal.

b. *Testing Burden for 2011 and Later Model Years.* Based on MY 2004 data, 1250 fuel economy vehicles were tested with the FTP and highway fuel economy tests. (The figure is approximate because the city FTP test may be used and recorded primarily as a fuel economy test, an emissions test, or both.) Data show that 330 Supplemental FTP (US06 and SC03) tests were conducted and 220 Cold CO tests. Consequently, if all fuel economy vehicles were required to conduct full five-cycle tests, approximately 920 additional Supplemental FTP tests and 1,030 Cold CO tests would be required. EPA estimates, based on an analysis of our 423 vehicle dataset, that 8 percent of the test groups will fall outside a band of ⟨≡∼ 4 percent of the regression for the city test and 23 percent outside a band of ⟨≡∼ 5 percent of the highway regression. Taking the 2004 numbers above as a baseline, 92 percent of the additional SC03 and Cold CO tests otherwise required would be avoided for city fuel economy; 77 percent of the additional USO6 tests would be avoided. Thus, for example, the initial estimate of increased testing burden for SC03 would be 8 percent of the difference between 1250 and 330.

The estimated cost impact of requiring cold FTP testing for light-duty diesel vehicles (as discussed in Section V.C.1.b) is small. As an example, in model year 2006, only five light-duty diesel vehicles were certified for sale in the U.S. A total of eight city/highway tests were performed on those vehicles to determine fuel economy estimates. As applied to the 2006 model year, our proposal would require that an additional eight cold FTP tests be performed in addition to the city/highway tests. Our cost analysis has accounted for additional cold FTP testing across the entire automotive industry, including diesel vehicles.

Finally, the high and low estimates under these assumptions are generated by differing estimates of the effect of another feature that will be available for MY 2011 and after: an expanded use of analytically derived fuel economy (ADFE) as an alternative to conducting vehicle tests. Current guidance (CCD–04–06) limits ADFE to 20 percent of the values that would otherwise be derived from tests; the 1250 test baseline already excludes such analytically derived results. Expanded ADFE guidance will be prepared in time for MY 2011 to allow for derivation of fuel economy values for some of the additional test cycles that otherwise would be required as described above. The low and high burden estimates assumes that 20 percent and 0 percent of the additional tests would thereby be avoided, respectively.

c. *Cost Analysis.* The information and paperwork burden, consistent with the Paperwork Reduction Act, is considered to consist of labor hours and costs, operations and maintenance (O&M) costs, and costs associated with gathering, reporting, and storing the information newly mandated by this rule. These costs include the costs associated with gathering the information that has to be reported to EPA, such as test results, and the capital costs needed to construct and maintain facilities to conduct the tests. It does not include other burdens associated with compliance with the fuel economy requirements of federal law and regulations. The analysis below follows this conceptualization and considers capital, labor and O&M associated with testing, and one-time startup costs primarily for information technology and paperwork, in turn.

i. *Capital Costs.* For capital costs, the largest component of the information burden estimate, we have used an FTP facility cost of $4 million per facility able to perform 750 US06 tests per year, a cost of $9 million for an environmental test facility able to conduct 300 to 428 SC03 tests per year, and $10 million for an environmental facility able to conduct 300 to 428 Cold

FTP tests per year. The new tests were deemed to require these facilities in proportion to the number of tests needed, and the costs were then annualized over ten years with a seven percent depreciation. This is likely a very conservative assumption since it does not attempt to account for the current excess capacity that exists in manufacturers' current test facilities. We assume that there is no excess capacity in our analysis. Furthermore, consistent with other information burden analyses for the emissions and fuel economy programs, we have considered these as ongoing rather than startup costs (i.e., as the facilities depreciate they are continually being replaced). Annualized and depreciated over ten years at seven percent, these capital costs per year under the above analysis are $0 for each of model years 2008, 2009 and 2010, and range from $524,000 to $866,000 per year for model years 2011 and after.

ii. *Labor and Operations and Maintenance (O&M) Costs.* For the labor and O&M costs of conducting tests, costs and hours for the differing categories are derived from prior Information Collection Requests submitted for EPA's light duty certification program. Those estimates are based on the number of tests and the hours of labor used at EPA's testing facility combined with industry data supplied in response to questionnaires; these have been somewhat adjusted to reflect current information. These costs are estimated to range from $1,860 to $2,441 per test. These costs per test are applied to the numbers of tests estimated under the minimum and maximum scenarios above, and amount to $606,000 to $757,000 and 8,800 to 11,000 hours per year for MY 2011 and after.

iii. *Startup Costs.* The incremental startup costs and hours, in contrast, are considered to be one-time costs beginning with model year 2008. These startup burdens are primarily information technology and paperwork costs involving familiarization with the new data reporting requirements and reformatting management information systems to carry out and report the necessary data and calculations. All these burdens are add-ons to well established reporting requirements: manufacturers already submit data to EPA on all five test cycles, have the option of applying analytically derived fuel economy numbers, and report vehicle class determinations and supporting information. These costs also include one-time costs for implementing US06 split phase sampling, as described in Section V of this preamble, which entails software and instrumentation reprogramming and a limited number of US06 validation tests. EPA estimates all startup costs, depreciated at 7 percent and annualized over ten years, as $526,100 to $614,900 and 3,800 to 4,700 hours.

2. Revised Label Format and New Information Included

The reporting and recordkeeping requirements associated with the fuel economy label are set forth in 40 CFR sections 600.312 to 600.314. These sections require that manufacturers supply EPA with the label values and the data used to derive them, and provide schedules for the updating of this information. Under the proposed rule, these values will be recalculated and new data will be submitted. The costs for these efforts are very minimal and are addressed above. There will be a one-time set-up charge associated with the new label format based on the effort required for each manufacturer to apply the new EPA templates to the labels they must print. This cost item has been included in the paperwork startup costs portion of the cost analysis.

3. Reporting of Fuel Economy Data for SC03, US06 and Cold CO Tests

Current regulations do not require manufacturers to measure and report fuel economy values for vehicles undergoing the SC03, US06, and Cold FTP. The proposed rule would require fuel economy values to be reported, along with the existing reporting requirements, under these tests whenever they are conducted. Providing this additional information is not expected to involve any additional capital or operating costs for manufacturers because the fuel economy data can be obtained without any modification of these test procedures and without the need for any new testing equipment. The only burden associated with this new requirement would be an initial startup paperwork burden of modifying information and reporting systems to report and store the fuel economy results for these tests. These burdens are included within the paperwork and information burden estimate in Section VI.A.1 above.

4. Impact on Confirmatory Testing

Confirmatory testing is additional testing performed either by EPA or by the manufacturer to confirm the results of the initial vehicle tests. EPA regulations describe confirmatory testing of fuel economy vehicles in 40 CFR 600.008–01 and of emission certification vehicles in 40 CFR 86.1835–01. We are not proposing to change those regulations in today's proposal, but we need to consider the potential burden impact of today's proposal based on these existing regulations. There are two primary considerations.

First, the regulations permit EPA to perform confirmatory testing of any vehicle. EPA's policy is to randomly test a small percentage of vehicles and other targeted vehicles (such as new-technology vehicles or previously uncertified models). EPA performs confirmatory testing on roughly ten percent of the vehicles that the manufacturers test. The cost to manufacturers associated with EPA confirmatory testing includes the cost of preparing and transporting vehicles to EPA testing facilities. (EPA bears the burden of testing). EPA is not proposing to increase the number of vehicles it targets for confirmatory testing; thus no additional burden is anticipated.

Second, manufacturers are required to perform their own confirmatory testing using criteria specified in the regulations, including failed or high emission levels, unexpectedly high fuel economy, fuel economy leader within class, and fuel economy near the Gas Guzzler tax threshold. The only criterion that could potentially cause an increase in the number of manufacturer-performed confirmatory tests under the proposal is failed or high emission levels. This is because more US06, SC03 and Cold CO tests will be needed to determine the label estimates, thus increasing the possibility for failed or high emission levels. This possibility is slight, however, and very difficult to quantify. Thus we do not anticipate any additional burden. In the event that confirmatory testing is increased as a result of today's proposed rule, this will be reflected in the next renewal request for EPA information collection authorization.

B. Fees

Under the Clean Air Act, EPA collects fees to cover its costs of issuing certificates of conformity for the classes of vehicles and engines covered by this proposal. On May 11, 2004, EPA updated its fees based upon a study of the costs associated with its motor vehicle and engine compliance program (69 FR 51402). At the time that cost study was conducted the current rulemaking was not considered.

The proposed rule does not place additional burden upon the EPA. There may be a slight increase in compliance testing when the rule is initially implemented, but it is expected to be minimal. Because EPA does not expect an increase in the costs of the motor vehicle and compliance program at this time, there will be no increase in the fees collected as a result of this proposal. We may need to add additional testing capacity at our laboratory facilities in the future. EPA will monitor its compliance testing and associated costs and, if necessary, in the future may change fees by rulemaking to include these new costs.

C. Aggregate Costs

Aggregate annual costs, as discussed above and summarized in Table VI–1 below, are estimated to be between $526,000 and $2.2 million.

TABLE VI–1.—AGGREGATE COSTS

Cost element	MY 2008 through MY 2010		MY 2011 and after	
	Minimum	Maximum	Minimum	Maximum
Test Volume	$0	$0	$605,672	$757,090
Facilities	0	0	524,112	866,111
Startup	526,128	614,928	526,128	614,928
Total	526,128	614,928	1,655,122	2,238,129

VII. Public Participation

This rule is being proposed under the authority of the Energy Policy and Conservation Act (EPCA),[68] and Section 774 of the Energy Policy Act of 2005.[69] We request comment on all aspects of this proposal. This section describes how you can participate in this process.

A. How and To Whom Do I Submit Comments?

We are opening a formal comment period by publishing this document. We will accept comments for the period indicated under **DATES** above. If you have an interest in the program described in this document, we encourage you to comment on any aspect of this rulemaking.

Your comments will be most useful if you include appropriate and detailed supporting rationale, data, and analysis. If you disagree with parts of the proposal, we encourage you to suggest and analyze alternate approaches to meeting the goals described in this proposal. You should send all comments, except those containing proprietary information, to our Air Docket (see **ADDRESSES**) before the end of the comment period.

You may submit comments electronically, by mail, or through hand delivery/courier. To ensure proper receipt by EPA, identify the appropriate docket identification number in the body of your comment. Submit your comments within the specified comment period. Comments received after the close of the comment period will be marked ''late.'' EPA is not required to consider these late comments. If you wish to submit CBI or information that is otherwise protected by statute, please follow the instructions in Section VI.B below. Do not use EPA Dockets or e-mail to submit CBI or information protected by statute.

[68] See 49 U.S.C. 32908.

[69] See Pub. L. 109–58, 119 Stat. 835 (2005).

1. Electronically

If you submit an electronic comment as prescribed below, we recommend that you include your name, mailing address, and an e-mail address or other contact information in the body of your comment. Also include this contact information on the outside of any disk or CD–ROM you submit, and in any cover letter accompanying the disk or CD–ROM. This ensures that you can be identified as the submitter of the comment and allows us to contact you if we cannot read your comment or if we need further information on the substance of your comment. Our policy is that we will not edit your comment; any identifying or contact information provided in the body of a comment will be included as part of the comment that is placed in the official public docket and made available in EPA's electronic public docket. If we cannot read your comment due to technical difficulties and cannot contact you for clarification, we may not be able to consider your comment.

a. *EPA Dockets.* To submit comments to EPA's electronic public docket, go directly to the Federal Docket Management System at *http://www.regulations.gov* and follow the online instructions for submitting comments. Direct your comments to Docket ID No. EPA–HQ–OAR–2005–0169. The system is an ''anonymous access'' system, which means we will not know your identity, e-mail address, or other contact information unless you provide it in the body of your comment.

b. *Disk or CD–ROM.* You may submit comments on a disk or CD–ROM that you send to the mailing address identified in Section VI.A.2 below. Avoid the use of special software, characters, and any form of encryption.

2. By Mail

Send your comments to: Environmental Protection Agency, EPA Docket Center (EPA/DC), Air and Radiation Docket, Mail Code 6102T, 1200 Pennsylvania Avenue, NW., Washington, DC 20460, Attention Docket ID No. EPA–HQ–OAR–2005–0169.

3. By Hand Delivery or Courier

Deliver your comments to: EPA Docket Center, (EPA/DC) EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC, Attention Docket ID No. EPA–HQ–OAR–2005–0169. Such deliveries are only accepted during the Docket's normal hours of operation from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. Special arrangements should be made for deliveries of boxed information.

B. How Should I Submit CBI to the Agency?

Do not submit information that you consider to be confidential business information (CBI) electronically through EPA's electronic public docket or by e-mail. Send or deliver information identified as CBI only to the following address: U.S. Environmental Protection Agency, Assessment and Standards Division, 2000 Traverwood Drive, Ann Arbor, MI 48105, Attention Docket No. EPA–HQ–OAR–2005–0169. You may claim information that you submit to EPA as CBI by marking any part or all of that information as CBI (if you submit CBI on disk or CD–ROM, mark the outside of the disk or CD–ROM as CBI and then identify electronically within the disk or CD–ROM the specific information that is CBI). Information so marked will not be disclosed except in accordance with procedures set forth in 40 CFR part 2.

In addition to one complete version of the comment that includes any information claimed as CBI, a copy of the comment that does not contain the information claimed as CBI must be submitted for inclusion in the public docket and EPA's electronic public docket. If you submit the copy that does not contain CBI on disk or CD–ROM, mark the outside of the disk or CD–ROM clearly that it does not contain CBI. Information not marked as CBI will be included in the public docket and EPA's electronic public docket without prior notice. If you have any questions about CBI or the procedures for claiming CBI, please consult the person identified in the **FOR FURTHER INFORMATION CONTACT** section.

C. Will There Be a Public Hearing?

We will hold a public hearing on this proposal on March 3, 2006 in Ann Arbor, Michigan. The hearing will start at 10 a.m. and continue until testimony is complete. See **ADDRESSES** above for location and phone information.

If you would like to present testimony at a public hearing, we ask that you notify the contact person listed above at least ten days before the hearing. You should estimate the time you need for your presentation and identify any needed audio/visual equipment. We suggest that you bring copies of your statement or other material for the EPA panel and the audience. It would also be helpful if you send us a copy of your statement or other materials before the hearing.

We will make a tentative schedule for the order of testimony based on the notification we receive. This schedule will be available on the morning of each hearing. In addition, we will reserve a block of time for anyone else in the audience who wants to give testimony.

We will conduct the hearing informally, and technical rules of evidence won't apply. We will arrange for a written transcript of the hearing and keep the official record of the hearing open for 30 days to allow you to submit supplementary information. You may make arrangements for copies of the transcript directly with the court reporter.

VIII. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order 12866 the Agency must determine whether the regulatory action is ''significant'' and therefore subject to review by the Office of Management and Budget (OMB) and the requirements of this Executive Order. The Executive Order defines a ''significant regulatory action'' as any regulatory action that is likely to result in a rule that may:

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, Local, or Tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

A Draft Technical Support Document has been prepared and is available in the docket for this rulemaking and at the internet address listed under **ADDRESSES** above. Pursuant to the terms of Executive Order 12866, OMB has notified EPA that it considers this a ''significant regulatory action'' within the meaning of the Executive Order. EPA has submitted this action to OMB for review. Changes made in response to OMB suggestions or recommendations will be documented in the public record.

B. Paperwork Reduction Act

The information collection requirements in this proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the *Paperwork Reduction Act*, 44 U.S.C. 3501 *et seq.* The Information Collection Request (ICR) documents prepared by EPA have been assigned EPA ICRs number 0783.48 (OMB control number 2060–0104) and 2211.01.

1. ICR #0783.48

The information collection burden associated with this rule (testing, recordkeeping and reporting requirements) is estimated to total between 3,703 and 15,634 hours yearly, and between $1,639,965 and $2,222,183 yearly ($510,181 to $598,982 for each of calendar years 2008 and 2009). This includes $10,290,300 in one-time startup and ongoing capital costs for test facilities annualized over ten years and depreciated at 7 percent for the highest estimate. The annual costs and hours for information collection activities by a given manufacturer under any of the options in this proposed rule depend upon manufacturer-specific variables, such as the number of different test groups and the number of vehicles tested for fuel economy determinations. The estimated number of likely respondent manufacturers is 35. The responses will be submitted annually as a part of the existing EPA certification and fuel economy process. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

2. ICR #2211.01

EPA is planning to conduct a series of focus groups as a result of comments received on the proposed label design formats. The specific questions to be asked of the groups will depend upon the comments received, but will generally fall into the areas described in the following two sections.

a. *Fuel Economy Background Questions.* These questions will be designed to assess the respondents' familiarity with the current fuel economy label and to lay the groundwork for the discussion about the revised labels. Examples of possible questions are: Have they seen the city and highway numbers anywhere else besides the label? If so, where? What do the various pieces of information on the label mean? Is this information useful? What is their overall opinion of the label? What improvements would they make?

b. *Questions About New Label Designs.* These questions could be either about those designs proposed by EPA or variations thereof, if indicated by the comments received on the proposal. Examples of possible questions are: What is their first impression of the label? Do they think the new label(s) looks better than the old label? Is it more easy to understand and, if so, why? Is any of the information presented in a better way or a more confusing way? Is any one of the alternatives better/worse than the others?

The information from the focus groups would be used as additional information to guide EPA in determining the final fuel economy label format. The burden associated with conducting the focus groups can be roughly estimated, based on the assumption that there would be 10 groups total with 9 participants in each group. The groups would be situated at about 5 different geographical locations. Each group would take about 2 hours, with an additional 2 hours allotted for traveling and screening. The participants would be chosen based on some very nominal screening criteria, such as having a valid driver's license and owning or leasing a vehicle. The screening would be done via telephone, and take no longer than 30 minutes. Thus the burden associated with the focus groups would be approximately 4.5 hours per participant, for a total of about 405 burden-hours.

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations in 40 CFR are listed in 40 CFR part 9.

To comment on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques, EPA has established a public docket for this rule, which includes these ICRs, under Docket ID number EPA–HQ–OAR–2005–0169. Submit any comments related to the ICRs for this proposed rule to EPA and OMB. See **ADDRESSES** section at the beginning of this notice for where to submit comments to EPA. Send comments to OMB at the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW., Washington, DC 20503, Attention: Desk Office for EPA. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after February 1, 2006, a comment to OMB is best assured of having its full effect if OMB receives it by March 3, 2006. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

C. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of this final rule on small entities, a small entity is defined as: (1) A small business as defined by the Small Business Administration (SBA) by category of business using North America Industrial Classification System (NAICS) and codified at 13 CFR 121.201; (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

After considering the economic impacts of today's proposed rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities. A small business that manufactures automobiles has a NAIC code of 336111. Based on Small Business Administration size standards, a small business for this NAIC code is defined as a manufacturer having less than 1000 employees. Out of a total of approximately 80 automotive manufacturers subject to today's proposal, EPA estimates that approximately 10 of these could be classified as small entities based on SBA size standards. Unlike large manufacturers with complex and diverse product lines, we expect that the small entities (generally these are vehicle importers and vehicle converters) will be able use the results of tests they are already conducting for emissions compliance to satisfy the proposed fuel economy labeling requirements. Therefore, we expect that these small entities will face minimal additional burden due to the proposed fuel economy labeling requirements.

Independent Commercial Importers (ICIs) have averaged about 50 imported engine families per year for the last three model years. There are approximately 10 ICIs subject to today's proposal. If we assume that the ICIs and other small entities account for five percent of the vehicle models for which fuel economy labels are needed (a proportion that is certainly an overestimate, but useful for placing an upper bound on the estimated cost impacts for small entities), then these entities must generate about 65 different fuel economy labels. Using the total estimated costs from Section VI of this preamble, the average annual cost per labeled vehicle configuration is about $1280–$1760, and the total annual cost for 20 small entities can be estimated to be $85,000–$114,000. The total average annual cost for an individual importer or small manufacturer can therefore be estimated to be a maximum of $4,250–$5,700. We have recently collected data on the currently operating small entities in the ICI and vehicle conversion categories; this data indicates that the average annual revenue for these companies is approximately $4.8 million. Therefore, the projected cost increase is a maximum of 0.12 percent of the average revenue for small importers or manufacturers. Because of the limited range of vehicle configurations typically offered by these small entities, we believe that the maximum cost for these entities will be even lower than the low end of the ranges shown above. Our methodology for estimating costs in Section VI assumes that manufacturers have diverse product lines, and thus ultimately will need to perform some level of additional testing in 2011 and later model years. Using costs based on such an assumption will tend to overestimate costs for ICIs and vehicle converters, who typically produce or import a single model or configuration.

Although this proposed rule will not have a significant economic impact on a substantial number of small entities, EPA nonetheless has tried to reduce the impact of this rule on small entities. Additionally, there are numerous existing regulatory relief provisions in the emissions compliance regulations for such small entities. Those provisions remain in effect and would not be impacted by today's proposed rule. We continue to be interested in the potential impacts of the proposed rule on small entities and welcome comments on issues related to such impacts.

D. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, establishes requirements for federal agencies to assess the effects of their regulatory actions on state, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with "federal mandates" that may result in expenditures to state, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives, and to adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective, or least burdensome alternative if the Administrator publishes with the final rule an explanation of why that alternative was not adopted.

Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

This rule contains no federal mandates for state, local, or tribal governments as defined by the provisions of Title II of the UMRA. The rule imposes no enforceable duties on any of these governmental entities. Nothing in the rule would significantly or uniquely affect small governments.

We have determined that this rule does not contain a federal mandate that may result in expenditures of more than $100 million to the private sector in any single year. We believe that this proposed rule represents the least costly, most cost effective approach to achieve the goals of the proposed rule. The costs are discussed in Section VI and in the Draft Technical Support Document.

E. Executive Order 13132: Federalism

Executive Order 13132, entitled ''Federalism'' (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure ''meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' ''Policies that have federalism implications'' is defined in the Executive Order to include regulations that have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.''

Under Section 6 of Executive Order 13132, EPA may not issue a regulation that has federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by State and local governments, or EPA consults with State and local officials early in the process of developing the proposed regulation. EPA also may not issue a regulation that has federalism implications and that preempts State law, unless the Agency consults with State and local officials early in the process of developing the proposed regulation.

Section 4 of the Executive Order contains additional requirements for rules that preempt State or local law, even if those rules do not have federalism implications (i.e., the rules will not have substantial direct effects on the States, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government). Those requirements include providing all affected State and local officials notice and an opportunity for appropriate participation in the development of the regulation. If the preemption is not based on expressed or implied statutory authority, EPA also must consult, to the extent practicable, with appropriate State and local officials regarding the conflict between State law and Federally protected interests within the agency's area of regulatory responsibility.

This proposed rule does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

Executive Order 13175, entitled ''Consultation and Coordination with Indian Tribal Governments'' (65 FR 67249, November 6, 2000), requires EPA to develop an accountable process to ensure ''meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications.''

This rule does not have tribal implications as specified in Executive Order 13175. This rule will be implemented at the Federal level and impose compliance costs only on engine manufacturers and ship builders. Tribal governments will be affected only to the extent they purchase and use equipment with regulated engines. Thus, Executive Order 13175 does not apply to this rule.

G. Executive Order 13045: Protection of Children From Environmental Risks Health and Safety

Executive Order 13045, ''Protection of Children from Environmental Health and Safety Risks'' (62 FR 19885, April 23, 1997) applies to any rule that (1) is determined to be ''economically significant'' as defined under Executive Order 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, Section 5–501 of the Order directs the Agency to evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

This proposed rule is not subject to the Executive Order because it does not involve decisions on environmental health or safety risks that may disproportionately affect children.

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

This rule is not a ''significant energy action'' as defined in Executive Order 13211, ''Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use'' (66 FR 28355 (May 22, 2001)), because it is not likely to have a significant effect on the supply, distribution, or use of energy. As specifically stated in section I.D, the proposed regulations do not affect the CAFE program. The proposed regulations do not require manufacturers to improve or otherwise change the fuel economy of their vehicles. The purpose of this proposal is to provide consumers with better information on which to base their vehicle purchasing decisions.

I. National Technology Transfer Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (''NTTAA''), Public Law 104–113, section 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless doing so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This proposed rulemaking does not involve technical standards. Therefore, EPA is not considering the use of any voluntary consensus standards.

EPA welcomes comments on this aspect of the proposed rulemaking and, specifically, invites the public to identify potentially-applicable voluntary consensus standards and to explain why such standards should be used in this regulation.

IX. Statutory Provisions and Legal Authority

Statutory authority for the fuel economy labeling program proposed today can be found in 42 U.S.C. 7401–7671q.

List of Subjects

40 CFR Part 86

Environmental protection, Administrative practice and procedure, Confidential business information, Labeling, Motor vehicle pollution, Reporting and recordkeeping requirements.

40 CFR Part 600

Administrative practice and procedure, Electric power, Fuel economy, Labeling, Reporting and recordkeeping requirements.

Dated: January 10, 2006.

Stephen L. Johnson,

Administrator.

For the reasons set forth in the preamble, we propose to amend parts 86 and 600 of title 40 of the Code of Federal Regulations as follows:

PART 86—CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES

1. The authority citation for part 86 continues to read as follows:

Authority: 42 U.S.C. 7401–7671q.

Subpart B—[Amended]

2. A new § 86.158–08 is added to read as follows:

§ 86.158–08 Supplemental Federal Test Procedures; overview.

The procedures described in §§ 86.158–08, 86.159–08, 86.160–00, and 86.162–00 discuss the aggressive driving (US06) and air conditioning (SC03) elements of the Supplemental Federal Test Procedures (SFTP). These test procedures consist of two separable test elements: A sequence of vehicle operation that tests exhaust emissions with a driving schedule (US06) that tests exhaust emissions under high speeds and accelerations (aggressive driving); and a sequence of vehicle operation that tests exhaust emissions with a driving schedule (SC03) which includes the impacts of actual air conditioning operation. These test procedures (and the associated standards set forth in subpart S of this part) are applicable to light-duty vehicles and light-duty trucks.

(a) Vehicles are tested for the exhaust emissions of THC, CO, NO_X, CH_4, and CO_2. For diesel-cycle vehicles, THC is sampled and analyzed continuously according to the provisions of § 86.110.

(b) Each test procedure follows the vehicle preconditioning specified in § 86.132–00.

(c) *US06 Test Cycle.* The test procedure for emissions on the US06 driving schedule (see § 86.159–00) is designed to determine gaseous exhaust emissions from light-duty vehicles and light-duty trucks while simulating high speed and acceleration on a chassis dynamometer (aggressive driving). The full test consists of preconditioning the engine to a hot stabilized condition, as specified in § 86.132–00, and an engine idle period of 1 to 2 minutes, after which the vehicle is accelerated into the US06 cycle. A proportional part of the diluted exhaust is collected continuously in two bag samples, one representing US06 city driving and the other representing US06 highway driving, for subsequent analysis, using a constant volume (variable dilution) sampler or critical flow venturi sampler. For petroleum-fueled diesel-cycle vehicles for which THC is sampled and analyzed continuously according to the provisions of § 86.110, the analytical system shall be configured to calculate THC for the US06 City phase and the US06 Highway phase as described in § 86.159–08.

(d) *SC03 Test Cycle.* The test procedure for determining exhaust emissions with the air conditioner operating (see § 86.160–00) is designed to determine gaseous exhaust emissions from light-duty vehicles and light-duty trucks while simulating an urban trip during ambient conditions of 95 °F, 100 grains of water/pound of dry air (approximately 40 percent relative humidity), and a solar heat load intensity of 850 W/m^2. The full test consists of vehicle preconditioning (see § 86.132–00 paragraphs (o)(1) and (2)), an engine key-off 10 minute soak, an engine start, and operation over the SC03 cycle. A proportional part of the diluted exhaust is collected continuously during the engine start and the SC03 driving cycle for subsequent analysis, using a constant volume (variable dilution) sampler or critical flow venturi sampler.

(e) The emission results from the aggressive driving test (§ 86.159–08), air conditioning test (§ 86.160–00), and a FTP test (§ 86.130–00 (a) through (d) and (f)) (conducted on a large single roll or equivalent dynamometer) are analyzed according to the calculation methodology in § 86.164–08 and compared to the applicable SFTP emission standards in subpart A of this part (§§ 86.108–00 and 86.109–00).

(f) These test procedures may be run in any sequence that maintains the applicable preconditioning elements specified in § 86.132–00.

3. A new § 86.159–08 is added to read as follows:

§ 86.159–08 Exhaust emission test procedures for US06 emissions.

(a) *Overview.* The dynamometer operation consists of a single, 600 second test on the US06 driving schedule, as described in appendix I, paragraph (g), of this part. The vehicle is preconditioned in accordance with § 86.132–00, to bring it to a warmed-up stabilized condition. This preconditioning is followed by a 1 to 2 minute idle period that proceeds directly into the US06 driving schedule during which continuous proportional samples of gaseous emissions are collected for analysis. The US06 test is divided into three periods collected in two bag samples. The first period, representing the first portion of city driving, terminates at the end of the deceleration which is scheduled to occur at 128 seconds of the driving schedule. The second period, representing highway driving, starts at the conclusion of the first phase of city driving and terminates at the end of the deceleration which is scheduled to occur at 493 seconds of the driving schedule. The third period, representing the second portion of city driving, consists of the remainder of the driving schedule including engine shutdown. The first period and the third period are collected in one bag sample, representing ''US06 city'' driving, and the second period is collected in a second bag sample, representing ''US06 highway'' driving. If engine stalling should occur during cycle operation, follow the provisions of § 86.136–90 (engine starting and restarting). For gasoline-fueled Otto-cycle vehicles, the composite samples collected in bags are analyzed for THC, CO, CO_2, CH_4, and NO_X. For petroleum-fueled diesel-cycle vehicles, THC is sampled and analyzed continuously according to the provisions of § 86.110. Parallel bag samples of dilution air are analyzed for

THC, CO, CO_2, CH_4, and NO_X. For petroleum-fueled diesel-cycle vehicles for which THC is sampled and analyzed continuously according to the provisions of § 86.110, the analytical system shall be configured to calculate THC for the US06 City phase and the US06 Highway phase as described in § 86.159–08.

(b) *Dynamometer activities.* (1) All official US06 tests shall be run on a large single roll electric dynamometer, or an approved equivalent dynamometer configuration, that satisfies the requirements of § 86.108–00.

(2) Position (vehicle can be driven) the test vehicle on the dynamometer and restrain.

(3) Required US06 schedule test dynamometer inertia weight class selections are determined by the test vehicles test weight basis and corresponding equivalent weight as listed in the tabular information of § 86.129–94(a) and discussed in § 86.129–00(e) and (f).

(4) Set the dynamometer test inertia weight and roadload horsepower requirements for the test vehicle (see § 86.129–00(e) and (f)). The dynamometer's horsepower adjustment settings shall be set to match the force imposed during dynamometer operation with actual road load force at all speeds.

(5) The vehicle speed as measured from the dynamometer rolls shall be used. A speed vs. time recording, as evidence of dynamometer test validity, shall be supplied on request of the Administrator.

(6) The drive wheel tires may be inflated up to a gauge pressure of 45 psi (310 kPa), or the manufacturer's recommended pressure if higher than 45 psi, in order to prevent tire damage. The drive wheel tire pressure shall be reported with the test results.

(7) The driving distance, as measured by counting the number of dynamometer roll or shaft revolutions, shall be determined for the test.

(8) Four-wheel drive vehicles will be tested in a two-wheel drive mode of operation. Full-time four-wheel drive vehicles will have one set of drive wheels temporarily disengaged by the vehicle manufacturer. Four-wheel drive vehicles which can be manually shifted to a two-wheel mode will be tested in the normal on-highway two-wheel drive mode of operation.

(9) During dynamometer operation, a fixed speed cooling fan with a maximum discharge velocity of 15,000 cfm will be positioned so as to direct cooling air to the vehicle in an appropriate manner with the engine compartment cover open. In the case of vehicles with front engine compartments, the fan shall be positioned within 24 inches (61 centimeters) of the vehicle. In the case of vehicles with rear engine compartments (or if special designs make the above impractical), the cooling fan(s) shall be placed in a position to provide sufficient air to maintain vehicle cooling. The Administrator may approve modified cooling configurations or additional cooling if necessary to satisfactorily perform the test. In approving requests for additional or modified cooling, the Administrator will consider such items as actual road cooling data and whether such additional cooling is needed to provide a representative test.

(c) The flow capacity of the CVS shall be large enough to virtually eliminate water condensation in the system.

(d) Practice runs over the prescribed driving schedule may be performed at test point, provided an emission sample is not taken, for the purpose of finding the appropriate throttle action to maintain the proper speed-time relationship, or to permit sampling system adjustment.

(e) Perform the test bench sampling sequence outlined in § 86.140–94 prior to or in conjunction with each series of exhaust emission measurements.

(f) *Test activities.* (1) The US06 consists of a single test which is directly preceded by a vehicle preconditioning in accordance with § 86.132–00. Following the vehicle preconditioning, the vehicle is idled for not less than one minute and not more than two minutes. The equivalent dynamometer mileage of the test is 8.0 miles (1.29 km).

(2) The following steps shall be taken for each test:

(i) Immediately after completion of the preconditioning, idle the vehicle. The idle period is not to be less than one minute or not greater than two minutes.

(ii) With the sample selector valves in the ''standby'' position, connect evacuated sample collection bags to the dilute exhaust and dilution air sample collection systems.

(iii) Start the CVS (if not already on), the sample pumps, the temperature recorder, the vehicle cooling fan, and the heated THC analysis recorder (diesel-cycle only). The heat exchanger of the constant volume sampler, if used, petroleum-fueled diesel-cycle THC analyzer continuous sample line should be preheated to their respective operating temperatures before the test begins.

(iv) Adjust the sample flow rates to the desired flow rate and set the gas flow measuring devices to zero.

(A) For gaseous bag samples (except THC samples), the minimum flow rate is 0.17 cfm (0.08 liters/sec).

(B) For THC samples, the minimum FID (or HFID in the case of diesel-cycle vehicles) flow rate is 0.066 cfm (0.031 liters/sec).

(C) CFV sample flow rate is fixed by the venturi design.

(v) Attach the exhaust tube to the vehicle tailpipe(s).

(vi) Start the gas flow measuring device, position the sample selector valves to direct the sample flow into the exhaust sample bag, the dilution air sample bag, turn on the petroleum-fueled diesel-cycle THC analyzer system integrator, mark the recorder chart, and record both gas meter or flow measurement instrument readings, (if applicable).

(vii) Place vehicle in gear after starting the gas flow measuring device, but prior to the first acceleration. Begin the first acceleration 5 seconds after starting the measuring device.

(viii) Operate the vehicle according to the US06 driving schedule, as described in appendix I, paragraph (g), of this part. Manual transmission vehicles shall be shifted according to the manufacturer recommended shift schedule, subject to review and approval by the Administrator. For further guidance on transmissions see § 86.128–00.

(ix) At the end of the deceleration which is scheduled to occur at 128 seconds, simultaneously switch the sample flows from the ''US06 city'' bags and samples to the ''US06 highway'' bags and samples, switch gas flow measuring device No. 1 (and the petroleum-fueled diesel hydrocarbon integrator No. 1 and mark the petroleum-fueled diesel hydrocarbon recorder chart if applicable) to ''standby'' mode, and start gas flow measuring device No. 2 (and the petroleum-fueled diesel hydrocarbon integrator No. 2 if applicable). Before the acceleration which is scheduled to occur at 136 seconds, record the measured roll or shaft revolutions.

(x) At the end of the deceleration which is scheduled to occur at 493 seconds, simultaneously switch the sample flows from the ''US06 highway'' bags and samples to the ''US06 city'' bags and samples, switch off gas flow measuring device No. 2 (and the petroleum-fueled diesel hydrocarbon integrator No. 2 and mark the petroleum-fueled diesel hydrocarbon recorder chart if applicable), and start gas flow measuring device No. 1 (and the petroleum-fueled diesel hydrocarbon integrator No. 1 if applicable). Before the acceleration which is scheduled to occur at 501 seconds, record the measured roll or shaft revolutions and the No. 2 gas meter reading or flow measurement instrument. As soon as possible transfer the ''US06 highway'' exhaust and dilution air bag samples to the analytical system and process the samples according to § 86.140–94 obtaining a stabilized reading of the bag exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

(xi) Turn the engine off 2 seconds after the end of the last deceleration (i.e., engine off at 596 seconds).

(xii) Five seconds after the engine stops running, simultaneously turn off gas flow measuring device No. 1 (and the petroleum-fueled diesel hydrocarbon integrator No. 1 and mark the petroleum-fueled diesel hydrocarbon recorder chart if applicable) and position the sample selector valves to the ''standby'' position. Record the measured roll or shaft revolutions and the No. 1 gas meter reading or flow measurement instrument.

(xiii) As soon as possible, transfer the ''US06 city'' exhaust and dilution air bag samples to the analytical system and process the samples according to § 86.140–94 obtaining a stabilized reading of the bag exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

(xiv) Immediately after the end of the sample period, turn off the cooling fan, close the engine compartment cover, disconnect the exhaust tube from the vehicle tailpipe(s), and drive the vehicle from dynamometer.

(xv) The CVS or CFV may be turned off, if desired.

4. A new § 86.164–08 is added to read as follows:

§ 86.164–08 Supplemental Federal Test Procedure calculations.

(a) The provisions of § 86.144–94(b) and (c) are applicable to this section except that the NO_X humidity correction factor of § 86.144–94(c)(7)(iv) must be modified when adjusting SC03 environmental test cell NO_X results to 100 grains of water (see paragraph (d) of this section). These provisions provide the procedures for calculating mass emission results of each regulated exhaust pollutant for the test schedules of FTP, US06, and SC03.

(b) The provisions of § 86.144–94(a) are applicable to this section. These provisions provide the procedures for determining the weighted mass emissions for the FTP test schedule (Y_{wm}).

(c)(1) When the test vehicle is equipped with air conditioning, the final reported test results for the SFTP composite ($NMHC+NO_X$) and optional composite CO standards shall be computed by the following formulas.

(i) $Y_{WSFTP}=0.35(Y_{FTP}) + 0.37(Y_{SC03})+0.28(Y_{US06})$

Where:

(A) Y_{WSFTP}=Mass emissions per mile for a particular pollutant weighted in terms of the contributions from the FTP, SC03, and US06 schedules. Values of Y_{WSFTP} are obtained for each of the exhaust emissions of NMHC, NO_X, and CO.

(B) Y_{FTP}=Weighted mass emissions per mile (Y_{wm}) based on the measured driving distance of the FTP test schedule.

(C) Y_{SC03}=Calculated mass emissions per mile based on the measured driving distance of the SC03 test schedule.

(D) Y_{US06}=Calculated mass emissions per mile, using the summed mass emissions of the ''US06 city'' phase (sampled during seconds 1–128 and seconds 494–600 of the US06 driving schedule) and the ''US06 highway'' phase (sampled during seconds 129–493 of the US06 driving schedule), based on the measured driving distance of the US06 test schedule.

(ii) Composite ($NMHC+NO_X$) $=Y_{WSFTP}(NMHC)+Y_{WSFTP}(NO_X)$

Where:

(A) $Y_{WSFTP}(NMHC)$=results of paragraph (c)(1)(i) of this section for NMHC.

(B) $Y_{WSFTP}(NO_X)$=results of paragraph (c)(1)(i) of this section for NO_X.

(2) When the test vehicle is not equipped with air conditioning, the relationship of paragraph (c)(1)(i) of this section is:

(i) $Y_{WSFTP}=0.72(Y_{FTP})+0.28(Y_{US06})$

Where:

(A) Y_{WSFTP}=Mass emissions per mile for a particular pollutant weighted in terms of the contributions from the FTP and US06 schedules. Values of Y_{WSFTP} are obtained for each of the exhaust emissions of NMHC, NO_X. and CO.

(B) Y_{FTP}=Weighted mass emissions per mile (Y_{wm}) based on the measured driving distance of the FTP test schedule.

(C) Y_{US06}=Calculated mass emissions per mile, using the summed mass emissions of the ''US06 city'' phase (sampled during seconds 1–128 and seconds 494–600 of the US06 driving schedule) and the ''US06 highway'' phase (sampled during seconds 129–493 of the US06 driving schedule), based on the measured driving distance of the US06 test schedule.

(ii) Composite ($NMHC+NO_X$)= $Y_{WSFTP}(NMHC)+Y_{WSFTP}(NO_X)$

Where:

(A) $Y_{WSFTP}(NMHC)$=results of paragraph (c)(2)(i) of this section for NMHC.

(B) $Y_{WSFTP}(NO_X)$=results of paragraph (c)(2)(i) of this section for NO_X.

(d) The NO_X humidity correction factor for adjusting NO_X test results to the environmental test cell air conditioning ambient condition of 100 grains of water/pound of dry air is:

$KH (100)=0.8825/[1-0.0047(H-75)]$

Where:

H=measured test humidity in grains of water/pound of dry air.

PART 600—FUEL ECONOMY OF VEHICLES

5. The authority citation for part 600 is revised to read as follows:

Authority: 49 U.S.C. 32901–23919q.

Subpart A—[Amended]

6. A new § 600.001–08 is added to read as follows:

§ 600.001–08 General applicability.

(a) The provisions of this subpart are applicable to 2008 and later model year automobiles.

(b)(1) Manufacturers that produce only electric vehicles are exempt from the requirement of this subpart, except with regard to the requirements in those sections pertaining specifically to electric vehicles.

(2) Manufacturers with worldwide production (excluding electric vehicle production) of less than 10,000 gasoline-fueled and/or diesel powered passenger automobiles and light trucks may optionally comply with the electric vehicle requirements in this subpart.

7. A new § 600.002–08 is added to read as follows:

§ 600.002–08 Definitions.

3-bag FTP means the Federal Test Procedure specified in 40 CFR Part 86, with three sampling portions consisting of the cold-start transient (''Bag 1''), stabilized (''Bag 2''), and hot-start transient phases (''Bag 3'').

4-bag FTP means the 3-bag FTP, with the addition of a sampling portion for the hot-start stabilized phase (''Bag 4'').

5-cycle means the FTP, HFET, US06, SC03 and cold temperature FTP tests as described in subpart B of this part.

Administrator means the Administrator of the Environmental Protection Agency or his authorized representative.

Alcohol means a mixture containing 85 percent or more by volume methanol, ethanol, or other alcohols, in any combination.

Alcohol-fueled automobile means an automobile designed to operate exclusively on alcohol.

Alcohol dual fuel automobile means an automobile:

(1) Which is designed to operate on alcohol and on gasoline or diesel fuel;

(2) Which provides equal or greater energy efficiency as calculated in accordance with § 600.510(g)(1) while operating on alcohol as it does while operating on gasoline or diesel fuel;

(3) Which, for model years 1993 through 1995, provides equal or superior energy efficiency, as determined in § 600.510(g)(2) while operating on a mixture of alcohol and gasoline or diesel fuel containing 50 percent gasoline or diesel fuel as it does while operating on gasoline or diesel fuel; and

(4) Which, in the case of passenger automobiles, meets or exceeds the minimum driving range established by the Department of Transportation in 49 CFR part 538.

Automobile means:

(1) Any four-wheel vehicle propelled by a combustion engine using onboard fuel, or by an electric motor drawing current from rechargeable storage batteries or other portable energy storage devices (rechargeable using energy from a source off the vehicle such as residential electric service);

(2) Which is manufactured primarily for use on public streets, roads, or highways (except any vehicle operated on a rail or rails);

(3) Which is rated at not more than 8,500 pounds gross vehicle weight, which has a curb weight of not more than 6,000 pounds, and which has a basic vehicle frontal area of not more than 45 square feet; or

(4) Is a type of vehicle which the Secretary of Transportation determines is substantially used for the same purposes.

Auxiliary emission control device (AECD) means an element of design as defined in part 86 of this chapter.

Average fuel economy means the unique fuel economy value as computed under § 600.510 for a specific class of automobiles produced by a manufacturer that is subject to average fuel economy standards.

Axle ratio means the number of times the input shaft to the differential (or equivalent) turns for each turn of the drive wheels.

Base level means a unique combination of basic engine, inertia weight class and transmission class.

Base vehicle means the lowest priced version of each body style that makes up a car line.

Basic engine means a unique combination of manufacturer, engine displacement, number of cylinders, fuel system (as distinguished by number of carburetor barrels or use of fuel injection), catalyst usage, and other engine and emission control system characteristics specified by the Administrator. For electric vehicles, basic engine means a unique combination of manufacturer and electric traction motor, motor controller, battery configuration, electrical charging system, energy storage device, and other components as specified by the Administrator.

Battery configuration means the electrochemical type, voltage, capacity (in Watt-hours at the c/3 rate), and physical characteristics of the battery used as the tractive energy device.

Body style means a level of commonality in vehicle construction as defined by number of doors and roof treatment (e.g., sedan, convertible, fastback, hatchback) and number of seats (i.e., front, second, or third seat) requiring seat belts pursuant to National Highway Traffic Safety Administration safety regulations in 49 CFR part 571. Station wagons and light trucks are identified as car lines.

Calibration means the set of specifications, including tolerances, unique to a particular design, version of application of a component, or component assembly capable of functionally describing its operation over its working range.

Car line means a name denoting a group of vehicles within a make or car division which has a degree of commonality in construction (e.g., body, chassis). Car line does not consider any level of decor or opulence and is not generally distinguished by characteristics as roof line, number of doors, seats, or windows, except for station wagons or light-duty trucks. Station wagons and light-duty trucks are considered to be different car lines than passenger cars.

Certification vehicle means a vehicle which is selected under § 86.084–24(b)(1) of this chapter and used to determine compliance under § 86.084–30 of this chapter for issuance of an original certificate of conformity.

City fuel economy means the fuel economy determined by operating a vehicle (or vehicles) over the driving schedule in the Federal emission test procedure.

Cold temperature FTP means the test performed under the provisions of Subpart C of 40 CFR Part 86.

Combined fuel economy means:

(1) For the purpose of determining manufacturer's average fuel economy under Supart F of this part, the term means fuel economy value determined for a vehicle (or vehicles) by harmonically averaging the city and highway fuel economy values, weighted 0.55 and 0.45 respectively.

(2) For the purpose of determining estimated annual fuel costs under § 86.600–307(f)) the term means the fuel economy value for a vehicle (or vehicles) by harmonically averaging the city and highway fuel economy values, weighted at .43 and .57 respectively.

(3) For electric vehicles, the term means the equivalent petroleum-based fuel economy value as determined by the calculation procedure promulgated by the Secretary of Energy.

Dealer means a person who resides or is located in the United States, any territory of the United States, or the District of Columbia and who is engaged in the sale or distribution of new automobiles to the ultimate purchaser.

Derived 5-cycle fuel economy means the 5-cycle fuel economy derived from the FTP-based city and HFET-based highway fuel economy by means of the equation provided in § 600.115–08 of this part.

Drive system is determined by the number and location of drive axles (e.g., front wheel drive, rear wheel drive, four wheel drive) and any other feature of the drive system if the Administrator determines that such other features may result in a fuel economy difference.

Electrical charging system means a device to convert 60Hz alternating electric current, as commonly available in residential electric service in the United States, to a proper form for recharging the energy storage device.

Electric traction motor means an electrically powered motor which provides tractive energy to the wheels of a vehicle.

Energy storage device means a rechargeable means of storing tractive energy on board a vehicle such as storage batteries or a flywheel.

Engine code means a unique combination, within an engine-system combination (as defined in part 86 of this chapter), of displacement, carburetor (or fuel injection) calibration, distributor calibration, choke calibration, auxiliary emission control devices, and other engine and emission control system components specified by the Administrator. For electric vehicles, engine code means a unique combination of manufacturer, electric traction motor, motor configuration, motor controller, and energy storage device.

Federal emission test procedure (FTP) refers to the dynamometer driving schedule, dynamometer procedure, and sampling and analytical procedures described in part 86 for the respective model year, which are used to derive city fuel economy data.

FTP-based city fuel economy means the fuel economy determined in § 600.113–08 of this part, on the basis of FTP testing.

Fuel means:

(1) Gasoline and diesel fuel for gasoline- or diesel-powered automobiles; or

(2) Electrical energy for electrically powered automobiles; or

(3) Alcohol for alcohol-powered automobiles; or

(4) Natural gas for natural gas-powered automobiles.

Fuel economy means:

(1) The average number of miles traveled by an automobile or group of automobiles per volume of fuel consumed as computed in § 600.113 or § 600.207; or

(2) The equivalent petroleum-based fuel economy for an electrically powered automobile as determined by the Secretary of Energy.

Fuel economy data vehicle means a vehicle used for the purpose of determining fuel economy which is not a certification vehicle.

Gross vehicle weight rating means the manufacturer's gross weight rating for the individual vehicle.

Hatchback means a passenger automobile where the conventional luggage compartment, i.e., trunk, is replaced by a cargo area which is open to the passenger compartment and accessed vertically by a rear door which encompasses the rear window.

Highway fuel economy means the fuel economy determined by operating a vehicle (or vehicles) over the driving schedule in the Federal highway fuel economy test procedure.

Highway fuel economy test procedure (HFET) refers to the dynamometer driving schedule, dynamometer procedure, and sampling and analytical procedures described in subpart B of this part and which are used to derive highway fuel economy data.

HFET-based fuel economy means the fuel economy determined in § 600.113–08 of this part, on the basis of HFET testing.

Inertia weight class means the class, which is a group of test weights, into which a vehicle is grouped based on its loaded vehicle weight in accordance with the provisions of part 86 of this chapter.

Label means a sticker that contains fuel economy information and is affixed to new automobiles in accordance with subpart D of this part.

Light truck means an automobile that is not a passenger automobile, as defined by the Secretary of Transportation at 49 CFR 523.5. This term is interchangeable with ''non-passenger automobile''.

Minivan means an automobile which is designed primarily to carry no more than eight passengers having an integral enclosure fully enclosing the driver, passenger, and load-carrying compartments, with a total interior volume at or below 180 cubic feet, and rear seats readily removed or folded to floor level to facilitate cargo carrying.

Model type means a unique combination of car line, basic engine, and transmission class.

Model year means the manufacturer's annual production period (as determined by the Administrator) which includes January 1 of such calendar year. If a manufacturer has no annual production period, the term ''model year'' means the calendar year.

Motor controller means an electronic or electro-mechanical device to convert energy stored in an energy storage device into a form suitable to power the traction motor.

Natural gas-fueled automobile means an automobile designed to operate exclusively on natural gas.

Natural gas dual fuel automobile means an automobile:

(1) Which is designed to operate on natural gas and on gasoline or diesel fuel;

(2) Which provides equal or greater energy efficiency as calculated in § 600.510(g)(1) while operating on natural gas as it does while operating on gasoline or diesel fuel; and

(3) Which, in the case of passenger automobiles, meets or exceeds the minimum driving range established by the Department of Transportation in 49 CFR part 538.

Nonpassenger automobile means a light truck.

Passenger automobile means any automobile which the Secretary of Transportation determines is manufactured primarily for use in the transportation of no more than 10 individuals.

Pickup truck means a nonpassenger automobile which has a passenger compartment and an open cargo bed.

Production volume means, for a domestic manufacturer, the number of vehicle units domestically produced in a particular model year but not exported, and for a foreign manufacturer, means the number of vehicle units of a particular model imported into the United States.

Rounded means a number shortened to the specific number of decimal places in accordance with the ''Round Off Method'' specified in ASTM E 29 (Incorporated by reference as specified in § 600.011–93).

SC03 means the test procedure specified in 40 CFR 86.160–00.

Secretary of Transportation means the Secretary of Transportation or his authorized representative.

Secretary of Energy means the Secretary of Energy or his authorized representative.

Sport utility vehicle (SUV) means a light truck with an extended roof line to increase cargo or passenger capacity, cargo compartment open to the passenger compartment, and one or more rear seats readily removed or folded to facilitate cargo carrying.

Station wagon means a passenger automobile with an extended roof line to increase cargo or passenger capacity, cargo compartment open to the passenger compartment, a tailgate, and one or more rear seats readily removed or folded to facilitate cargo carrying.

Subconfiguration means a unique combination within a vehicle configuration of equivalent test weight, road-load horsepower, and any other operational characteristics or parameters which the Administrator determines may significantly affect fuel economy within a vehicle configuration.

Transmission class means a group of transmissions having the following common features: Basic transmission type (manual, automatic, or semi-automatic); number of forward gears used in fuel economy testing (e.g., manual four-speed, three-speed automatic, two-speed semi-automatic); drive system (e.g., front wheel drive, rear wheel drive; four wheel drive), type of overdrive, if applicable (e.g., final gear ratio less than 1.00, separate overdrive unit); torque converter type, if applicable (e.g., non-lockup, lockup, variable ratio); and other transmission characteristics that may be determined to be significant by the Administrator.

Transmission configuration means the Administrator may further subdivide within a transmission class if the Administrator determines that sufficient fuel economy differences exist. Features such as gear ratios, torque converter multiplication ratio, stall speed, shift calibration, or shift speed may be used to further distinguish characteristics within a transmission class.

Test weight means the weight within an inertia weight class which is used in the dynamometer testing of a vehicle, and which is based on its loaded vehicle weight in accordance with the provisions of part 86 of this chapter.

Ultimate consumer means the first person who purchases an automobile for purposes other than resale or leases an automobile.

US06 means the test procedure as described in 40 CFR 86.159–08.

Van means any light truck having an integral enclosure fully enclosing the driver compartment and load carrying device, and having no body sections protruding more than 30 inches ahead of the leading edge of the windshield.

Vehicle configuration means a unique combination of basic engine, engine code, inertia weight class, transmission configuration, and axle ratio within a base level.

Vehicle-specific 5-cycle fuel economy means the fuel economy calculated according to the procedures in § 600.114–08 of this part.

8. A new § 600.006–08 is added to read as follows:

§ 600.006–08 Data and information requirements for fuel economy vehicles.

(a) For certification vehicles with less than 10,000 miles, the requirements of this section are considered to have been met except as noted in paragraph (c) of this section.

(b)(1) The manufacturer shall submit the following information for each fuel economy data vehicle:

(i) A description of the vehicle, exhaust emission test results, applicable deterioration factors, adjusted exhaust emission levels, and test fuel property values as specified in § 600.113–93 except as specified in paragraph (h) of this section.

(ii) A statement of the origin of the vehicle including total mileage accumulation, and modification (if any) form the vehicle configuration in which the mileage was accumulated. (For modifications requiring advance approval by the Administrator, the name of the Administrator's representative approving the modification and date of approval are required.) If the vehicle was previously used for testing for compliance with part 86 of this chapter or previously accepted by the Administrator as a fuel economy data vehicle in a different configuration, the requirements of this paragraph may be satisfied by reference to the vehicle number and previous configuration.

(iii) A statement that the fuel economy data vehicle, with respect to which data are submitted:

(A) Has been tested in accordance with applicable test procedures,

(B) Is, to the best of the manufacturer's knowledge, representative of the vehicle configuration listed, and

(C) Is in compliance with applicable exhaust emission standards.

(2) The manufacturer shall retain the following information for each fuel economy data vehicle, and make it available to the Administrator upon request:

(i) A description of all maintenance to engine, emission control system, or fuel system, or fuel system components performed within 2,000 miles prior to fuel economy testing.

(ii) In the case of electric vehicles, a description of all maintenance to electric motor, motor controller, battery configuration, or other components performed within 2,000 miles prior to fuel economy testing.

(iii) A copy of calibrations for engine, fuel system, and emission control devices, showing the calibration of the actual components on the test vehicle as well as the design tolerances.

(iv) In the case of electric vehicles, a copy of calibrations for the electric motor, motor controller, battery configuration, or other components on the test vehicle as well as the design tolerances.

(v) If calibrations for components specified in paragraph (b)(2)(iii) or (iv) of this section were submitted previously as part of the description of another vehicle or configuration, the original submittal may be referenced.

(c) The manufacturer shall submit the following fuel economy data:

(1) For vehicles tested to meet the requirements of 40 CFR part 86 (other than those chosen in accordance with 40 CFR 86.1829–01(a) or 40 CFR 86.1845, the FTP, highway, US06, SC03 and cold temperature FTP fuel economy results, as applicable, from all tests on that vehicle, and the test results adjusted in accordance with paragraph (g) of this section.

(2) For each fuel economy data vehicle, all individual test results (excluding results of invalid and zero mile tests) and these test results adjusted in accordance with paragraph (g) of this section.

(3) For diesel vehicles tested to meet the requirements of 40 CFR part 86, data from a cold temperature FTP, performed in accordance with 600.111–08(e), using the fuel specified in 600.107–08(c).

(d) The manufacturer shall submit an indication of the intended purpose of the data (e.g., data required by the general labeling program or voluntarily submitted for specific labeling).

(e) In lieu of submitting actual data from a test vehicle, a manufacturer may provide fuel economy values derived from an analytical expression, e.g., regression analysis. In order for fuel economy values derived from analytical methods to be accepted, the expression (form and coefficients) must have been approved by the Administrator.

(f) If, in conducting tests required or authorized by this part, the manufacturer utilizes procedures, equipment, or facilities not described in the Application for Certification required in 40 CFR 86.087–21 or 40 CFR 86.1844–01 as applicable, the manufacturer shall submit to the Administrator a description of such procedures, equipment, and facilities.

(g)(1) The manufacturer shall adjust all test data used for fuel economy label calculations in subpart D and average fuel economy calculations in subpart F for the classes of automobiles within the categories identified in paragraphs (a)(1) through (6) of § 600.510. The test data shall be adjusted in accordance with paragraph (g)(3) or (4) as applicable.

(2) [Reserved]

(3) The manufacturer shall adjust all test data generated by vehicles with engine-drive system combinations with more than 6,200 miles by using the following equation:

$$FE_{4,000mi} = FE_T[0.979 + 5.25\times10^{-6}(mi)]^{-1}$$

Where:

$FE_{4,000mi}$=Fuel economy data adjusted to 4,000-mile test point rounded to the nearest 0.1 mpg.

FE_T=Tested fuel economy value rounded to the nearest 0.1 mpg.

mi=System miles accumulated at the start of the test rounded to the nearest whole mile.

(4) For vehicles with 6,200 miles or less accumulated, the manufacturer is not required to adjust the data.

9. A new § 600.007–08 is added to read as follows:

§ 600.007–08 Vehicle acceptability.

(a) All certification vehicles and other vehicles tested to meet the requirements of 40 CFR part 86 (other than those chosen per 40 CFR 86.080–24(c) or 40 CFR 86.1829–01(a) as applicable, are considered to have met the requirements of this section.

(b) Any vehicle not meeting the provisions of paragraph (a) of this section must be judged acceptable by the Administrator under this section in order for the test results to be reviewed for use in subpart C or F of this part. The Administrator will judge the acceptability of a fuel economy data vehicle on the basis of the information supplied by the manufacturer under § 600.006(b). The criteria to be met are:

(1) A fuel economy data vehicle may have accumulated not more than 10,000 miles. A vehicle will be considered to have met this requirement if the engine

and drivetrain have accumulated 10,000 or fewer miles. The components installed for a fuel economy test are not required to be the ones with which the mileage was accumulated, e.g., axles, transmission types, and tire sizes may be changed. The Administrator will determine if vehicle/engine component changes are acceptable.

(2) A vehicle may be tested in different vehicle configurations by change of vehicle components, as specified in paragraph (b)(1) of this section, or by testing in different inertia weight classes. Also, a single vehicle may be tested under different test conditions, i.e., test weight and/or road load horsepower, to generate fuel economy data representing various situations within a vehicle configuration. For purposes of this part, data generated by a single vehicle tested in various test conditions will be treated as if the data were generated by the testing of multiple vehicles.

(3) The mileage on a fuel economy data vehicle must be, to the extent possible, accumulated according to 40 CFR 86.1831.

(4) Each fuel economy data vehicle must meet the same exhaust emission standards as certification vehicles of the respective engine-system combination during the test in which the city fuel economy test results are generated. The deterioration factors established for the respective engine-system combination per § 86.1841–01 as applicable will be used.

(5) The calibration information submitted under § 600.006(b) must be representative of the vehicle configuration for which the fuel economy data were submitted.

(6) Any vehicle tested for fuel economy purposes must be representative of a vehicle which the manufacturer intends to produce under the provisions of a certificate of conformity.

(7) For vehicles imported under § 85.1509 or § 85.1511(b)(2), (b)(4), (c)(2), (c)(4), or (e)(2) (when applicable) only the following requirements must be met:

(i) For vehicles imported under § 85.1509, a highway fuel economy value must be generated contemporaneously with the emission tests used for purposes of demonstrating compliance with § 85.1509. No modifications or adjustments should be made to the vehicles between the highway fuel economy, FTP, US06, SC03 and Cold temperature FTP tests.

(ii) For vehicles imported under § 85.1509 or § 85.1511(b)(2), (b)(4), (c)(2), (c)(4) or (e)(2) (when applicable) with over 10,000 miles, the equation in § 600.006–86(g)(1) shall be used as though only 10,000 miles had been accumulated.

(iii) Any required fuel economy testing must take place after any safety modifications are completed for each vehicle as required by regulations of the Department of Transportation.

(iv) Every vehicle imported under § 85.1509 or § 85.1511(b)(2), (b)(4), (c)(2), (c)(4) or (e)(2) (when applicable) shall be considered a separate type for the purposes of calculating a fuel economy label for a manufacturer's average fuel economy.

(c) If, based on review of the information submitted under § 600.006(b), the Administrator determines that a fuel economy data vehicle meets the requirements of this section, the fuel economy data vehicle will be judged to be acceptable and fuel economy data from that fuel economy data vehicle will be reviewed pursuant to § 600.008.

(d) If, based on the review of the information submitted under § 600.006(b), the Administrator determines that a fuel economy data vehicle does not meet the requirements of this section, the Administrator will reject that fuel economy data vehicle and inform the manufacturer of the rejection in writing.

(e) If, based on a review of the emission data for a fuel economy data vehicle, submitted under § 600.006(b), or emission data generated by a vehicle tested under § 600.008(e), the Administrator finds an indication of non-compliance with section 202 of the Clean Air Act, 42 U.S.C. 1857 et seq. of the regulation thereunder, he may take such investigative actions as are appropriate to determine to what extent emission non-compliance actually exists.

(1) The Administrator may, under the provisions of 40 CFR 86.079–37(a) or 40 CFR 86.1830–01 as applicable, request the manufacturer to submit production vehicles of the configuration(s) specified by the Administrator for testing to determine to what extent emission noncompliance of a production vehicle configuration or of a group of production vehicle configurations may actually exist.

(2) If the Administrator determines, as a result of his investigation, that substantial emission non-compliance is exhibited by a production vehicle configuration or group of production vehicle configurations, he may proceed with respect to the vehicle configuration(s) as provided under section 206(b)(2) or section 207(c)(1), as applicable of the Clean Air Act, 42 U.S.C. 1857 et seq.

(f) All vehicles used to generate fuel economy data, and for which emission standards apply, must be covered by a certificate of conformity under part 86 of this chapter before:

(1) The data may be used in the calculation of any approved general or specific label value, or

(2) The data will be used in any calculations under subpart F, except that vehicles imported under §§ 85.1509 and 85.1511 need not be covered by a certificate of conformity.

10. A new § 600.008–08 is added to read as follows:

§ 600.008–08 Review of fuel economy data, testing by the Administrator.

(a) *Testing by the Administrator.* (1) The Administrator may require that any one or more of the test vehicles be submitted to the Agency, at such place or places as the Agency may designate, for the purposes of conducting fuel economy tests. The Administrator may specify that such testing be conducted at the manufacturer's facility, in which case instrumentation and equipment specified by the Administrator shall be made available by the manufacturer for test operations. The tests to be performed may comprise the FTP, highway fuel economy test, US06, SC03, or Cold temperature FTP or any combination of those tests. Any testing conducted at a manufacturer's facility pursuant to this paragraph shall be scheduled by the manufacturer as promptly as possible.

(2) *Retesting and official data determination.* For any vehicles selected for confirmatory testing under the provisions of paragraph (a)(1) of this section, the Administrator will follow this procedure:

(i) The manufacturer's data (or harmonically averaged data if more than one test was conducted) will be compared with the results of the Administrator's test.

(ii) If, in the Administrator's judgment, the comparison in paragraph (a)(2)(i) of this section indicates a disparity in the data, the Administrator will repeat the test or tests as applicable.

(A) The manufacturer's average test results and the results of the Administrator's first test will be compared with the results of the Administrator's second test as in paragraph (a)(2)(i) of this section.

(B) If, in the Administrator's judgment, both comparisons in paragraph (a)(2)(i)(A) of this section, indicate a disparity in the data, the Administrator will repeat the applicable test or tests until:

(*i*) In the Administrator's judgment no disparity in the data is indicated by comparison of two tests by the Administrator or by comparison of the manufacturer's average test results and a test by the Administrator; or

(*ii*) Four tests of a single test type are conducted by the Administrator in which a disparity in the data is indicated when compared as in paragraph (a)(2)(ii) of this section.

(iii) If there is, in the Administrator's judgment, no disparity indicated by comparison of manufacturer's average test results with a test by the Administrator, the test values generated by the Administrator will be used to represent the vehicle.

(iv) If there is, in the Administrator's judgment, no disparity indicated by comparison of two tests by the Administrator, the harmonic averages of the fuel economy results from those tests will be used to represent the vehicle.

(v) If the situation in paragraph (a)(2)(ii)(B)(*ii*) of this section occurs, the Administrator will notify the manufacturer, in writing, that the Administrator rejects that fuel economy data vehicle.

(b) *Manufacturer-conducted confirmatory testing.* (1) If the Administrator determines not to conduct a confirmatory test under the provisions of paragraph (a) of this section, manufacturers will conduct a confirmatory test at their facility after submitting the original test data to the Administrator whenever any of the following conditions exist:

(i) The vehicle configuration has previously failed an emission standard;

(ii) The test exhibits high emission levels determined by exceeding a percentage of the standards specified by the Administrator for that model year;

(iii) The fuel economy value of the FTP or HFET test is higher than expected based on procedures approved by the Administrator;

(iv) The fuel economy for the FTP or HFET test is close to a Gas Guzzler Tax threshold value based on tolerances established by the Administrator; or

(v) The fuel economy value for the FTP or highway is a potential fuel economy leader for a class of vehicles based on cut points provided by the Administrator.

(2) If the Administrator selects the vehicle for confirmatory testing based on the manufacturer's original test results, the testing shall be conducted as ordered by the Administrator. In this case, the manufacturer-conducted confirmatory testing specified under paragraph (b)(1) of this section would not be required.

(3) The manufacturer shall conduct a retest of the FTP or highway test if the difference between the fuel economy of the confirmatory test and the original manufacturer's test equals or exceeds three percent (or such lower percentage to be applied consistently to all manufacturer-conducted confirmatory testing as requested by the manufacturer and approved by the Administrator).

(i) The manufacturer may, in lieu of conducting a retest, accept the lower of the original and confirmatory test fuel economy results for use in subpart C or F of this part.

(ii) The manufacturer shall conduct a second retest of the FTP or highway test if the fuel economy difference between the second confirmatory test and the original manufacturer test equals or exceeds three percent (or such lower percentage as requested by the manufacturer and approved by the Administrator) and the fuel economy difference between the second confirmatory test and the first confirmatory test equals or exceeds three percent (or such lower percentage as requested by the manufacturer and approved by the Administrator). The manufacturer may, in lieu of conducting a second retest, accept the lowest of the original test, the first confirmatory test, and the second confirmatory test fuel economy results for use in subpart C or F of this part.

(4) The Administrator may request the manufacturer to conduct a retest of the US06, SC03 or Cold Temperature FTP on the basis of fuel economy that is higher than expected as specified in criteria provided by the Administrator. Such retests shall not be required before the 2011 model year.

(c) *Review of fuel economy data.* (1) Fuel economy data must be judged reasonable and representative by the Administrator in order for the test results to be used for the purposes of subpart C or F of this part. In making this determination, the Administrator will, when possible, compare the results of a test vehicle to those of other similar test vehicles.

(2) If testing was conducted by the Administrator under the provisions of paragraph (a) of this section, the fuel economy data determined by the Administrator under paragraph (a) of this section, together with all other fuel economy data submitted for that vehicle under § 600.006(c) or (e) will be evaluated for reasonableness and representativeness per paragraph (c)(1) of this section.

(i) The fuel economy data which are determined to best meet the criteria of paragraph (c)(1) of this section will be accepted for use in subpart C or F of this part.

(ii) City, HFET, US06, SC03 and Cold temperature FTP test data will be considered separately.

(iii) If more than one test was conducted, the Administrator may select an individual test result or the harmonic average of selected test results to satisfy the requirements of paragraph (c)(2)(i) of this section.

(3) If confirmatory testing was not conducted by the Administrator but confirmatory testing was conducted by the manufacturer under the provisions of paragraph (b) of this section, the fuel economy data determined by the Administrator under paragraph (b) of this section, will be evaluated for reasonableness and representativeness per paragraph (c)(1) of this section.

(i) The fuel economy data which are determined to best meet the criteria of paragraph (c)(1) of this section will be accepted for use in subpart C or F of this part.

(ii) City, HFET, US06, SC03 and Cold temperature FTP test data will be considered separately.

(iii) If more than one test was conducted, the Administrator may select an individual test result or the harmonic average of selected test results to satisfy the requirements of paragraph (c)(2)(i) of this section.

(4) If no confirmatory testing was conducted by either the Administrator or the manufacturer under the provisions of paragraph (a) and (b) of this section, respectively, then the data submitted under the provisions of § 600.006(c) or (e) shall be accepted for use in subpart C or F of this part.

(i) City, HFET, US06, SC03 and Cold temperature FTP test data will be considered separately.

(ii) If more than one test was conducted, the harmonic average of the test results shall be accepted for use in subpart C or F of this part.

(d) If, based on a review of the fuel economy data generated by testing under paragraph (a) of this section, the Administrator determines that an unacceptable level of correlation exists between fuel economy data generated by a manufacturer and fuel economy data generated by the Administrator, he/she may reject all fuel economy data submitted by the manufacturer until the cause of the discrepancy is determined and the validity of the data is established by the manufacturer.

(e)(1) If, based on the results of an inspection conducted under § 600.005(b) or any other information, the Administrator has reason to believe that the manufacturer has not followed proper testing procedures or that the testing equipment is faulty or improperly calibrated, or if records do not exist that will enable him to make a finding of proper testing, the Administrator may notify the manufacturer in writing of his finding and require the manufacturer to:

(i) Submit the test vehicle(s) upon which the data are based or additional test vehicle(s) at a place he may designate for the purpose of fuel economy testing.

(ii) Conduct such additional fuel economy testing as may be required to demonstrate that prior fuel economy test data are reasonable and representative.

(2) Previous acceptance by the Administrator of any fuel economy test data submitted by the manufacturer shall not limit the Administrator's right to require additional testing under paragraph (h)(1) of this section.

(3) If, based on tests required under paragraph (e)(1) of this section, the Administrator determines that any fuel economy data submitted by the manufacturer and used to calculate the manufacturer's fuel economy average was unrepresentative, the Administrator may recalculate the manufacturer's fuel economy average based on fuel economy data that he/she deems representative.

(4) A manufacturer may request a hearing as provided in § 600.009 if the Administrator decides to recalculate the manufacturer's average pursuant to determinations made relative to this section.

11. A new § 600.010–08 is added to read as follows:

§ 600.010–08 Vehicle test requirements and minimum data requirements.

(a) For each certification vehicle defined in this part, and for each vehicle tested according to the emission test procedures in 40 CFR part 86 for addition of a model after certification or approval of a running change (40 CFR 86.079–32, 86.079–33 and 86.082–34 or 40 CFR 86.1842–01 as applicable):

(1) The manufacturer shall generate FTP fuel economy data by testing according to the applicable procedures.

(2) The manufacturer shall generate highway fuel economy data by:

(i) Testing according to applicable procedures, or

(ii) Using an analytical technique, as described in § 600.006(e).

(3) The manufacturer shall generate US06 fuel economy data by testing according to the applicable procedures. Alternative fueled vehicles or dual fueled vehicles operating on alternative fuel may optionally generate this data using the alternative fuel.

(4) The manufacturer shall generate SC03 fuel economy data by testing according to the applicable procedures. Alternative fueled vehicles or dual fueled vehicles operating on alternative fuel may optionally generate this data using the alternative fuel.

(5) The manufacturer shall generate Cold temperature FTP fuel economy data by testing according to the applicable procedures. Alternative fueled vehicles or dual fueled vehicles operating on alternative fuel may optionally generate this data using the alternative fuel.

(6) The data generated in paragraphs (a)(1) through (5) of this section, shall be submitted to the Administrator in combination with other data for the vehicle required to be submitted in part 86.

(b) For each fuel economy data vehicle:

(1) The manufacturer shall generate city and FTP fuel economy data by:

(i) Testing according to applicable procedures, or

(ii) Use of an analytical technique as described in § 600.006(e), in addition to testing (e.g., city fuel economy data by testing, highway fuel economy data by analytical technique).

(2) The data generated shall be submitted to the Administrator according to the procedures in § 600.006.

(c) *Minimum data requirements for labeling.* (1) In order to establish fuel economy label values under § 600.306, the manufacturer shall use only test data accepted in accordance with § 600.008(b) and (f) and meeting the minimum coverage of:

(i) Data required for emission certification under 40 CFR 86.084–24, 86.079–32, 86.079–33, and 86.082–34 or 40 CFR 86.1828–01 and 86.1842–01 as applicable.

(ii)(A) FTP and HFET data from the highest projected model year sales subconfiguration within the highest projected model year sales configuration for each base level, and

(B) If required under § 600.116–08, US06, SC03 and cold temperature FTP data from the highest projected model year sales subconfiguration within the highest projected model year sales configuration for each base level.

(C) Optionally, the manufacturer may generate US06, SC03 and cold temperature FTP fuel economy data for the highest projected model year sales subconfiguration within the highest projected model year sales configuration for each base level.

(iii) For additional model types established under § 600.208(a)(2) or 600.209(a)(2), FTP and HFET data, and if required under § 600.116–08, US06, SC03 and Cold temperature FTP data from each subconfiguration included within the model type.

(2) For the purpose of recalculating fuel economy label values as required under § 600.314(b), the manufacturer shall submit data required under § 600.507.

(d) *Minimum data requirements for the manufacturer's average fuel economy.* For the purpose of calculating the manufacturer's average fuel economy under § 600.510, the manufacturer shall submit data representing at least 90 percent of the manufacturer's actual model year production, by configuration, for each category identified for calculation under § 600.510(a).

12. A new § 600.011–08 is added to read as follows:

§ 600.011–08 Reference materials.

(a) *Incorporation by reference.* The documents in paragraph (b) of this section have been incorporated by reference. The incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be inspected at USEPA, OAR, 1200 Pennsylvania Ave., NW., Washington, DC 20460, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(b) The following paragraphs and tables set forth the material that has been incorporated by reference in this part.

(1) *ASTM material.* The following table sets forth material from the American Society for Testing and Materials which has been incorporated by reference. The first column lists the number and name of the material. The second column lists the section(s) of this part, other than § 600.011, in which the matter is referenced. Copies of these materials may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

Document number and name	40 CFR part 600 reference
ASTM E 29–67 (Reapproved 1973) Standard Recommended Practice for Indicating Which Places of Figures Are To Be Considered Significant in Specified Limiting Values..	600.002–08.
ASTM D 1298–85 (Reapproved 1990) Standard Practice for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method.	600.113–08(f)(1)(i), (f)(2)(i)(A), (f)(2)(i)(B), (f)(2)(ii); 600.510–08(g)(1)(ii)(B), (g)(2)(ii)(B).
ASTM D 3343–90 Standard Test Method for Estimation of Hydrogen Content of Aviation Fuels	600.113–08(f)(1)(ii), (f)(2)(i), (f)(2)(ii).
ASTM D 3338–92 Standard Test Method for Estimation of Net Heat of Combustion of Aviation Fuels.	600.113–08(f)(1)(iii).
ASTM D 240–92 Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter.	600.113–08(f)(2)(iii); 600.510–93(g)(1)(ii)(A), (g)(2)(ii)(A).
ASTM D975–04c "Standard Specification for Diesel Fuel Oils"	600.107–08(b), 600.113–08(c)(1).
ASTM D 1945–91 Standard Test Method for Analysis of Natural Gas By Gas Chromatography	600.113–08(f)(3), (k).

(2) [Reserved]

Subpart B—[Amended]

13. A new § 600.106–08 is added to read as follows:

§ 600.106–08 Equipment requirements.

The requirements for test equipment to be used for all fuel economy testing are given in Subparts B and C of part 86 of this chapter.

14. A new § 600.107–08 is added to read as follows:

§ 600.107–08 Fuel specifications.

(a) The test fuel specifications for gasoline, diesel, methanol, and methanol-petroleum fuel mixtures are given in § 86.113 of this chapter, except for cold temperature FTP fuel requirements for diesel vehicles, which are given in paragraph (b) of this section.

(b) Diesel test fuel used for cold temperature FTP testing must comprise a winter-grade diesel fuel as specified in ASTM D975–04c ''Standard Specification for Diesel Fuel Oils'' and that complies with 40 CFR part 80. Alternatively, EPA may approve the use of a different diesel fuel, provided that the level of kerosene added shall not exceed 20 percent.

15. A new § 600.109–08 is added to read as follows:

§ 600.109–08 EPA driving cycles.

(a) The FTP driving cycle is prescribed in § 86.115 of this chapter.

(b) The highway fuel economy driving cycle is specified in this paragraph.

(1) The Highway Fuel Economy Driving Schedule is set forth in appendix I to this part. The driving schedule is defined by a smooth trace drawn through the specified speed versus time relationships.

(2) The speed tolerance at any given time on the dynamometer driving schedule specified in appendix I, or as printed on a driver's aid chart approved by the Administrator, when conducted to meet the requirements of paragraph (b) of § 600.111 is defined by upper and lower limits. The upper limit is 2 mph higher than the highest point on trace within 1 second of the given time. The lower limit is 2 mph lower than the lowest point on the trace within 1 second of the given time. Speed variations greater than the tolerances (such as may occur during gear changes) are acceptable provided they occur for less than 2 seconds on any occasion. Speeds lower than those prescribed are acceptable provided the vehicle is operated at maximum available power during such occurrences.

(3) A graphic representation of the range of acceptable speed tolerances is found in § 86.115 (c) of this chapter.

(4) The US06 driving cycle is set forth in Appendix I of part 86 of this chapter.

(5) The SC03 driving cycle is set forth in Appendix I of part 86 of this chapter.

16. A new § 600.110–08 is added to read as follows:

§ 600.110–08 Equipment calibration.

The equipment used for fuel economy testing must be calibrated according to the provisions of § 86.116 and 86.216 of this chapter.

17. A new § 600.111–08 is added to read as follows:

§ 600.111–08 Test procedures.

(a) *FTP testing procedures.* The test procedures to be followed for conducting the FTP test are those prescribed in §§ 86.127 through 86.138 of this chapter, as applicable, except as provided for in paragraph (b)(5) of this section. (The evaporative loss portion of the test procedure may be omitted unless specifically required by the Administrator.)

(b) *Highway fuel economy testing procedures.* (1) The Highway Fuel Economy Dynamometer Procedure (HFET) consists of preconditioning highway driving sequence and a measured highway driving sequence.

(2) The HFET is designated to simulate non-metropolitan driving with an average speed of 48.6 mph and a maximum speed of 60 mph. The cycle is 10.2 miles long with 0.2 stop per mile and consists of warmed-up vehicle operation on a chassis dynamometer through a specified driving cycle. A proportional part of the diluted exhaust emission is collected continuously for subsequent analysis of hydrocarbons, carbon monoxide, carbon dioxide using a constant volume (variable dilution) sampler. Diesel dilute exhaust is continuously analyzed for hydrocarbons using a heated sample line and analyzer. Methanol and formaldehyde samples are collected and individually analyzed for methanol-fueled vehicles (measurement of methanol and formaldehyde may be omitted for 1993 through 1994 model year methanol-fueled vehicles provided a HFID calibrated on methanol is used for measuring HC plus methanol).

(3) Except in cases of component malfunction or failure, all emission control systems installed on or incorporated in a new motor vehicle must be functioning during all procedures in this subpart. The Administrator may authorize maintenance to correct component malfunction or failure.

(4) Transmission. The provisions of § 86.128 of this chapter apply for vehicle transmission operation during highway fuel economy testing under this subpart.

(5) Road load power and test weight determination. Section 86.129 of this chapter applies for determination of road load power and test weight for highway fuel economy testing. The test weight for the testing of a certification vehicle will be that test weight specified by the Administrator under the provisions of part 86 of this chapter. The test weight for a fuel economy data vehicle will be that test weight specified by the Administrator from the test weights covered by that vehicle configuration. The Administrator will base his selection of a test weight on the relative projected sales volumes of the various test weights within the vehicle configuration.

(6) Vehicle preconditioning. The HFET is designed to be performed immediately following the Federal Emission Test Procedure, §§ 86.127 through 86.138 of this chapter. When conditions allow, the tests should be scheduled in this sequence. In the event the tests cannot be scheduled within three hours of the Federal Emission Test Procedure (including one hour hot soak evaporative loss test, if applicable) the vehicle should be preconditioned as in paragraph (b)(6)(i) or (ii) of this section, as applicable.

(i) If the vehicle has experienced more than three hours of soak (68 °F–86 °F) since the completion of the Federal Emission Test Procedure, or has experienced periods of storage outdoors, or in environments where soak temperature is not controlled to 68 °F–86 °F, the vehicle must be preconditioned by operation on a dynamometer through one cycle of the EPA Urban Dynamometer Driving Schedule, § 86.115 of this chapter.

(ii) In unusual circumstances where additional preconditioning is desired by the manufacturer, the provisions of § 86.132(a)(3) of this chapter apply.

(7) Highway fuel economy dynamometer procedure. (1) The dynamometer procedure consists of two cycles of the Highway Fuel Economy Driving Schedule (§ 600.109(b)) separated by 15 seconds of idle. The first cycle of the Highway Fuel Economy Driving Schedule is driven to precondition the test vehicle and the second is driven for the fuel economy measurement.

(8) The provisions of paragraphs (b), (c), (e), (f), (g) and (h) of § 86.135 Dynamometer procedure of this chapter, apply for highway fuel economy testing.

(9) Only one exhaust sample and one background sample are collected and analyzed for hydrocarbons (except diesel hydrocarbons which are analyzed continuously), carbon monoxide, and carbon dioxide. Methanol and formaldehyde samples (exhaust and dilution air) are collected and analyzed for methanol-fueled vehicles (measurement of methanol and formaldehyde may be omitted for 1993 through 1994 model year methanol-fueled vehicles provided a HFID calibrated on methanol is used for measuring HC plus methanol).

(10) The fuel economy measurement cycle of the test includes two seconds of idle indexed at the beginning of the second cycle and two seconds of idle indexed at the end of the second cycle.

(11) *Engine starting and restarting.* (i) If the engine is not running at the initiation of the highway fuel economy test (preconditioning cycle), the start-up procedure must be according to the manufacturer's recommended procedures.

(ii) False starts and stalls during the preconditioning cycle must be treated as in 40 CFR 86.136(d) and (e). If the vehicle stalls during the measurement cycle of the highway fuel economy test, the test is voided, corrective action may be taken according to 40 CFR 86.1834–01 as applicable, and the vehicle may be rescheduled for test. The person taking the corrective action shall report the action so that the test records for the vehicle contain a record of the action.

(12) *Dynamometer test run.* The following steps must be taken for each test:

(i) Place the drive wheels of the vehicle on the dynamometer. The vehicle may be driven onto the dynamometer.

(ii) Open the vehicle engine compartment cover and position the cooling fan(s) required. Manufacturers may request the use of additional cooling fans for additional engine compartment or under-vehicle cooling and for controlling high tire or brake temperatures during dynamometer operation.

(iii) Preparation of the CVS must be performed before the measurement highway driving cycle.

(iv) *Equipment preparation.* The provisions of § 86.137(b)(3) through (6) of this chapter apply for highway fuel economy test except that only one exhaust sample collection bag and one dilution air sample collection bag need be connected to the sample collection systems.

(v) Operate the vehicle over one Highway Fuel Economy Driving Schedule cycle according to the dynamometer driving schedule specified in § 600.109(b).

(vi) When the vehicle reaches zero speed at the end of the preconditioning cycle, the driver has 17 seconds to prepare for the emission measurement cycle of the test.

(vii) Operate the vehicle over one Highway Fuel Economy Driving Schedule cycle according to the dynamometer driving schedule specified in § 600.109(b) while sampling the exhaust gas.

(viii) Sampling must begin two seconds before beginning the first acceleration of the fuel economy measurement cycle and must end two seconds after the end of the deceleration to zero. At the end of the deceleration to zero speed, the roll or shaft revolutions must be recorded.

(ix) For methanol dual fuel automobiles, the procedures of § 600.111(a) and (b) shall be performed for each of the required test fuels:

(A) Gasoline or diesel fuel as specified in § 600.107(a) and (b); and

(B) Methanol fuel as specified in § 600.107(c) and (d); and

(C) [Reserved.]

(D) In lieu of testing using the mixture containing 50% gasoline or diesel and 50% methanol by volume, the manufacturer must provide a written statement attesting that the equal or superior energy efficiency is attained while using the 50% gasoline or diesel and 50% methanol mixture compared to using gasoline.

(c) *US06 testing procedures.* The test procedure to be followed for conducting the US06 test are prescribed in §§ 86.158 through 86.159 of this chapter, as applicable.

(d) *SC03 testing procedures.* The test procedures to be followed for conducting the SC03 test are prescribed in §§ 86.158 and 86.160 through 164 of this chapter, as applicable.

(e) *Cold temperature FTP procedures.* The test procedures to be followed for conducting the cold temperature FTP test are prescribed in §§ 86.227 through 86.240 of this chapter, as applicable.

18. A new § 600.112–08 is added to read as follows:

§ 600.112–08 Exhaust sample analysis.

The exhaust sample analysis must be performed according to § 86.140, or § 86.240 of this chapter, as applicable.

19. A new § 600.113–08 is added to read as follows:

§ 600.113–08 Fuel economy calculations for FTP, HFET, US06, SC03 and Cold Temperature FTP tests.

The Administrator will use the calculation procedure set forth in this paragraph for all official EPA testing of vehicles fueled with gasoline, diesel, methanol or natural gas fuel. The calculations of the weighted fuel economy values require input of the weighted grams/mile values for total hydrocarbons (HC), carbon monoxide (CO), and carbon dioxide (CO_2); and, additionally for methanol-fueled automobiles, methanol (CH_3 OH) and formaldehyde (HCHO); and additionally for natural gas-fueled vehicles non-methane hydrocarbons (NMHC) and methane (CH_4) for the FTP, HFET, US06, SC03 and Cold temperature FTP tests. Additionally, the specific gravity, carbon weight fraction and net heating value of the test fuel must be determined. The FTP, HFET, US06, SC03 and cold temperature FTP fuel economy values shall be calculated as specified in this section. An example appears in appendix II to this part.

(a) Calculate the FTP fuel economy.

(1) Calculate the weighted grams/mile values for the FTP test for HC, CO and CO_2; and, additionally for methanol-fueled automobiles, CH_3 OH and HCHO; and additionally for natural gas-fueled automobiles NMHC and CH_4 as specified in § 86.144 of this chapter. Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(2) Calculate separately the grams/mile values for the cold transient phase, stabilized phase and hot transient phase of the FTP test. For vehicles with more than one source of propulsion energy, one of which is a rechargeable energy storage system, or vehicles with special features that the Administrator determines may have a reachargeable energy source, whose charge can vary during the test, calculate separately the grams/mile values for the cold transient phase, stabilized phase, hot transient phase and hot stabilized phase of the FTP test.

(b)(1) Calculate the mass values for the highway fuel economy test for HC, CO and CO_2, and where applicable CH_3 OH, HCHO, NMHC and CH_4 as specified in § 86.144(b) of this chapter. Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(2) Calculate the grams/mile values for the highway fuel economy test for HC, CO and CO_2, and where applicable CH_3 OH, HCHO, NMHC and CH_4 by dividing the mass values obtained in paragraph (b)(1) of this section, by the actual distance traveled, measured in miles, as specified in § 86.135(h) of this chapter.

(c) Calculate the cold temperature FTP fuel economy.

(1) Calculate the weighted grams/mile values for the cold temperature FTP test for HC, CO and CO_2; and, additionally for methanol-fueled automobiles, CH_3 OH and HCHO; and additionally for natural gas-fueled automobiles NMHC and CH_4 as specified in § 86.244 of this chapter. Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(2) Calculate separately the grams/mile values for the cold transient phase, stabilized phase and hot transient phase of the cold temperature FTP test in § 40 CFR 86.244. For vehicles with more than one source of propulsion energy, one of which is a rechargeable energy storage system, or vehicles with special features that the Administrator determines may have a reachargeable energy source, whose charge can vary during the test, calculate separately the grams/mile values for the cold transient phase, stabilized phase, hot transient phase and hot stabilized phase of the cold temperature FTP test.

(3) Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(d) Calculate separately the first and second phase grams/mile values for the US06 test for HC, CO and CO_2; and additionally for methanol-fueled automobiles, CH_3 OH and HCHO; and additionally for natural gas-fueled automobiles NMHC and CH_4 as specified in 86.144 of this chapter. Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(e) Calculate the grams/mile values for the SC03 test for HC, CO and CO_2; and additionally for methanol-fueled automobiles, CH_3 OH and HCHO; and additionally for natural gas-fueled automobiles NMHC and CH_4 as specified in 86.144 of this chapter. Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(f)(1) Gasoline test fuel properties shall be determined by analysis of a fuel sample taken from the fuel supply. A sample shall be taken after each addition of fresh fuel to the fuel supply. Additionally, the fuel shall be resampled once a month to account for any fuel property changes during storage. Less frequent resampling may be permitted if EPA concludes, on the basis of manufacturer-supplied data, that the properties of test fuel in the manufacturer's storage facility will remain stable for a period longer than one month. The fuel samples shall be analyzed to determine the following fuel properties:

(i) Specific gravity per ASTM D 1298 (Incorporated by reference as specified in § 600.011–93).

(ii) Carbon weight fraction per ASTM D 3343 (Incorporated by reference as specified in § 600.011–93).

(iii) Net heating value (Btu/lb) per ASTM D 3338 (Incorporated by reference as specified in § 600.011–93).

(2) Methanol test fuel shall be analyzed to determine the following fuel properties:

(i) Specific gravity using either:

(A) ASTM D 1298 (incorporated by reference as specified in § 600.011–93) for the blend; or

(B) ASTM D 1298 (incorporated by reference as specified in § 600.011–93) for the gasoline fuel component and also for the methanol fuel component and combining as follows:

$SG=SG_g$ x volume fraction gasoline$+SG_m$ x volume fraction methanol.

(ii)(A) Carbon weight fraction using the following equation:

$CWF=CWF_g \text{ x } MF_g+0.375 \text{ x } MF_m$

Where:

CWF_g=Carbon weight fraction of gasoline portion of blend per ASTM D 3343 (incorporated by reference as specified in § 600.011–93).

MF_g=Mass fraction gasoline=$(GxSG_g)/(GxSG_g+MxSG_m)$

MF_m=Mass fraction methanol=$(MxSG_m)/(GxSG_g+MxSG_m)$

Where:

G=Volume fraction gasoline

M=Volume fraction methanol

SG_g=Specific gravity of gasoline as measured by ASTM D 1298 (Incorporated by reference as specified in § 600.011–93).

SG_m=Specific gravity of methanol as measured by ASTM D 1298 (Incorporated by reference as specified in § 600.011–93).

(B) Upon the approval of the Administrator, other procedures to measure the carbon weight fraction of the fuel blend may be used if the manufacturer can show that the procedures are superior to or equally as accurate as those specified in this paragraph (f)(2)(ii).

(iii) Net heating value (BTU/lb) per ASTM D 240 (Incorporated by reference as specified in § 600.011–93).

(3) Natural gas test fuel shall be analyzed to determine the following fuel properties:

(i) Fuel composition per ASTM D 1945–91, Standard Test Method for Analysis of Natural Gas By Gas Chromatography. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103. Copies may be inspected at U.S. EPA Headquarters Library, EPA West Building, Constitution Avenue and 14th Street, NW., Room 3340, Washington, DC, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(ii) Specific gravity (based on fuel composition per ASTM D 1945).

(iii) Carbon weight fraction based on the carbon contained only in the HC constituents of the fuel=weight of carbon in HC constituents divided by the total weight of fuel.

(iv) Carbon weight fraction of fuel=total weight of carbon in the fuel (i.e., includes carbon contained in HC and in CO_2 divided by total weight of fuel.

(g) Calculate separate FTP, highway, US06, SC03 and Cold temperature FTP fuel economy from the grams/mile values for total HC, CO, CO_2 and, where applicable, CH_3, OH, HCHO, NMHC and CH_4 and, the test fuel's specific gravity, carbon weight fraction, net heating value, and additionally for natural gas, the test fuel's composition. The emission values (obtained per paragraph (a) through (e) of this section, as applicable) used in each calculation of this section shall be rounded in accordance with 40 CFR 86.084–26(a)(6)(iii) or 40 CFR 86.1837–01 as applicable. The CO_2 values (obtained per this section, as applicable) used in each calculation of this section shall be rounded to the nearest gram/mile. The specific gravity and the carbon weight fraction (obtained per paragraph (f) of this section) shall be recorded using three places to the right of the decimal point. The net heating value (obtained per paragraph (f) of this section) shall be recorded to the nearest whole Btu/lb.

(h)(1) For gasoline-fueled automobiles, the fuel economy in miles per gallon is to be calculated using the following equation:

$$mpg=(5174\times10^4\times C\times CWF\times SG) / [((CWF\times HC) + (0.429\times CO) + (0.273\times CO_2)) \times ((0.6\times SG\times NHV)+5471)]$$

Where:

HC=Grams/mile HC as obtained in paragraph (g) of this section.

CO=Grams/mile CO as obtained in paragraph (g) of this section.

CO_2=Grams/mile CO_2 as obtained in paragraph (g) of this section.

CWF=Carbon weight fraction of test fuel as obtained in paragraph (g) of this section.

NHV=Net heating value by mass of test fuel as obtained in paragraph (g) of this section.

SG=Specific gravity of test fuel as obtained in paragraph (g) of this section.

(2) Round the calculated result to the nearest 0.1 miles per gallon.

(i)(1) For diesel-fueled automobiles, calculate the fuel economy in miles per gallon of diesel fuel by dividing 2778 by the sum of three terms:

(i) 0.866 multiplied by HC (in grams/miles as obtained in paragraph (g) of this section);

(ii) 0.429 multiplied by CO (in grams/mile as obtained in paragraph (g) of this section); and

(iii) 0.273 multiplied by CO_2 (in grams/mile as obtained in paragraph (g) of this section).

(2) Round the quotient to the nearest 0.1 mile per gallon.

(j) For methanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and methanol, the fuel economy in miles per gallon is to be calculated using the following equation:

$$mpg=(CWF\times SG\times 3781.8) / ((CWF_{exHC}\times HC) + (0.429\times CO) + (0.273\times CO_2) + (0.375\times CH_3OH) + (0.400\times HCHO))$$

Where:

CWF=Carbon weight fraction of the fuel as determined in paragraph (f)(2)(ii) of this section.

SG=Specific gravity of the fuel as determined in paragraph (f)(2)(i) of this section.

CWF_{exHC}=Carbon weight fraction of exhaust hydrocarbons= CWF_g as determined in (c)(2)(ii) of this section (for M100 fuel, CWF_{exHC}=0.866).

HC=Grams/mile HC as obtained in paragraph (g) of this section.

CO=Grams/mile CO as obtained in paragraph (g) of this section.

CO_2=Grams/mile CO_2 as obtained in paragraph (g) of this section.

CH_3OH=Grams/mile CH_3OH (methanol) as obtained in paragraph (d) of this section.

HCHO=Grams/mile HCHO (formaldehyde) as obtained in paragraph (g) of this section.

(k) For automobiles fueled with natural gas, the fuel economy in miles per gallon of natural gas is to be calculated using the following equation:

$$mpg_e = \frac{CWF_{HC/NG} D_{NG} 121.5}{(0.749)CH_4 + (CWF_{NMHC}) + (0.429)CO + (0.273)(CO_2 - CO_{2\,NG})}$$

Where:

mpg_e=miles per equivalent gallon of natural gas.

$CWF_{HC/NG}$=carbon weight fraction based on the hydrocarbon constituents in the natural gas fuel as obtained in paragraph (g) of this section.

D_{NG}=density of the natural gas fuel [grams/ft^3 at 68 °F (20° C) and 760 mm Hg (101.3 kPa)] pressure as obtained in paragraph (g) of this section.

CH_4, NMHC, CO, and CO_2=weighted mass exhaust emissions [grams/mile] for methane, non-methane HC, carbon monoxide, and carbon dioxide as calculated in § 600.113.

CWF_{NMHC}=carbon weight fraction of the non-methane HC constituents in the fuel as determined from the speciated fuel composition per paragraph (f)(3) of this section.

CO_{2NG}=grams of carbon dioxide in the natural gas fuel consumed per mile of travel.

$CO_{2NG}=FC_{NG}\ D_{NG}\ WF_{CO2}$

where:

FC_{NG}=cubic feet of natural gas fuel consumed per mile

$$= \frac{(0.749)CH_4 + (CWF_{NMHC})NMHC + (0.429)CO + (0.273))CO_2)}{CWF_{NG} D_{NG}}$$

where:

CWF_{NG}=the carbon weight fraction of the natural gas fuel as calculated in paragraph (f) of this section.

WF_{CO2}=weight fraction carbon dioxide of the natural gas fuel calculated using the mole fractions and molecular weights of the natural gas fuel constituents per ASTM D 1945.

20. A new § 600.114–08 is added to read as follows:

§ 600.114–08 Vehicle-specific 5-cycle fuel economy calculations.

This section applies to data used for fuel economy labeling under subpart D of this part.

(a) For each vehicle tested under sec. 600.010–08(c)(i) and (ii), determine the 5-cycle city fuel economy using the following equation:

$$\text{City FE} = 0.89 \times \frac{1}{(\text{Start FC} + \text{Running FC})}, \text{ where}$$

$$\text{StartFC (gallons per mile)} = 0.330 \times \left(\frac{(0.76 \times \text{StartFuel}_{75} + 0.24 \times \text{StartFuel}_{20})}{3.5} \right)$$

where,

$$\text{Start Fuel}_x \text{ for vehicles tested over a3} - \text{bag FTP} = \frac{3.59}{\text{Bag 1 FE}_x} - \frac{3.59}{\text{Bag 3 FE}_x}$$

or,

$$\text{Start Fuel}_x \text{ for vehicles tested over a4} - \text{bag FTP} = \frac{7.5}{\left(\frac{3.59}{\text{Bag 1 FE}_x} + \frac{3.91}{\text{Bag 2 FE}_x} \right)} - \frac{7.5}{\left(\frac{3.59}{\text{Bag 3 FE}_x} + \frac{3.91}{\text{Bag 4 FE}_x} \right)}$$

where

Bag y FE_x=the fuel economy in miles per gallon of fuel during the specified bag of the FTP test conducted at an ambient temperature of 75° or 20 °F.

$$\text{Running FC} = 0.70 \times \left[\frac{0.48}{\text{Bag } 2_{75} \text{ FE}} + \frac{0.41}{\text{Bag } 3_{75} \text{ FE}} + \frac{0.11}{\text{US06 City FE}} \right] + 0.30 \times \left[\frac{0.5}{\text{Bag } 2_{20} \text{ FE}} + \frac{0.5}{\text{Bag } 2_{20} \text{ FE}} \right]$$
$$+ 0.133 \times \frac{21.5}{19.9} \times \left[\frac{1}{\text{SC03 FE}} - \left(\frac{0.61}{\text{Bag } 3_{75} \text{ FE}} + \frac{0.39}{\text{Bag } 2_{75} \text{ FE}} \right) \right]$$

where:

US06 City FE = fuel economy in miles per gallon over the ''city'' portion of the US06 test,

HFET FE = fuel economy in miles per gallon over the HFET test,

SC03 FE = fuel economy in miles per gallon over the SC03 test.

(b) For each vehicle tested under sec. 600.010–08(a) and (c)(1)(ii)(B), determine the 5-cycle highway fuel economy using the following equation:

$$\text{Highway FE} = 0.89 \times \frac{1}{\text{Start FC} + \text{Running FC}}, \text{ where}$$

$$\text{StartFC (gallons per mile)} = 0.330 \times \left(\frac{(0.76 \times \text{StartFuel}_{75} + 0.24 \times \text{StartFuel}_{20})}{60} \right), \text{ where}$$

$$\text{Start Fuel}_x \text{ for vehicles tested over a3} - \text{bag FTP} = \frac{3.59}{\text{Bag 1 FE}_x} - \frac{3.59}{\text{Bag 3 FE}_x}, \text{ or}$$

$$\text{Start Fuel}_x \text{ for vehicles tested over a4} - \text{bag FTP} = \frac{7.5}{\left(\frac{3.59}{\text{Bag 1 FE}_x} + \frac{3.91}{\text{Bag 2 FE}_x} \right)} - \frac{7.5}{\left(\frac{3.59}{\text{Bag 3 FE}_x} + \frac{3.91}{\text{Bag 4 FE}_x} \right)}, \text{ where}$$

Bag y FE_x=the fuel economy in miles per gallon of fuel during the specified bag of the FTP test conducted at an ambient temperature of 75° or 20 °F.

$$\text{Running FC} = (1.012)\times\left[\frac{0.79}{\text{US06 Highway FE}}+\frac{0.21}{\text{HFET FE}}\right] + 0.133\times 0.377\times\left[\frac{1}{\text{SC06 FE}}-\left(\frac{0.61}{\text{Bag } 3_{75}\text{ FE}}+\frac{0.39}{\text{Bag } 2_{75}\text{ FE}}\right)\right],\ \text{where}$$

US06 Highway FE = fuel economy in mile per gallon over the highway portion of the US06 test,

HFET FE = fuel economy in mile per gallon over the HFET test,

SC03 FE = fuel economy in mile per gallon over the SC03 test.

21. A new § 600.115–08 is added to read as follows:

§ 600.115–08 Calculations for derived 5-cycle fuel economy.

This section applies to data used for fuel economy labeling under subpart D of this part.

(a) For each vehicle tested under 600.010 (a) and (b), determine the derived 5-cycle city fuel economy using the equation in this paragraph (a) and coefficients determined by the Administrator. Paragraph (c) of this section provides coefficients applicable to 2008 model year vehicles. In the case of dual fuel vehicles, determine separate fuel economy values for each fuel type. To determine the intercept and slope coefficients, the Administrator will compile the 5-cycle data collected under § 600.010–08(a) for three or more model years prior to the model year for which the coefficients are applicable. The Administrator will perform a least squares regression in which the vehicle-specific 5-cycle city fuel consumption (gallons per mile) is the dependent variable and the FTP fuel consumption (gallons per mile) is the independent variable. The resulting equation will define the slope and intercept coefficients. The Administrator will provide the coefficients to manufacturers by guidance letter issued no later than January 1 of the calendar year prior to the model year to which the coefficients are first applicable.

The equation is:

$$\text{Derived 5-cycle City Fuel Economy} = \frac{1}{\left(\{\text{City Intercept}\}+\frac{\{\text{City Slope}\}}{\text{FTP FE}}\right)}$$

, where:

City Intercept = Intercept determined by the Administrator

City Slope = Slope determined by the Administrator

FTP FE = the city fuel economy determined under sec. 600.113–08(a), rounded to the nearest tenth.

(b) For each vehicle tested under § 600.010 (a) and (b), determine the derived 5-cycle highway fuel economy using the equation in this paragraph (b) and coefficients determined by the Administrator. Paragraph (c) of this section provides coefficients applicable to 2008 model year vehicles. In the case of dual fuel vehicles, determine separate fuel economy values for each fuel type. To determine the intercept and slope coefficients, the Administrator will compile the 5-cycle data collected under § 600.010–08(a) for three or more model years prior to the model year for which the coefficients are applicable. The Administrator will perform a least squares regression in which the vehicle-specific 5-cycle highway fuel consumption (gallons per mile) is the dependent variable and the HFET fuel consumption (gallons per mile) is the independent variable. The resulting equation will define the slope and intercept coefficients. The Administrator will provide the coefficients for a given model year by guidance letter issued no later than January 1 of the calendar year prior to the model year to which the coefficients are first applicable.

The equation is:

$$\text{Derived 5-cycle Highway Fuel Economy} = \frac{1}{\left(\{\text{Highway Intercept}\}+\frac{\{\text{Highway Slope}\}}{\text{FTP FE}}\right)}$$

where:

Highway Intercept = Intercept determined by the Administrator based on historic 5-cycle highway fuel economy data

Highway Slope = Slope determined by the Administrator based on historic 5-cycle highway fuel economy data

HFET FE = the highway fuel economy determined under § 600.113–08(b), rounded to the nearest tenth.

(c) For 2008 and later model year vehicles, unless superseded by written guidance from the Administrator, the following values shall be used in the equations in paragraphs (a) and (b) of this section:

City Intercept = 0.002549

City Slope = 1.2259

Highway Intercept = 0.000308

Highway Slope = 1.4030

22. A new § 600.116–08 is added to read as follows:

§ 600.116–08 Criteria for additional US06, SC03 and cold temperature FTP testing.

This section applies to 2011 and later model year vehicles. This section defines which 2011 and later model year vehicles must use the vehicle-specific 5-cycle fuel economy method specified in § 600.114–08.

(a) *City fuel economy testing.* (1) For each vehicle tested under § 600.010–08(a) [cert vehicles], the 5-cycle city fuel economy for that vehicle determined according to the provisions of § 600.114–08(b) and rounded to the nearest one tenth of a mile per gallon shall be compared to the following value calculated for that vehicle:

(i) The Derived 5-Cycle City Fuel Economy calculated under § 600.115–08(a) multiplied by 0.96 and rounded to the nearest one tenth of a mile per gallon.

(ii) [Reserved]

(2) If the 5-cycle city fuel economy determined in § 600.010–08(a) is less than the value determined in paragraph (a)(1)(i) of this section, then the manufacturer must conduct additional fuel economy testing according to the provisions of paragraph (a)(3) of this section.

(3) For vehicles meeting the criteria in paragraph (a)(2) of this section, the manufacturer shall identify all model types that are represented by the certification test group of the emission data vehicle tested under § 600.010–08(a). For each of these model types, the manufacturer shall:

(i) Perform US06, SC03, and cold temperature FTP tests in addition to the FTP and HFET tests;

(ii) Determine the 5-cycle city fuel economy for each model type according to the provisions of § 600.114–08;

(iii) Determine the 5-cycle highway fuel economy for each model type according to the provisions of § 600.114–08;

(b) *Highway fuel economy testing.* (1) For each vehicle tested under § 600.010–08(a) [cert vehicles], the 5-cycle highway fuel economy for that vehicle determined according to the provisions of § 600.114–08(c) and rounded to the nearest one tenth of a mile per gallon shall be compared to the following value calculated for that vehicle:

(i) The Derived 5-Cycle Highway Fuel Economy calculated under § 600.115–08(b) multiplied by 0.95 and rounded to the nearest one tenth of a mile per gallon.

(ii) [Reserved]

(2) If the 5-cycle highway fuel economy determined in § 600.010–08(a) is less than the value determined in paragraph (b)(1)(i) of this section, then the manufacturer must conduct additional fuel economy testing according to the provisions of paragraph (b)(3) of this section.

(3) For vehicles meeting the criteria in paragraphs (a)(2) and (b)(2) of this section, the manufacturer shall identify all model types that are represented by the certification test group of the emission data vehicle tested under § 600.010–08(a). For each of these model types, the manufacturer shall:

(i) Perform US06, SC03, and cold temperature FTP tests in addition to the FTP and HFET tests;

(ii) Determine the 5-cycle city fuel economy for each model type according to the provisions of § 600.114–08;

(iii) Determine the 5-cycle highway fuel economy for each model type according to the provisions of § 600.114–08;

(4) For vehicles meeting the criteria in paragraph (b)(2) of this section, but not meeting the criteria in paragraph (a)(2) of this section, the manufacturer shall identify all model types that are represented by the certification test group of the emission data vehicle tested under § 600.010–08(a). For each of these model types, the manufacturer shall:

(i) Perform a US06 test in addition to the FTP and HFET tests;

(ii) Determine the 5-cycle highway fuel economy according to the following formula:

$$\text{Highway FE} = 0.89 \times \frac{1}{\text{Start FC} + \text{Running FC}}, \text{ where}$$

$$\text{StartFC} = 0.33 \times \frac{(0.004774 + 1.1377 \times \text{StartFuel}_{75})}{60.0}, \text{ where}$$

$$\text{StartFuel}_{75} = 3.59 \times \left(\frac{1}{\text{Bag 1 FE}_{75}} - \frac{1}{\text{Bag 3 FE}_{75}} \right), \text{ and}$$

where,

Bag y FE_{75} = the fuel economy in miles per gallon of fuel during the specified bag of the FTP test conducted at an ambient temperature of 75°.

$$\text{Running FC} = \left[1.0 + (0.04 \times 0.3)\right] \times \left[\frac{0.79}{\text{US06 Highway FE}} + \frac{0.21}{\text{HFET FE}} \right] + \left[0.377 \times 0.133 \times \left(0.004254 + \frac{0.15931}{\text{US06 FE}} \right) \right]$$

where,

US06 Highway FE = fuel economy in miles per gallon over the highway portion of the US06 test, and

HFET FE = fuel economy in miles per gallon over the HFET test.

Subpart C—[Amended]

23. A new § 600.201–08 is added to read as follows:

§ 600.201–08 General applicability.

The provisions of this subpart are applicable to 2008 and later model year gasoline-fueled, diesel-fueled, alcohol-fueled, natural gas-fueled, alcohol dual fuel, and natural gas dual fuel automobiles.

* * * * *

24. A new § 600.206–08 is added to read as follows:

§ 600.206–08 Calculation and use of FTP-based and HFET-based fuel economy values for vehicle configurations.

(a) Fuel economy values determined for each vehicle under § 600.113(a) and (b) and as approved in § 600.008–08(c), are used to determine FTP-based city, HFET-based highway, and combined FTP/Highway-based fuel economy values for each vehicle configuration for which data are available.

(1) If only one set of FTP-based city and HFET-based highway fuel economy values is accepted for a vehicle configuration, these values, rounded to the nearest tenth of a mile per gallon, comprise the city and highway fuel economy values for that configuration.

(2) If more than one FTP-based city or highway fuel economy value is accepted for a vehicle configuration:

(i) All data shall be grouped according to the subconfiguration for which the data were generated using sales projections supplied in accordance with § 600.208(a)(3).

(ii) Within each group of data, all values are harmonically averaged and rounded to the nearest 0.0001 of a mile per gallon in order to determine FTP-based city and HFET-based highway fuel economy values for each subconfiguration at which the vehicle configuration was tested.

(iii) All FTP-based city fuel economy values and all HFET-based highway fuel economy values calculated in paragraph (a)(2)(ii) of this section are (separately for city and highway) averaged in proportion to the sales fraction (rounded to the nearest 0.0001) within the vehicle configuration (as provided to the Administrator by the manufacturer) of vehicles of each tested subconfiguration. The resultant values, rounded to the nearest 0.0001 mile per gallon, are the FTP-based city and HFET-based highway fuel economy values for the vehicle configuration.

(3) For the purpose of determining average fuel economy under § 600.510–93, the combined fuel economy value for a vehicle configuration is calculated by harmonically averaging the FTP-based city and HFET-based highway fuel economy values, as determined in § 600.206(a)(1) or (2), weighted 0.55 and 0.45 respectively, and rounded to the nearest 0.0001 mile per gallon. A sample of this calculation appears in Appendix II to this part.

(4) For alcohol dual fuel automobiles and natural gas dual fuel automobiles the procedures of paragraphs (a)(1) through (3) of this section shall be used to calculate two separate sets of FTP-based city, HFET-based highway, and combined fuel economy values for each configuration.

(i) Calculate the city, highway, and combined fuel economy values from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the city, highway, and combined fuel economy values from the tests performed using alcohol or natural gas test fuel.

(b) If only one equivalent petroleum-based fuel economy value exists for an electric configuration, that value, rounded to the nearest tenth of a mile per gallon, will compose the petroleum-based fuel economy for that configuration.

(c) If more than one equivalent petroleum-based fuel economy value exists for an electric vehicle configuration, all values for that vehicle configuration are harmonically averaged and rounded to the nearest 0.0001 mile per gallon for that configuration.

25. A new § 600.207–08 is added to read as follows:

§ 600.207–08 Calculation and use of 5-cycle-based fuel economy values for vehicle configurations.

(a) Fuel economy values determined for each vehicle, under 600.114–08, 600.115–08, or 600.116–08 as applicable, and as approved in § 600.008–08(c), are used to determine 5-cycle city, highway, and combined fuel economy values for each vehicle configuration for which data are available.

(1) If only one set of 5-cycle city and highway fuel economy values is accepted for a vehicle configuration, these values, rounded to the nearest tenth of a mile per gallon, comprise the city and highway fuel economy values for that configuration.

(2) If more than one 5-cycle city or highway fuel economy value is accepted for a vehicle configuration:

(i) All data shall be grouped according to the subconfiguration for which the data were generated using sales projections supplied in accordance with § 600.209(a)(3).

(ii) Within each group of data, all values are harmonically averaged and rounded to the nearest 0.0001 of a mile per gallon in order to determine 5-cycle city and highway fuel economy values for each subconfiguration at which the vehicle configuration was tested.

(iii) All 5-cycle city fuel economy values and all 5-cycle highway fuel economy values calculated in paragraph (b)(2)(ii) of this section are (separately for FTP, highway, US06, SC03 and Cold temperature FTP) averaged in proportion to the sales fraction (rounded to the nearest 0.0001) within the vehicle configuration (as provided to the Administrator by the manufacturer) of vehicles of each tested subconfiguration. The resultant values, rounded to the nearest 0.0001 mile per gallon, are the 5-cycle city and highway fuel economy values for the vehicle configuration.

(3) The 5-cycle combined fuel economy value for a vehicle configuration is calculated by harmonically averaging the 5-cycle city and highway fuel economy values, as determined in § 600.207(a)(1) or (2), weighted 0.43 and 0.57 respectively, and rounded to the nearest 0.0001 mile per gallon. An example of this calculation appears in Appendix II to this part.

(4) For alcohol dual fuel automobiles and natural gas dual fuel automobiles the procedures of paragraphs (a)(1) through (3) of this section shall be used to calculate two separate sets of 5-cycle city, highway, and combined fuel economy values for each configuration.

(i) Calculate the 5-cycle city, highway, and combined fuel economy values from the tests performed using gasoline or diesel test fuel.

(ii)(A) Calculate the 5-cycle city, highway, and combined fuel economy values from the tests performed using alcohol or natural gas test fuel, if testing was performed; or

(B) Calculate the derived 5-cycle city, highway, and combined fuel economy according to § 600.115–08, expressed in terms of gasoline equivalent.

(b) If only one equivalent petroleum-based fuel economy value exists for an electric configuration, that value, rounded to the nearest tenth of a mile per gallon, will compose the petroleum-based 5-cycle fuel economy for that configuration.

(c) If more than one equivalent petroleum-based 5-cycle fuel economy value exists for an electric vehicle configuration, all values for that vehicle configuration are harmonically averaged and rounded to the nearest 0.0001 mile per gallon for that configuration.

26. A new § 600.208–08 is added to read as follows:

§ 600.208–08 Calculation of FTP-based and HFET-based fuel economy values for a model type.

(a) Fuel economy values for a base level are calculated from vehicle configuration fuel economy values as determined in § 600.206–08(a), (b), or (c) as applicable, for low-altitude tests.

(1) If the Administrator determines that automobiles intended for sale in the State of California are likely to exhibit significant differences in fuel economy from those intended for sale in other states, he will calculate fuel economy values for each base level for vehicles intended for sale in California and for

each base level for vehicles intended for sale in the rest of the states.

(2) In order to highlight the fuel efficiency of certain designs otherwise included within a model type, a manufacturer may wish to subdivide a model type into one or more additional model types. This is accomplished by separating subconfigurations from an existing base level and placing them into a new base level. The new base level is identical to the existing base level except that it shall be considered, for the purposes of this paragraph, as containing a new basic engine. The manufacturer will be permitted to designate such new basic engines and base level(s) if:

(i) Each additional model type resulting from division of another model type has a unique car line name and that name appears on the label and on the vehicle bearing that label;

(ii) The subconfigurations included in the new base levels are not included in any other base level which differs only by basic engine (i.e., they are not included in the calculation of the original base level fuel economy values); and

(iii) All subconfigurations within the new base level are represented by test data in accordance with § 600.010–08(c)(1)(ii).

(3) The manufacturer shall supply total model year sales projections for each car line/vehicle subconfiguration combination.

(i) Sales projections must be supplied separately for each car line-vehicle subconfiguration intended for sale in California and each car line/vehicle subconfiguration intended for sale in the rest of the states if required by the Administrator under paragraph (a)(1) of this section.

(ii) Manufacturers shall update sales projections at the time any model type value is calculated for a label value.

(iii) The requirements of this paragraph (a)(3) may be satisfied by providing an amended application for certification, as described in 40 CFR 86.084–21 or 40 CFR 86.1844–01 as applicable.

(4) Vehicle configuration fuel economy values, as determined in § 600.206–08(a), (b) or (c), as applicable, are grouped according to base level.

(i) If only one vehicle configuration within a base level has been tested, the fuel economy value from that vehicle configuration constitutes the fuel economy for that base level.

(ii) If more than one vehicle configuration within a base level has been tested, the vehicle configuration fuel economy values are harmonically averaged in proportion to the respective sales fraction (rounded to the nearest 0.0001) of each vehicle configuration and the resultant fuel economy value rounded to the nearest 0.0001 mile per gallon.

(5) The procedure specified in § 600.208–08(a) will be repeated for each base level, thus establishing city, highway, and combined fuel economy values for each base level.

(6) For the purposes of calculating a base level fuel economy value, if the only vehicle configuration(s) within the base level are vehicle configuration(s) which are intended for sale at high altitude, the Administrator may use fuel economy data from tests conducted on these vehicle configuration(s) at high altitude to calculate the fuel economy for the base level.

(7) For alcohol dual fuel automobiles and natural gas dual fuel automobiles the procedures of paragraphs (a)(1) through (6) of this section shall be used to calculate two separate sets of city, highway, and combined fuel economy values for each base level.

(i) Calculate the city, highway, and combined fuel economy values from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the city, highway, and combined fuel economy values from the tests performed using alcohol or natural gas test fuel.

(b) For each model type, as determined by the Administrator, a city, highway, and combined fuel economy value will be calculated by using the projected sales and fuel economy values for each base level within the model type. Separate model type calculations will be done based on the vehicle configuration fuel economy values as determined in § 600.206–08(a), (b) or (c), as applicable.

(1) If the Administrator determines that automobiles intended for sale in the State of California are likely to exhibit significant differences in fuel economy from those intended for sale in other states, he will calculate fuel economy values for each model type for vehicles intended for sale in California and for each model type for vehicles intended for sale in the rest of the states.

(2) The sales fraction for each base level is calculated by dividing the projected sales of the base level within the model type by the projected sales of the model type and rounding the quotient to the nearest 0.0001.

(3) The FTP-based city fuel economy values of the model type (calculated to the nearest 0.0001 mpg) are determined by dividing one by a sum of terms, each of which corresponds to a base level and which is a fraction determined by dividing:

(i) The sales fraction of a base level; by

(ii) The FTP-based city fuel economy value for the respective base level.

(4) The procedure specified in paragraph (b)(3) of this section is repeated in an analogous manner to determine the highway and combined fuel economy values for the model type.

(5) For alcohol dual fuel automobiles and natural gas dual fuel automobiles the procedures of paragraphs (b)(1) through (4) of this section shall be used to calculate two separate sets of city, highway, and combined fuel economy values for each model type.

(i) Calculate the city, highway, and combined fuel economy values from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the city, highway, and combined fuel economy values from the tests performed using alcohol or natural gas test fuel.

27. A new § 600.209–08 is added to read as follows:

§ 600.209–08 Calculation of 5-cycle fuel economy values for a model type.

(a) 5-cycle fuel economy values for a base level are calculated from vehicle configuration 5-cycle fuel economy values as determined in § 600.207–08 for low-altitude tests.

(1) If the Administrator determines that automobiles intended for sale in the State of California are likely to exhibit significant differences in fuel economy from those intended for sale in other states, he will calculate fuel economy values for each base level for vehicles intended for sale in California and for each base level for vehicles intended for sale in the rest of the states.

(2) In order to highlight the fuel efficiency of certain designs otherwise included within a model type, a manufacturer may wish to subdivide a model type into one or more additional model types. This is accomplished by separating subconfigurations from an existing base level and placing them into a new base level. The new base level is identical to the existing base level except that it shall be considered, for the purposes of this paragraph, as containing a new basic engine. The manufacturer will be permitted to designate such new basic engines and base level(s) if:

(i) Each additional model type resulting from division of another model type has a unique car line name and that name appears on the label and on the vehicle bearing that label;

(ii) The subconfigurations included in the new base levels are not included in any other base level which differs only by basic engine (i.e., they are not included in the calculation of the original base level fuel economy values); and

(iii) All subconfigurations within the new base level are represented by test data in accordance with § 600.010–08(c)(ii).

(3) The manufacturer shall supply total model year sales projections for each car line/vehicle subconfiguration combination.

(i) Sales projections must be supplied separately for each car line-vehicle subconfiguration intended for sale in California and each car line/vehicle subconfiguration intended for sale in the rest of the states if required by the Administrator under paragraph (a)(1) of this section.

(ii) Manufacturers shall update sales projections at the time any model type value is calculated for a label value.

(iii) The requirements of this paragraph (a)(3) may be satisfied by providing an amended application for certification, as described in 40 CFR 86.084–21 or 40 CFR 86.1844–01 as applicable.

(4) 5-cycle vehicle configuration fuel economy values, as determined in § 600.207–08 are grouped according to base level.

(i) If only one vehicle configuration within a base level has been tested, the fuel economy value from that vehicle configuration constitutes the fuel economy for that base level.

(ii) If more than one vehicle configuration within a base level has been tested, the vehicle configuration fuel economy values are harmonically averaged in proportion to the respective sales fraction (rounded to the nearest 0.0001) of each vehicle configuration and the resultant fuel economy value rounded to the nearest 0.0001 mile per gallon.

(5) The procedure specified in § 600.209–08(a) will be repeated for each base level, thus establishing city, highway, and combined fuel economy values for each base level.

(6) For the purposes of calculating a base level fuel economy value, if the only vehicle configuration(s) within the base level are vehicle configuration(s) which are intended for sale at high altitude, the Administrator may use fuel economy data from tests conducted on these vehicle configuration(s) at high altitude to calculate the fuel economy for the base level.

(7) For alcohol dual fuel automobiles and natural gas dual fuel automobiles the procedures of paragraphs (a)(1) through (6) of this section shall be used to calculate two separate sets of city, highway, and combined fuel economy values for each base level.

(i) Calculate the city, highway, and combined fuel economy values from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the city, highway, and combined fuel economy values from the tests performed using alcohol or natural gas test fuel.

(b) For each model type, as determined by the Administrator, a city, highway, and combined fuel economy value will be calculated by using the projected sales and fuel economy values for each base level within the model type. Separate model type calculations will be done based on the vehicle configuration fuel economy values as determined in § 600.207–08, as applicable.

(1) If the Administrator determines that automobiles intended for sale in the State of California are likely to exhibit significant differences in fuel economy from those intended for sale in other states, he will calculate fuel economy values for each model type for vehicles intended for sale in California and for each model type for vehicles intended for sale in the rest of the states.

(2) The sales fraction for each base level is calculated by dividing the projected sales of the base level within the model type by the projected sales of the model type and rounding the quotient to the nearest 0.0001.

(3) The 5-cycle city fuel economy values of the model type (calculated to the nearest 0.0001 mpg) are determined by dividing one by a sum of terms, each of which corresponds to a base level and which is a fraction determined by dividing:

(i) The sales fraction of a base level; by

(ii) The 5-cycle city fuel economy value for the respective base level.

(4) The procedure specified in paragraph (b)(3) of this section is repeated in an analogous manner to determine the highway and combined fuel economy values for the model type.

(5) For alcohol dual fuel automobiles and natural gas dual fuel automobiles the procedures of paragraphs (b)(1) through (4) of this section shall be used to calculate two separate sets of city, highway, and combined fuel economy values for each model type.

(i) Calculate the city, highway, and combined fuel economy values from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the city, highway, and combined fuel economy values from the tests performed using alcohol or natural gas test fuel.

28. A new § 600.210–08 is added to read as follows:

§ 600.210–08 Calculation of 5-cycle-based fuel economy values for labeling.

(a) *General Labels.* The city and highway model type fuel economy determined in § 600.209–08 (b), rounded to the nearest mpg, comprise the fuel economy values for general fuel economy labels. If the manufacturer determines that the resulting label values are not representative of the fuel economy for that model type, they may voluntarily lower these values.

(b) *Specific Labels.* (1) The 5-cycle city model type fuel economy value determined in § 600.207–08(a), rounded to the nearest mpg, comprises the city fuel economy value for specific fuel economy labels. If the manufacturer determines that the resulting city label value is not representative of the fuel economy for that specific vehicle, they may voluntarily lower this value.

(2) The 5-cycle highway model type fuel economy value determined in § 600.207–08(a) rounded to the nearest mpg, comprises the highway fuel economy value for specific fuel economy labels. If the manufacturer determines that the resulting highway label value is not representative of the fuel economy for that specific vehicle, they may voluntarily lower this value.

(c) If the city value exceeds the highway value for a model type under (a) or (b) of this section, the city value will be set equal to the highway value. In cases where special vehicle design features may result in city values that exceed highway values, the manufacturer may request Administrator approval to waive this requirement. Such a request must be accompanied by on-road fuel economy data which demonstrates that the fuel economy during city-type driving is higher than fuel economy during highway-type driving.

(d) For the purposes of calculating the combined fuel economy for a model type, to be used in determining annual fuel costs under § 600.307–08, the manufacturer shall (except as provided for in paragraph (d)(2) of this section):

(1)(i) For gasoline-fueled, diesel-fueled, alcohol-fueled, and natural gas-fueled automobiles, harmonically average the unrounded city and highway values, determined in paragraphs (a)(1)(i) and (b)(1)(i), or (a)(2)(i) and (b)(2)(i) of this section weighted 0.43 and 0.57 respectively, and round to the nearest whole mpg. (An example of this calculation procedure appears in appendix II of this part); or

(ii) For alcohol dual fuel and natural gas dual fuel automobiles, harmonically average the unrounded city and highway values from the tests performed using gasoline or diesel test fuel as determined in paragraphs (a)(1)(ii)(A) and (b)(1)(ii)(A), or (a)(2)(ii)(A) and (b)(2)(ii)(A) of this section.

(2) If the resulting city value determined in paragraph (a) of this section exceeds the resulting highway value determined in paragraph (b) of this section, the combined fuel economy will be set equal to the highway value, rounded to the nearest whole mpg, unless as otherwise approved by the Administrator under paragraph (c) of this section.

Subpart D—[Amended]

29. A new § 600.301–08 is added to read as follows:

§ 600.301–08 General applicability.

(a) The provisions of this subpart are applicable to 2008 and later model year gasoline-fueled, diesel-fueled, alcohol-fueled, natural gas-fueled, alcohol dual fuel, and natural gas dual fuel automobiles.

(b)(1) Manufacturers that produce only electric vehicles are exempt from the requirement of this subpart, except with regard to the requirements in those sections pertaining specifically to electric vehicles.

(2) Manufacturers with worldwide production (excluding electric vehicle production) of less than 10,000 gasoline-fueled and/or diesel powered passenger automobiles and light trucks may optionally comply with the electric vehicle requirements in this subpart.

* * * * *

30. A new § 600.306–08 is added to read as follows:

§ 600.306–08 Labeling requirements.

(a) Prior to being offered for sale, each manufacturer shall affix or cause to be affixed and each dealer shall maintain or cause to be maintained on each automobile:

(1) A general fuel economy label (initial, or updated as required in § 600.314) as described in § 600.307(c) or:

(2) A specific label, as described in § 600.307(d), for those automobiles manufactured or imported before the date that occurs 15 days after general labels have been determined by the manufacturer.

(i) If the manufacturer elects to use a specific label within a model type (as defined in § 600.002–08, he shall also affix specific labels on all automobiles within this model type, except on those automobiles manufactured or imported before the date that labels are required to bear range values as required by paragraph (b) of this section, or determined by the Administrator, or as permitted under § 600.310–08.

(ii) If a manufacturer elects to change from general to specific labels or vice versa within a model type, the manufacturer shall, within five calendar days, initiate or discontinue as applicable, the use of specific labels on all vehicles within a model type at all facilities where labels are affixed.

(3) For any vehicle for which a specific label is requested which has a combined FTP/HFET-based fuel economy value, as determined in § 600.206–08(a)(3), at or below the minimum tax-free value, the following statement must appear on the specific label:

''[Manufacturer's name] may have to pay IRS a Gas Guzzler Tax on this vehicle because of the low fuel economy.'' (4)(i) At the time a general fuel economy value is determined for a model type, a manufacturer shall, except as provided in paragraph (a)(4)(ii) of this section, relabel, or cause to be relabeled, vehicles which:

(A) Have not been delivered to the ultimate purchaser, and

(B) Have a combined FTP/HFET-based model type fuel economy value (as determined in § 600.208–08(b) of 0.1 mpg or more below the lowest fuel economy value at which a Gas Guzzler Tax of $0 is to be assessed.

(ii) The manufacturer has the option of relabeling vehicles during the first five working days after the general label value is known.

(iii) For those vehicle model types which have been issued a specific label and are subsequently found to have tax liability, the manufacturer is responsible for the tax liability regardless of whether the vehicle has been sold or not or whether the vehicle has been relabeled or not.

(b) *FE range of comparable vehicles.* The manufacturer shall include the current range of fuel economy of comparable automobiles (as described in §§ 600.311 and 600.314) in the label of each vehicle manufactured or imported more than 15 calendar days after the current range is made available by the Administrator.

(1) Automobiles manufactured before a date 16 or more calendar days after the initial label range is made available under § 600.311–08(c) may be labeled without a range of fuel economy of comparable automobiles. In place of the range of fuel economy of comparable automobiles, the label must contain the statement ''Fuel economy for comparable vehicles not available at this time. See *www.fueleconomy.gov* for comparisons.''

(2) Automobiles manufactured more than 15 calendar days after the initial or updated label range is made available under § 600.311–08(c) or (d) will be labeled with the current range of fuel economy of comparable automobiles as approved for that label.

(c) The fuel economy label must be readily visible from the exterior of the automobile and remain affixed until the time the automobile is delivered to the ultimate consumer.

(1) It is preferable that the fuel economy label information be included with the Automobile Information Disclosure Act label, provided that the prominence and legibility of the fuel economy label is maintained. For this purpose, all fuel economy label information must be placed on a separate section in the label and may not be intermixed with the Automobile Information Disclosure Act label information, except for vehicle descriptions as noted in § 600.307–08(c).

(2) The fuel economy label must be located on a side window. If the window is not large enough to contain both the Automobile Information Disclosure Act label and the fuel economy label, the manufacturer shall have the fuel economy label affixed on another window and as close as possible to the Automobile Information Disclosure Act label.

(3) The manufacturer shall have the fuel economy label affixed in such a manner that appearance and legibility are maintained until after the vehicle is delivered to the ultimate consumer.

31. A new § 600.307–08 is added to read as follows:

§ 600.307–08 Fuel economy label format requirements.

[**Note:** Proposed rule offers 4 label formats. One will be selected based on comments received. Precise font sizes and locations are to be determined based on the final format chosen].

(a)(1) Fuel economy labels must be:

(i) Rectangular in shape with a minimum height of 4.5 inches (114 mm) and a minimum length of 7.0 inches (178 mm) as depicted in Appendix VIII.

(ii) Printed in a color which contrasts with the paper color.

(iii) The label shall have a contrasting border. The top border shall be at least [TBD] inches wide and the bottom border shall be at least [TBD] wide. The side borders shall be no more than [TBD] wide.

(2) The top [TBD] percent of the fuel economy label area shall contain only the following information and in the same format depicted in the label format in Appendix VIII:

(i) The titles ''CITY MPG'' and ''HIGHWAY MPG'', centered over the applicable fuel economy estimates, in bold caps [TBD] points in size,

(ii)(A) For gasoline-fueled, diesel-fueled, alcohol-fueled, and natural gas-fueled automobiles, the city and highway fuel economy estimates calculated in accordance with § 600.209(a) and (b),

(B) For alcohol dual fuel automobiles and natural gas dual fuel automobiles, the city and highway fuel economy estimates for operation on gasoline or diesel fuel as calculated in § 600.210–08(a) and (b),

(iii) The fuel pump logo,

(iv) The following phrase is centered, full justification, underneath the fuel pump logo, in bold print: ''Your actual mileage can vary significantly according to how you drive and maintain your vehicle and other factors.

(v) The statement: ''Expected range for most drivers:__ to __ mpg'', placed underneath both the city and highway estimates, centered to the estimate numbers. The range values for this statement are to be calculated in accordance with the following:

(A) The lower range values shall be determined by multiplying the city and highway estimates by 0.83, then rounding to the next lower integer value.

(B) The upper range values shall be determined by multiplying the city and highway estimates by 1.17 and rounding to the next higher integer value.

(vi) The top border shall contain a ''dropped out'' centered title ''EPA FUEL ECONOMY ESTIMATES'' in bold caps [TBD] points in size. At the far left of the top border, the official EPA logo shall appear and at the far right of the top border, the official DOE logo shall appear. The logos shall be [TBD] inches in diameter.

(vii)(A) For dedicated alcohol-fueled automobiles, the title A(insert appropriate fuel (example ''METHANOL ''(M85))'')''. The title shall be positioned [TBD] and shall be in upper case in a bold condensed type and no smaller than [TBD] points in size.

(B) For dedicated natural gas-fueled automobiles, the title ''NATURAL GAS*''. The title shall be positioned [TBD] and shall be in uppercase in a bold condensed type and no smaller than [TBD] points in size.

(C) For dedicated alcohol dual fuel automobiles and natural gas dual fuel automobiles, the title ''DUAL FUEL*''. The title shall be positioned [TBD] and shall be in upper case in a bold condensed type and no smaller than [TBD] points in size.

(viii)(A) For dedicated alcohol-fueled automobiles, the title ''(insert appropriate fuel (example ''M85''))'' centered above the title ''CITY MPG'' and above the title ''HIGHWAY MPG'' in bold caps [TBD] points in size.

(B) For dedicated natural gas-fueled automobile, the title AGASOLINE EQUIVALENT'' centered above the title ''CITY MPG'' and above the title ''HIGHWAY MPG'' in bold caps [TBD] points in size.

(C) For alcohol dual fuel automobiles and natural gas dual fuel automobiles, the title ''GASOLINE'' centered above the title ''CITY MPG'' and above the title ''HIGHWAY MPG'' in bold caps [TBD] in size.

(3) The bottom [TBD] percent of the label shall contain the following information: (i) The bottom border shall contain the following ''dropped out'' centered text in [TBD] font print: ''For more information see the FREE FUEL ECONOMY GUIDE available at dealers or on line at *www.fueleconomy.gov*''.

(ii) If the label is separate from the Automobile Information Disclosure Act label, the [vehicle/truck] description, as described in paragraph (c) or (d) of this section, when applicable.

(iii)(A) A statement: ''For comparison shopping, the range of fuel economy for all [VEHICLE CLASS]s is __ to __ mpg city and__ to __mpg highway.'' (The range values are those determined in accordance with § 600.311.) Or, when applicable, [Alternative: (A) A graphic representation of combined FE range as shown in Appendix IV. Format TBD.]

(B) A statement: ''A range of fuel economy values for other [VEHICLE CLASS]s is not available at this time.''

(iv) The statement: ''Estimated Annual Fuel Cost:'' followed by the appropriate value calculated in accordance with paragraph (f) or (g) of this section and the statement ''based on ____ miles at [the EPA-provided cost per gallon of the required fuel for that vehicle.'' The estimated annual fuel cost value for alcohol dual fuel automobiles and natural gas dual fuel vehicles to appear on the fuel economy label shall be that calculated based on operating the vehicle on gasoline or diesel fuel as determined in § 600.307(g) and (h) [check cites]. At the manufacturer's option, the label may also contain the estimated annual fuel cost value based on operating the vehicle on the alternative fuel.

(v)(A) The Gas Guzzler statement, when applicable (see paragraph (e) of this section), must be centered on a separate line between the bottom border and the Estimated Annual Fuel Cost statements. The words ''Gas Guzzler'' shall be highlighted.

(B) The type size shall be at least as large as the largest type size in the bottom [TBD] percent of the label.

(vi)(A) For dedicated alcohol-fueled, and natural gas-fueled automobiles, the statement: ''*This vehicle operates on [insert appropriate fuel(s)] only.'' shall appear [TBD]. The phrase shall be in lower case in a medium condensed type except for the fuels listed which shall be capitalized in a bold condensed type no smaller than [TBD] points in size.

(B) For dedicated natural gas-fueled automobiles, the statements: ''All fuel economy values on this label pertain to gasoline equivalent fuel economy. To convert these values into units of miles per 100 cubic feet of natural gas, multiply by 0.823.'' At the manufacturers option, the statement ''To convert these values into units of miles per 100 cubic feet of natural gas, multiply by 0.823.'' may be replaced by the statement ''The fuel economy in units of miles per (insert units used in retail) is estimated to be (insert city fuel economy value) in the city, and (insert highway fuel economy value) on the highway.''

(C) For alcohol dual fuel automobiles and natural gas dual fuel automobiles, the statement: ''This vehicle operates on [insert gasoline or diesel as appropriate] and [insert other fuel(s) as appropriate].'' shall appear above the bottom border. The phrase shall be in lower case in a medium condensed type except for the words ''gasoline'' or ''diesel'' (as appropriate) and the other fuels listed, which shall be capitalized in a bold condensed type no smaller than [TBD] points in size.

(vii) For alcohol dual fuel automobiles and natural gas dual fuel automobiles, the statement: ''All fuel economy values on this label pertain to [insert gasoline or diesel as appropriate] fuel usage. [insert other fuel(s) as appropriate] fuel(s) usage will yield different values. See the FREE FUEL ECONOMY GUIDE for information on [insert other fuel(s)].'' At the manufacturers option, the above statements may be replaced by the statement ''The fuel economy while using [insert appropriate fuel (example ''M85)] is estimated to be [insert city fuel economy value and appropriate units] in the city and [insert highway fuel economy value and appropriate units] on the highway. See the FREE FUEL ECONOMY GUIDE for other information on [insert appropriate fuel].''

(4) The maximum type size for the statements located in the lower [TBD] percent of the label shall not exceed [TBD] points in size.

(b) The city mpg number shall be displayed on the [TBD] and the highway mpg number displayed on the [TBD].

(1) Except for the digit ''one,'' each mpg digit shall measure at least [TBD] inches by [TBD inches ([TBD × TBD] mm) in width and height respectively.

(2) The digit ''one,'' shall measure at least [TBD] mm by [TBD] mm width and height respectively.

(3)(i) MPG digits not printed as a single character shall be made of a matrix of smaller characters. This matrix shall be at least four characters wide by five characters high (with the exception of three characters wide for the numerical character denoting ''one''.)

(ii) The small characters shall be made of successive overstrikes to form a reasonably dark and continuous line that approximates a single large character.

(4)(i) If manufacturer chooses to enlarge the label from that depicted in Appendix IV, the logo and the fuel economy label values, including the titles ''CITY MPG'' and ''HIGHWAY MPG'', must be increased in the same proportion.

(ii) The area bounded by the bottom of the fuel pump logo to the top of the border must continue to represent at least [TBD] percent of the available label area.

(c) *Vehicle description information for general and specific labels.* (1) Where the fuel economy label is physically incorporated with the Motor Vehicle Information and Cost Savings Act label, the applicable vehicle description, as set forth in this paragraph, does not have to be repeated if the information is readily found on this label.

(2) For fuel economy labels which are physically separate from the Motor Vehicle Information and Cost Savings Act label, the vehicle description on general labels will be as follows:

(i) Model year;

(ii) Vehicle car line;

(iii) Engine displacement, in cubic inches, cubic centimeters, or liters whichever is consistent with the customary description of that engine;

(iv) Number of engine cylinders or rotors;

(v) Additional engine description, if necessary to distinguish otherwise identical model types, as approved by the Administrator; and

(vi) Transmission class.

(3) For fuel economy labels which are physically separate from the Motor Vehicle Information and Cost Savings Act label, the vehicle description on specific labels will be as follows:

(i) The descriptions of paragraph (c) of this section, and

(ii) Inertia weight class;

(iii) Axle ratio; and

(iv) Other engine or vehicle parameters, if approved by the Administrator.

(d) [Reserved]

(e)(1) For fuel economy labels of passenger automobile model types requiring a tax statement under § 600.513, the phrase ''* * * Gas Guzzler Tax: $____ * * *''.

(2) The tax value required by this paragraph shall be based on the combined fuel economy value for the model type calculated in accordance with § 600.208–08 and rounded to the nearest 0.1 mpg.

(f) *Estimated annual fuel cost—general labels.* The annual fuel cost estimate for operating an automobile included in a model type shall be computed by using values for the fuel cost per gallon of the required fuel as specified in the owner's manual and average annual mileage, predetermined by the Administrator, and the combined fuel economy determined in § 600.210(d).

(1) The annual fuel cost estimate for a model type is computed by multiplying:

(i) Fuel cost per gallon (natural gas must be expressed in units of cost per equivalent gallon, where 100 SCF=0.823 equivalent gallons) expressed in dollars to the nearest 0.05 dollar; by

(ii) Average annual mileage, expressed in miles per year to the nearest 1,000 miles per year, by

(iii) The average, rounded to the nearest 0.0001 gallons per mile (natural gas must be expressed in units of gallons equivalent per mile where 100 SCF=0.823 equivalent gallons) of the combined fuel economy value determined in § 600.210(d) for a model type.

(2) The product computed in paragraph (f)(1) of this section and rounded to the nearest dollar per year will comprise the annual fuel cost estimate that appears on general labels for the model type.

(g) Estimated annual fuel cost—specific labels. The annual fuel cost estimate for operating an automobile included in a vehicle configuration will be computed by using the values for the fuel cost per volume (gallon for liquid fuels, cubic feet for gaseous fuels) and average mileage and the fuel economy determined in paragraph (h)(1)(iii) of this section.

(1) The annual fuel cost estimate for vehicle configuration is computed by multiplying:

(i) Fuel cost per gallon (natural gas must be expressed in units of cost per equivalent gallon, where 100 SCF=0.823 equivalent gallons) expressed in dollars to the nearest 0.05 dollar; by

(ii) Average annual mileage, expressed in miles per year to the nearest 1,000 miles per year, by

(iii) The inverse, rounded to the nearest 0.0001 gallons per mile (natural gas must be expressed in units of gallon equivalent per mile, where 100 SCF=0.823 equivalent gallons) of the fuel economy value determined in § 600.207–08(a)(2)(iii) for a vehicle configuration.

(2) The product computed in paragraph (g)(1) of this section and rounded to the nearest dollar per year will comprise the annual fuel cost estimate that appears on specific labels for that vehicle configuration.

* * * * *

32. A new § 600.311–08 is added to read as follows:

§ 600.311–08 Range of fuel economy for comparable automobiles.

(a) The Administrator will determine the range of city and the range of highway fuel economy values for each class of comparable automobiles.

[Alternative proposal for graphic depiction of comparable fuel economy] (a) The Administrator will determine the range of combined fuel economy values for each class of comparable automobiles. The range of combined fuel economy values within a class is the maximum and minimum combined fuel economy values for all general labels as determined in § 600.210–08(d).

(b) The range of city fuel economy values within a class is the maximum city and the minimum city fuel economy value for all general labels as determined in § 600.210–08(a) regardless of manufacturer. The range of highway values is determined in the same manner.

(c) The initial range will be made available on a date specified by the Administrator that closely coincides to the date of the general model introduction for the industry.

(d) The ranges of comparable fuel economy values for a class of automobiles will be updated periodically and will be derived from the latest available label values reported to the Administrator for that class of automobiles.

(e) If the Administrator determines that automobiles intended for sale in California are likely to exhibit significant differences in fuel economy from those intended for sale in other states, he/she will compute separate ranges of fuel economy values for each class of automobiles for California and for the other states.

(f) For high altitude vehicles determined under § 600.310, both general and specific labels will contain the range of comparable fuel economy computed in this section.

(g) The manufacturer shall include the appropriate range of fuel economy determined by the Administrator in paragraph (c) or (d) of this section, on each label affixed to an automobile within the class, except as provided in § 600.306(b)(1).

33. A new § 600.314–08 is added to read as follows:

§ 600.314–01 Updating label values, annual fuel cost, Gas Guzzler Tax, and range of fuel economies for comparable automobiles.

(a) The label values established in § 600.312 shall remain in effect for the model year unless updated in accordance with paragraph (b) of this section.

(b)(1) The manufacturer shall recalculate the model type fuel economy values for any model type containing base levels affected by running changes specified in § 600.507(a).

(2) For separate model types created in § 600.209–08(a)(2), the manufacturer shall recalculate the model type values for any additions or deletions of subconfigurations to the model type. Minimum data requirements specified in § 600.010(c) shall be met prior to recalculation.

(3) Label value recalculations shall be performed to read as follows:

(i) The manufacturer shall use updated total model year projected sales for label value recalculations.

(ii) All model year data approved by the Administrator at the time of the recalculation for that model type shall be included in the recalculation.

(iii) Using the additional data under paragraph (b) of this section, the manufacturer shall calculate new 5-cycle model type city and highway values in accordance with §§ 600.209–08 and 600.210–08 except that the values shall be rounded to the nearest 0.1 mpg.

(iv) The existing label values, calculated in accordance with §§ 600.209–08 and 600.210–08, shall be rounded to the nearest 0.1 mpg.

(4)(i) If the recalculated city or highway fuel economy value in paragraph (b)(3)(iii) of this section is less than the respective city or highway value in paragraph (b)(3)(iv) of this section by 1.0 mpg or more, the manufacturer shall affix labels with the recalculated 5-cycle model type values (rounded to whole mpg'') to all new vehicles of that model type beginning on the day of implementation of the running change.

(ii) If the recalculated city or highway fuel economy value in paragraph (b)(3)(iii) of this section is higher than the respective city or highway value in paragraph (b)(3)(iv) of this section by 1.0 mpg or more, then the manufacturer has the option to use the recalculated values for labeling the entire model type beginning on the day of implementation of the running change.

(c) For fuel economy labels updated using recalculated fuel economy values determined in accordance with paragraph (b) of this section, the manufacturer shall concurrently update all other label information (e.g., the annual fuel cost, range of comparable vehicles and the applicability of the Gas Guzzler Tax as needed).

(d) The Administrator shall periodically update the range of fuel economies of comparable automobiles based upon all label data supplied to the Administrator.

(e) The manufacturer may request permission from the Administrator to calculate and use label values based on test data from vehicles which have not completed the Administrator ordered confirmatory testing required under the provisions of § 600.008–08(c). If the Administrator approves such a calculation the following procedures shall be used to determine if relabeling is required after the confirmatory testing is completed.

(1) The Administrator-ordered confirmatory testing shall be completed as quickly as possible.

(2) Using the additional data under paragraph (e)(1) of this section, the manufacturer shall calculate new model type city and highway values in accordance with §§ 600.207–08 and 600.210–08 except that the values shall be rounded to the nearest 0.1 mpg.

(3) The existing label values, calculated in accordance with §§ 600.209–08 and 600.210–08, shall be rounded to the nearest 0.1 mpg.

(4) *Relabeling.* (i) If the recalculated city or highway fuel economy value in paragraph (b)(3)(iii) of this section is less than the respective city or highway value in paragraph (b)(3)(iv) of this section by 0.5 mpg or more, the manufacturer shall affix labels with the recalculated 5-cycle model type values (rounded to whole mpg) to all new vehicles of that model type beginning 15 days after the completion of the confirmatory test.

(ii) If both the recalculated city or highway fuel economy value in paragraph (b)(3)(iii) of this section is less than the respective city or highway value in paragraph (b)(3)(iv) of this section by 0.1 mpg or more and the recalculated gas guzzler tax rate determined under the provisions of § 600.513–91 is larger, the manufacturer shall affix labels with the recalculated model type values (rounded to whole mpg) and gas guzzler tax statement and rates to all new vehicles of that model type beginning 15 days after the completion of the confirmatory test.

(5) For fuel economy labels updated using recalculated fuel economy values determined in accordance with paragraph (e)(4) of this section, the manufacturer shall concurrently update all other label information (e.g., the annual fuel cost, range of comparable vehicles and the applicability of the Gas Guzzler Tax if required by Department of Treasury regulations).

34. A new § 600.315–08 is added to read as follows:

§ 600.315–08 Classes of comparable automobiles.

(a) The Secretary will classify automobiles as passenger automobiles or light trucks (nonpassenger automobiles) in accordance with 49 CFR part 523.

(1) The Administrator will classify passenger automobiles by car line into one of the following classes based on interior volume index or seating capacity except for those passenger automobiles which the Administrator determines are most appropriately placed in a different classification or classed as special purpose vehicles as provided in paragraph (a)(3) of this section.

(i) *Two seaters.* A car line shall be classed as ''Two Seater'' if the majority of the vehicles in that car line have no more than two designated seating positions as such term is defined in the regulations of the National Highway Traffic Safety Administration, Department of Transportation (DOT), 49 CFR 571.3.

(ii) *Minicompact cars.* Interior volume index less than 85 cubic feet.

(iii) *Subcompact cars.* Interior volume index greater than or equal to 85 cubic feet but less than 100 cubic feet.

(iv) *Compact cars.* Interior volume index greater than or equal to 100 cubic feet but less than 110 cubic feet.

(v) *Midsize cars.* Interior volume index greater than or equal to 110 cubic feet but less than 120 cubic feet.

(vi) *Large cars.* Interior volume index greater than or equal to 120 cubic feet.

(vii) *Small station wagons.* Station wagons with interior volume index less than 130 cubic feet.

(viii) *Midsize station wagons.* Station wagons with interior volume index greater than or equal to 130 cubic feet but less than 160 cubic feet.

(ix) *Large station wagons.* Station wagons with interior volume index greater than or equal to 160 cubic feet.

(2) The Administrator will classify nonpassenger automobiles into the following categories: Small pickup trucks, standard pickup trucks, vans, minivans, SUVS and special purpose vehicles. Pickup trucks will be separated by car line on the basis of gross vehicle weight rating (GVWR). For pickup truck car lines with more than one GVWR, the GVWR of the pickup truck car line is the arithmetic average of all distinct GVWR's less than or equal to 8,500 pounds available for that car line.

(i) *Small pickup trucks.* Pickup trucks with a GVWR less than 6000 pounds.

(ii) *Standard pickup trucks.* Pickup trucks with a GVWR of 6000 pounds up to and including 8,500 pounds.

(iii) *Vans.*

(iv) *Minivans.*

(v) *Sport utility vehicles.*

(3)(i) *Special purpose vehicles.* All automobiles with GVWR less than or equal to 8,500 pounds which possess special features and which the Administrator determines are more appropriately classified separately from typical automobiles or which do not meet the requirements of paragraphs (a)(1) and (2) of this section will be classified as special purpose vehicles.

(ii) All automobiles with GVWR less than or equal to 8,500 pounds which possess features that could apply to two classes will be classified by the Administrator based on the Administrator's judgment on which class of vehicles consumers are more likely to make comparisons.

(4) Once a certain car line is classified by the Administrator, the classification will remain in effect for the model year.

(b) *Interior volume index-passenger automobiles.* (1) The interior volume index shall be calculated for each car line which is not a ''two seater'' car line, in cubic feet rounded to the nearest 0.1 cubic foot. For car lines with more than one body style, the interior volume index for the car line is the arithmetic average of the interior volume indexes of each body style in the car line.

(2) For all body styles except station wagons, minivans and hatchbacks with more than one seat (e.g., with a second or third seat) equipped with seatbelts as required by DOT safety regulations, interior volume index is the sum, rounded to the nearest 0.1 cubic feet, of the front seat volume, the rear seat volume, if applicable, and the luggage capacity.

(3) For all station wagons, minivans and hatchbacks with more than one seat (e.g., with a second or third seat) equipped with seatbelts as required by DOT safety regulations, interior volume index is the sum, rounded to the nearest 0.1 cubic feet, of the front seat volume, the rear seat volume, and the cargo volume index.

(c) All interior and cargo dimensions are measured in inches to the nearest 0.1 inch. All dimensions and volumes shall be determined from the base vehicles of each body style in each car line, and do not include optional equipment. The dimensions H61, W3, W5, L34, H63, W4, W6, L51, H201, L205, L210, L211, H198, and volume V1 are to be determined in accordance with the procedures outlined in Motor Vehicle Dimensions SAE J1100a (Report of Human Factors Engineering Committee, Society of Automotive Engineers, approved September 1973 and last revised September 1975) except as noted herein:

(1) *SAE J1100a(2.3).—Cargo dimensions.* All dimensions measured with the front seat positioned the same as for the interior dimensions and the second seat, for the station wagons, minivans and hatchbacks, in the upright position. All head restraints shall be in the stowed position and considered part of the seat.

(2) *SAE J1100a(8)—Luggage capacity.* Total of columns of individual pieces of standard luggage set plus H boxes stowed in the luggage compartment in accordance with the procedure described in 8.2. For passenger automobiles with no rear seat or with two rear seats with no rear seatbelts, the luggage compartment shall include the area to the rear of the front seat, with the rear seat (if applicable) folded, to the height of a horizontal plane tangent to the top of the front seatback.

(3) *SAE J1100a(7)—Cargo dimensions.* (i) *L210—Cargo length at second seatback height-hatchback.* The minimum horizontal dimension from the ''X'' plane tangent to the rearmost surface of the second seatback to the inside limiting interference of the hatchback door on the zero ''Y'' plane.

(ii) *L211—Cargo length at floor—second-hatchback.* The minimum horizontal dimensions at floor level from the rear of the second seatback to the normal limiting interference of the hatchback door on the vehicle zero ''Y'' plane.

(iii) *H198—Second seatback to load floor height.* The dimension measured vertically from the horizontal tangent to the top of the second seatback to the undepressed floor covering.

(d) The front seat volume is calculated in cubic feet by dividing 1,728 into the product of three terms listed below and rounding the quotient to the nearest 0.001 cubic feet:

(1) H61—Effective head room—front. (In inches, obtained according to paragraph (c) of this section),

(2)(i) (W3+W5+5)/2—Average of shoulder and hip room—front, if hip room is more than 5 inches less than shoulder room. (In inches, W3 and W5 are obtained according to paragraph (c) of this section), or

(ii) W3—Shoulder room—front, if hip room is not more than 5 inches less than shoulder room. (In inches, W3 is obtained according to paragraph (c) of this section), and

(3) L34—Maximum effective leg room—accelerator. (In inches, obtained according to paragraph (c) of this section.) Round the quotient to the nearest 0.001 cubic feet.

(e) The rear seat volume is calculated in cubic feet, for vehicles within a rear seat equipped with rear seat belts (as required by DOT), by dividing 1,728 into the product of three terms listed below and rounding the quotient to the nearest 0.001 cubic feet:

(1) H63—Effective head room—second. (Inches obtained according to paragraph (c) of this section),

(2)(i) (W4+W6+5)/2—Average of shoulder and hip room—second, if hip room is more than 5 inches less than shoulder room. (In inches, W4 and W6 are obtained according to paragraph (c) of this section), or

(ii) W4—Shoulder room—second, if hip room is not more than 5 inches less than shoulder room. (In inches, W3 is obtained according to paragraph (c) of this section), and

(3) L51—Minimum effective leg room—second. (In inches obtained according to paragraph (c) of this section.)

(f) The luggage capacity is V1, the usable luggage capacity obtained according to paragraph (c) of this section. For passenger automobiles with no rear seat or with a rear seat but no rear seat belts, the area to the rear of the front seat shall be included in the determination of V1, usable luggage capacity, as outlined in paragraph (c) of this section.

(g) *Cargo volume index.* (1) For station wagons and minivans the cargo volume index V2 is calculated, in cubic feet, by dividing 1,728 into the product of three terms and rounding the quotient to the nearest 0.001 cubic feet:

(i) W4—Shoulder room—second. (In inches obtained according to paragraph (c) of this section.)

(ii) H201—Cargo height. (In inches obtained according to paragraph (c) of this section.)

(iii) L205—Cargo length at belt—second. (In inches obtained according to paragraph (c) of this section.)

(2) For hatchbacks, the cargo volume index V3 is calculated, in cubic feet, by dividing 1,728 into the product of three terms:

(i) Average cargo length, which is the arithmetic average of:

(A) L210—Cargo length at second seatback height—hatchback. (In inches obtained according to paragraph (c) of this section);

(B) L211—Cargo length at floor—second-hatchback. (In inches obtained according to paragraph (c) of this section);

(ii) W4—Shoulder room—second. (In inches obtained according to paragraph (c) of this section);

(iii) H198—Second seatback to load floor height. (In inches obtained according to paragraph (c) of this section.) Round the quotient to the nearest 0.001 cubic foot.

(h) The following data must be submitted to the Administrator no later than the time of a general label request. Data shall be included for each body style in the car line covered by that general label.

(1) For all passenger automobiles:

(i) Dimensions H61, W3, L34 determined in accordance with paragraph (c) of this section.

(ii) Front seat volume determined in accordance with paragraph (d) of this section.

(iii) Dimensions H63, W4, L51 (if applicable) determined in accordance with paragraph (c) of this section.

(iv) Rear seat volume (if applicable) determined in accordance with paragraph (e) of this section.

(v) The interior volume index determined in accordance with paragraph (b) of this section for:

(A) Each body style, and

(B) The car line.

(vi) The class of the car line as determined in paragraph (a) of this section.

(2) For all passenger automobiles except station wagons, minivans and hatchbacks with more than one seat (e.g., with a second or third seat) equipped with seat belts as required by DOT safety regulations:

(i) The quantity and letter designation of the pieces of the standard luggage set installed in the vehicle in the determination of usable luggage capacity V1, and

(ii) The usable luggage capacity V1, determined in accordance with paragraph (f) of this section.

(3) For station wagons and minivans with more than one seat (e.g., with a second or third seat) equipped with seat belts as required by DOT safety regulations:

(i) The dimensions H201 and L205 determined in accordance with paragraph (c) of this section, and

(ii) The cargo volume index V2 determined in accordance with paragraph (g)(1) of this section.

(4) For hatchbacks with more than one seat (e.g., with a second or third seat) equipped with seat belts as required by DOT safety regulations:

(i) The dimensions L210, L211, and H198 determined in accordance with paragraph (c) of this section.

(ii) The cargo volume index V3 determined in accordance with paragraph (g)(2) of this section.

(5) For pickup trucks:

(i) All GVWR's of less than or equal to 8,500 pounds available in the car line.

(ii) The arithmetic average GVWR for the car line.

* * * * *

Subpart E—[Amended]

* * * * *

35. A new § 600.405–08 is added to read as follows:

§ 600.405–08 Dealer requirements.

(a) Each dealer shall prominently display at each location where new automobiles are offered for sale a copy of the annual Fuel Economy Guide containing the information specified in § 600.407. The Fuel Economy Guide may be made available either in hard copy or electronically via an on-site computer available for prospective purchasers to view and print as desired. The dealer shall provide this information without charge. The dealer will be expected to make this information available as soon as it is received by the dealer, but in no case later than 15 working days after notification is given of its availability. The Department of Energy will annually notify dealers of the availability of the information with instructions on how to obtain it either electronically or in hard copy.

(b) The dealer shall display the Fuel Economy Guide, or a notice of where the customer can electronically access the Fuel Economy Guide, in the same manner and in each location used to display brochures describing the automobiles offered for sale by the dealer. The notice shall include a link to the official Web site where this information is contained (*www.fueleconomy.gov.*)

(c) The dealer shall display the booklet applicable to each model year automobile offered for sale at the location.

* * * * *

36. A new § 600.407–08 is added to read as follows:

§ 600.407–08 Booklets displayed by dealers.

(a) Booklets displayed by dealers in order to fulfill the obligations of § 600.405 may be either

(1) The printed copy of the annual Fuel Economy Guide published by the Department of Energy, or;

(2) Optionally, dealers may display the Fuel Economy Guide on a computer that is linked to the electronic version of the Fuel Economy Guide (available at *www.fueleconomy.gov.*), or;

(3) A booklet approved by the Administrator of EPA containing the same information, format, and order as the Fuel Economy Guide published by the Department of Energy. Such a booklet may highlight the dealer's product line by contrasting color of ink or boldface type and may include other supplemental information regarding the dealer's product line subject to approval by the Administrator.

(b) A manufacturer's name and logo or a dealer's name and address or both may appear on the back cover of the hard copies of the Fuel Economy Guide.

Subpart F—[Amended]

* * * * *

37. A new § 600.507–08 is added to read as follows:

§ 600.507–08 Running change data requirements.

(a) Except as specified in paragraph (d) of this section, the manufacturer shall submit additional running change fuel economy data as specified in paragraph (b) of this section for any running change approved or implemented under 40 CFR 86.079–32, 86.079–33, or 86.082–34 or 40 CFR 86.1842–01 as applicable, which:

(1) Creates a new base level or,

(2) Affects an existing base level by:

(i) Adding an axle ratio which is at least 10 percent larger (or, optionally, 10 percent smaller) than the largest axle ratio tested.

(ii) Increasing (or, optionally, decreasing) the road-load horsepower for a subconfiguration by 10 percent or more for the individual running change or, when considered cumulatively, since original certification (for each cumulative 10 percent increase using the originally certified road-load horsepower as a base).

(iii) Adding a new subconfiguration by increasing (or, optionally, decreasing) the equivalent test weight for any previously tested subconfiguration in the base level.

(b)(1) The additional running change fuel economy data requirement in paragraph (a) of this section will be determined based on the sales of the vehicle configurations in the created or affected base level(s) as updated at the time of running change approval.

(2) Within each newly created base level as specified in paragraph (a)(1) of this section, the manufacturer shall submit data from the highest projected total model year sales subconfiguration within the highest projected total model year sales configuration in the base level.

(3) Within each base level affected by a running change as specified in paragraph (a)(2) of this section, fuel economy data shall be submitted for the vehicle configuration created or affected by the running change which has the highest total model year sales. The test vehicle shall be of the subconfiguration created by the running change which has the highest projected total model year sales within the applicable vehicle configuration.

(c) The manufacturer shall submit the fuel economy data required by this section to the Administrator in accordance with § 600.314(b).

(d) For those model types created under § 600.208–08(a)(2), the manufacturer shall submit data for each subconfiguration added by a running change.

* * * * *

38. A new § 600.510–08 is added to read as follows:

§ 600.510–08 Calculation of average fuel economy.

(a) Average fuel economy will be calculated to the nearest 0.1 mpg for the classes of automobiles identified in this section, and the results of such calculations will be reported to the Secretary of Transportation for use in determining compliance with the applicable fuel economy standards.

(1) An average fuel economy calculation will be made for the category of passenger automobiles that is domestically manufactured as defined in § 600.511(d)(1).

(2) An average fuel economy calculation will be made for the category of passenger automobiles that is not domestically manufactured as defined in § 600.511(d)(2).

(3) An average fuel economy calculation will be made for the category of light trucks that is domestically manufactured as defined in § 600.511(e)(1).

(4) An average fuel economy calculation will be made for the category of light trucks that is not domestically manufactured as defined in § 600.511(e)(2).

(b) For the purpose of calculating average fuel economy under paragraph (c), of this section:

(1) All fuel economy data submitted in accordance with § 600.006(e) or § 600.512(c) shall be used.

(2) The combined city/highway fuel economy will be calculated for each model type in accordance with § 600.208–08 of this section except that:

(i) Separate fuel economy values will be calculated for model types and base levels associated with car lines that are:

(A) Domestically produced; and

(B) Nondomestically produced and imported;

(ii) Total model year production data, as required by this subpart, will be used instead of sales projections;

(iii) The fuel economy value of diesel-powered model types will be multiplied by the factor 1.0 to correct gallons of diesel fuel to equivalent gallons of gasoline;

(iv) The fuel economy value will be rounded to the nearest 0.1 mpg; and

(v) At the manufacturer's option, those vehicle configurations that are self-compensating to altitude changes may be separated by sales into high-altitude sales categories and low-altitude sales categories. These separate sales categories may then be treated (only for the purpose of this section) as separate configurations in accordance with the procedure of § 600.208–08(a)(4)(ii).

(3) The fuel economy value for each vehicle configuration is the combined fuel economy calculated according to § 600.206–08(a)(3) except that:

(i) Separate fuel economy values will be calculated for vehicle configurations associated with car lines that are:

(A) Domestically produced; and

(B) Nondomestically produced and imported;

(ii) Total model year production data, as required by this subpart will be used instead of sales projections; and

(iii) The fuel economy value of diesel-powered model types will be multiplied by the factor 1.0 to convert gallons of diesel fuel to equivalent gallons of gasoline.

(c) Except as permitted in paragraph (d) of this section, the average fuel economy will be calculated individually for each category identified in paragraph (a) of this section as follows:

(1) Divide the total production volume of that category of automobiles; by

(2) A sum of terms, each of which corresponds to a model type within that category of automobiles and is a fraction determined by dividing:

(i) The number of automobiles of that model type produced by the manufacturer in the model year; by

(ii) For gasoline-fueled and diesel-fueled model types, the fuel economy calculated for that model type in accordance with paragraph (b)(2) of this section; or

(iii) For alcohol-fueled model types, the fuel economy value calculated for that model type in accordance with paragraph (b)(2) of this section divided by 0.15 and rounded to the nearest 0.1 mpg; or

(iv) For natural gas-fueled model types, the fuel economy value calculated for that model type in accordance with paragraph (b)(2) of this section divided by 0.15 and rounded to the nearest 0.1 mpg; or

(v) For alcohol dual fuel model types, for model years 1993 through 2004, the harmonic average of the following two terms; the result rounded to the nearest 0.1 mpg:

(A) The combined model type fuel economy value for operation on gasoline or diesel fuel as determined in § 600.208(b)(5)(i); and

(B) The combined model type fuel economy value for operation on alcohol fuel as determined in § 600.208(b)(5)(ii) divided by 0.15 provided the requirements of § 600.510 (g) are met; or

(vi) For natural gas dual fuel model types, for model years 1993 through 2004, the harmonic average of the following two terms; the result rounded to the nearest 0.1 mpg:

(A) The combined model type fuel economy value for operation on gasoline or diesel as determined in § 600.208(b)(5)(i); and

(B) The combined model type fuel economy value for operation on natural gas as determined in § 600.208(b)(5)(ii) divided by 0.15 provided the requirements of paragraph (g) of this section are met.

(d) The Administrator may approve alternative calculation methods if they are part of an approved credit plan under the provisions of 15 U.S.C. 2003.

(e) For passenger categories identified in paragraphs (a)(1) and (2) of this section, the average fuel economy calculated in accordance with paragraph (c) of this section shall be adjusted using the following equation:

$$AFE_{adj}=AFE[((0.55 \times a \times c) + (0.45 \times c) + (0.5556 \times a) + 0.4487) / ((0.55 \times a) + 0.45)] + IW$$

Where:

AFE_{adj}=Adjusted average combined fuel economy, rounded to the nearest 0.1 mpg.

AFE=Average combined fuel economy as calculated in paragraph (c) of this section, rounded to the nearest 0.0001 mpg.

a=Sales-weight average (rounded to the nearest 0.0001 mpg) of all model type highway fuel economy values (rounded to the nearest 0.1 mpg) divided by the sales-weighted average (rounded to the nearest 0.0001 mpg) of all model type city fuel economy values (rounded to the nearest 0.1 mpg). The quotient shall be rounded to 4 decimal places. These average fuel economies shall be determined using the methodology of paragraph (c) of this section.

c=0.0022 for the 1986 model year.

c=A constant value, fixed by model year. For 1987, the Administrator will specify the c value after the necessary laboratory humidity and test fuel data become available. For 1988 and later model years, the Administrator will specify the c value after the necessary laboratory humidity and test fuel data become available.

$IW=(9.2917 \times 10^{-3} \times SF_{3IWC} \times FE_{3IWC}) - (3.5123 \times 10^{-3} \times H\ SF_{4ETW} \times FE_{4IWC})$

Note: Any calculated value of IW less than zero shall be set equal to zero.

SF_{3IWC}=The 3000 lb. inertia weight class sales divided by total sales. The quotient shall be rounded to 4 decimal places.

SF_{4ETW}=The 4000 lb. equivalent test weight category sales divided by total sales. The quotient shall be rounded to 4 decimal places.

FE_{4IWC}=The sales-weighted average combined fuel economy of all 3000 lb. inertia weight class base levels in the compliance category. Round the result to the nearest 0.0001 mpg.

FE_{4IWC}=The sales-weighted average combined fuel economy of all 4000 lb. inertia weight class base levels in the compliance category. Round the result to the nearest 0.0001 mpg.

(f) The Administrator shall calculate and apply additional average fuel economy adjustments if, after notice and opportunity for comment, the Administrator determines that, as a result of test procedure changes not previously considered, such correction is necessary to yield fuel economy test results that are comparable to those obtained under the 1975 test procedures. In making such determinations, the Administrator must find that:

(1) A directional change in measured fuel economy of an average vehicle can be predicted from a revision to the test procedures;

(2) The magnitude of the change in measured fuel economy for any vehicle or fleet of vehicles caused by a revision to the test procedures is quantifiable from theoretical calculations or best available test data;

(3) The impact of a change on average fuel economy is not due to eliminating the ability of manufacturers to take advantage of flexibility within the existing test procedures to gain measured improvements in fuel economy which are not the result of actual improvements in the fuel economy of production vehicles;

(4) The impact of a change on average fuel economy is not solely due to a greater ability of manufacturers to reflect in average fuel economy those design changes expected to have comparable effects on in-use fuel economy;

(5) The test procedure change is required by EPA or is a change initiated by EPA in its laboratory and is not a change implemented solely by a manufacturer in its own laboratory.

(g)(1) Alcohol dual fuel automobiles and natural gas dual fuel automobiles must provide equal or greater energy efficiency while operating on alcohol or natural gas as while operating on gasoline or diesel fuel to obtain the CAFE credit determined in paragraphs (c)(2)(v) and (vi) of this section. The following equation must hold true:

E_{alt}/E_{pet}> or = 1

Where:

$E_{alt}=[FE_{alt}/(NHV_{alt} \times Dalt)] \times 10^6$=energy efficiency while operating on alternative fuel rounded to the nearest 0.01 miles/million BTU.

$E_{pet}=[FE_{pet}/(NHV_{pet} \times D_{pet})] \times 10^6$ = energy efficiency while operating on gasoline or diesel (petroleum) fuel rounded to the nearest 0.01 miles/million BTU.

FE_{alt} is the fuel economy [miles/gallon for liquid fuels or miles/100 standard cubic feet for gaseous fuels] while operated on the alternative fuel as determined in § 600.113–08(a) and (b);

FE_{pet} is the fuel economy [miles/gallon] while operated on petroleum fuel (gasoline or diesel) as determined in § 600.113(a) and (b);

NHV_{alt} is the net (lower) heating value [BTU/lb] of the alternative fuel;

NHV_{pet} is the net (lower) heating value [BTU/lb] of the petroleum fuel;

D_{alt} is the density [lb/gallon for liquid fuels or lb/100 standard cubic feet for gaseous fuels] of the alternative fuel;

D_{pet} is the density [lb/gallon] of the petroleum fuel.

(i) The equation must hold true for both the FTP city and HFET highway fuel economy values for each test of each test vehicle.

(ii)(A) The net heating value for alcohol fuels shall be determined per ASTM D 240 (Incorporated by reference as specified in § 600.011–93).

(B) The density for alcohol fuels shall be determined per ASTM D 1298 (Incorporated by reference as specified in § 600.011–93).

(iii) The net heating value and density of gasoline are to be determined by the manufacturer in accordance with § 600.113(f).

(2) For model years 1993 through 1995, alcohol dual fuel automobiles designed to operate on mixtures of alcohol and gasoline must, in addition to paragraph (g)(1) of this section, to obtain the CAFE credit determined in paragraphs (c)(2)(v) and (vi) of this section, provide equal or superior energy efficiency while operating on a mixture of 50% alcohol, 50% gasoline by volume, as while operating on gasoline fuel. The following equation must hold true:

E_{50}/E_g> or = 1

Where:

$E_{50}=[FE_{50}/(NHV_{50} \times D_{50})] \times 10^6$ = energy efficiency while operating on 50% alcohol, 50% gasoline rounded to the nearest 0.01 miles/million BTU.

$E_g=[FE_g/(NHV_g \times D_g)] \times 10^6$ = energy efficiency while operating on gasoline fuel rounded to the nearest 0.01 miles/million BTU.

FE_{50} is the fuel economy [miles/gallon] while operated on 50% alcohol, 50% gasoline as determined in § 600.113(a) and (b);

FE_g is the fuel economy [miles/gallon] while operated on gasoline as determined in § 600.113(a) and (b);

NHV5. is the net (lower) heating value [BTU/lb] of the 50/50 blend;

NHVg is the net (lower) heating value [BTU/lb] of gasoline;

D_{50} is the density [lb/gallon] of the 50/50 blend;

D_g is the density [lb/gallon] of the gasoline.

(i) To demonstrate that the equation holds true for each engine family, the manufacturer will:

(A) Test one test vehicle in each engine family on both the FTP city and HFET highway cycles; or

(B) In lieu of testing, provide a written statement attesting that equal or superior energy efficiency is attained while using a 50% alcohol, 50% gasoline mixture compared to using 100% gasoline.

(ii)(A) The net heating value for the 50% alcohol, 50% gasoline mixture shall be determined by ASTM D 240 (Incorporated by reference as specified in § 600.011–93).

(B) The density for the 50% alcohol, 50% gasoline mixture shall be determined per ASTM D 1298 (Incorporated by reference as specified in § 600.011–93).

(iii) The net heating value and density of gasoline are to be determined by the manufacturer in accordance with § 600.113(f).

(3) Alcohol dual fuel passenger automobiles and natural gas dual fuel passenger automobiles manufactured during model years 1993 through 2004 must meet the minimum driving range requirements established by the Secretary of Transportation (49 CFR part 538) to obtain the CAFE credit determined in paragraphs (c)(2)(v) and (vi) of this section.

(h) For each of the model years 1993 through 2004, and for each category of automobile identified in paragraph (a) of this section, the maximum increase in average fuel economy determined in paragraph (c) of this section attributable to alcohol dual fuel automobiles and natural gas dual fuel automobiles shall be 1.2 miles per gallon or as provided for in paragraph (i) of this section.

(1) The Administrator shall calculate the increase in average fuel economy to determine if the maximum increase provided in paragraph (h) of this section has been reached. The Administrator shall calculate the average fuel economy for each category of automobiles specified in paragraph (a) of this section by subtracting the average fuel economy values calculated in accordance with this section by assuming all alcohol dual fuel and natural gas dual fuel automobiles are operated exclusively on gasoline (or diesel) fuel from the average fuel economy values determined in paragraphs (b)(2)(vi), (b)(2)(vii), and (c) of this section. The difference is limited to the maximum increase specified in paragraph (h) of this section.

(2) [Reserved]

(i) In the event that the Secretary of Transportation lowers the corporate average fuel economy standard applicable to passenger automobiles below 27.5 miles per gallon for any model year during 1993 through 2004, the maximum increase of 1.2 mpg per year specified in paragraph (h) of this section shall be reduced by the amount the standard was lowered, but not reduced below 0.7 mpg per year.

39. A new § 600.510–08 is added to read as follows:

§ 600.510–08 Model year report.

(a) For each model year, the manufacturer shall submit to the Administrator a report, known as the model year report, containing all information necessary for the calculation of the manufacturer's average fuel economy. The results of the manufacturer calculations and summary information of model type fuel economy values which are contained in the average calculation shall be submitted to the Secretary of the Department of Transportation, National Highway and Traffic Safety Administration. (b)(1) The model year report shall be in writing, signed by the authorized representative of the manufacturer and shall be submitted no later than 90 days after the end of the model year.

(2) The Administrator may waive the requirement that the model year report be submitted no later than 90 days after the end of the model year. Based upon a request by the manufacturer, if the Administrator determines that 90 days is insufficient time for the manufacturer to provide all additional data required as determined in § 600.507, the Administrator shall establish a date by which the model year report must be submitted.

(3) Separate reports shall be submitted for passenger automobiles and light trucks (as identified in § 600.510).

(c) The model year report must include the following information:

(1) All fuel economy data used in the FTP/HFET-based model type calculations under § 600.208–08, and subsequently required by the Administrator in accordance with § 600.507;

(2) All fuel economy data for certification vehicles and for vehicles tested for running changes approved under 40 CFR 86.1842–01;

(3) Any additional fuel economy data submitted by the manufacturer under § 600.509;

(4) A fuel economy value for each model type of the manufacturer's product line calculated according to § 600.510(b)(2);

(5) The manufacturer's average fuel economy value calculated according to § 600.510(c);

(6) A listing of both domestically and nondomestically produced car lines as determined in § 600.511 and the cost information upon which the determination was made; and

(7) The authenticity and accuracy of production data must be attested to by the corporation, and shall bear the signature of an officer (a corporate executive of at least the rank of vice-president) designated by the corporation. Such attestation shall constitute a representation by the manufacturer that the manufacturer has established reasonable, prudent procedures to ascertain and provide production data that are accurate and authentic in all material respects and that these procedures have been followed by employees of the manufacturer involved in the reporting process. The signature of the designated officer shall constitute a representation by the required attestation.

40. A new § 600.513–08 is added to read as follows:

§ 600.513–08 Gas Guzzler Tax.

(a) This section applies only to passenger automobiles sold after December 27, 1991, regardless of the model year of those vehicles. For alcohol dual fuel and natural gas dual fuel automobiles, the fuel economy while such automobiles are operated on gasoline will be used for Gas Guzzler Tax assessments.

(1) The provisions of this section do not apply to passenger automobiles exempted for Gas Guzzler Tax assessments by applicable federal law and regulations. However, the manufacturer of an exempted passenger automobile may, in its discretion, label such vehicles in accordance with the provisions of this section.

(2) For 1991 and later model year passenger automobiles, the combined FTP/HFET-based model type fuel economy value determined in § 600.208–08 used for Gas Guzzler Tax assessments shall be calculated in accordance with the following equation, rounded to the nearest 0.1 mpg:

$$FE_{adj}=FE[((0.55 \times a_g \times c) + (0.45 \times c) + (0.5556 \times a_g) + 0.4487) / ((0.55 \times a_g) + 0.45)] + IW_g$$

Where:

FE_{adj}=Fuel economy value to be used for determination of gas guzzler tax assessment rounded to the nearest 0.1 mpg.

FE=Combined model type fuel economy calculated in accordance with § 600.208–08, rounded to the nearest 0.0001 mpg.

a_g=Model type highway fuel economy, calculated in accordance with § 600.208–08, rounded to the nearest 0.0001 mpg divided by the model type city fuel economy calculated in accordance with § 600.208–08, rounded to the nearest 0.0001 mpg. The quotient shall be rounded to 4 decimal places.

c=gas guzzler adjustment factor=1.300×10^{-3} for the 1986 and later model years.

$IW_g=(9.2917 \times 10^{-3} \times SF_{3IWCG} \times FE_{3IWCG}) - (3.5123 \times 10^{-3} \times SF_{4ETWG} \times FE_{4IWCG})$

Note: Any calculated value of IW less than zero shall be set equal to zero.

SF_{3IWCG}=The 3000 lb. inertia weight class sales in the model type divided by the total model type sales; the quotient shall be rounded to 4 decimal places.

SF_{4ETWG}=The 4000 lb. equivalent test weight sales in the model type divided by the total model type sales, the quotient shall be rounded to 4 decimal places.

FE_{3IWCG}=The 3000 lb. inertial weight class base level combined fuel economy used to calculate the model type fuel economy rounded to the nearest 0.0001 mpg.

FE_{4IWCG}=The 4000 lb. inertial weight class base level combined fuel economy used to calculate the model type fuel economy f/rounded to the nearest 0.001 mpg.

(b)(1) For passenger automobiles sold after December 31, 1990, with a combined FTP/HFET-based model type fuel economy value of less than 22.5 mpg (as determined in sec. 600.208–08), calculated in accordance with paragraph (a)(2) of this section and rounded to the nearest 0.1 mpg, each vehicle fuel economy label shall include a Gas Guzzler Tax statement pursuant to 49 U.S.C. 32908(b)(1)(E). The tax amount stated shall be as specified in paragraph (b)(2) of this section.

(2) For passenger automobiles with a combined general label model type fuel economy value of:

(i) At least 22.5 mpg, no Gas Guzzler Tax statement is required.

(ii) At least 21.5 mpg, but less than 22.5 mpg, the Gas Guzzler Tax statement shall show a tax of $1,000.

(iii) At least 20.5 mpg, but less than 21.5 mpg, the Gas Guzzler Tax statement shall show a tax of $1,300.

(iv) At least 19.5 mpg, but less than 20.5 mpg, the Gas Guzzler Tax statement shall show a tax of $1,700.

(v) At least 18.5 mpg; but less than 19.5 mpg, the Gas Guzzler Tax statement shall show a tax of $2,100.

(vi) At least 17.5 mpg, but less than 18.5 mpg, the Gas Guzzler Tax statement shall show a tax of $2,600.

(vii) At least 16.5 mpg, but less than 17.5 mpg, the Gas Guzzler Tax statement shall show a tax of $3,000.

(viii) At least 15.5 mpg, but less than 16.5 mpg, the Gas Guzzler Tax statement shall show a tax of $3,700.

(ix) At least 14.5 mpg, but less than 15.5 mpg, the Gas Guzzler Tax statement shall show a tax of $4,500.

(x) At least 13.5 mpg, but less than 14.5 mpg, the Gas Guzzler Tax statement shall show a tax of $5,400.

(xi) At least 12.5 mpg, but less than 13.5 mpg, the Gas Guzzler Tax statement shall show a tax of $6,400.

(xii) Less than 12.5 mpg, the Gas Guzzler Tax statement shall show a tax of $7,700.

41. Appendix II to Part 600 is amended by revising paragraph (b) and adding a new paragraph (c) to read as follows:

Appendix II to Part 600—Sample Fuel Economy Calculations

* * * * *

(b) This sample fuel economy calculation is applicable to 1988 and later model year automobiles.

(1) Assume that a gasoline-fueled vehicle was tested by the Federal Emission Test Procedure and the following results were calculated:

HC = .139 grams/mile

CO = 1.59 grams/mile

CO_2 = 317 grams/mile

(2) Assume that the test fuel used for this test had the following properties:

SG=0.745

CWF=0.868

NHV=18,478 Btu/lb.

(3) According to the procedure in § 600.113–88, the city fuel economy or MPG_c, for the vehicle may be calculated by substituting the HC, CO, and CO_2 gram/mile values and the SG, CWF, and NHV values into the following equation:

$$MPG_c = \left(5174\times10^4\times CWF\times SG\right)/\left[\left(\left(CWF\times HC\right)+\left(0.429\times CO+\left(0.273\times CO_2\right)\right)\left(\left(0.6\times SG\times NHV\right)+5471\right)\right)\right]$$

$$MPG_c = \left(5174\times10^4\times0.868\times0.745\right)/\left[\left(0.868\times.139\times0.429\times1.59+0.273\times317\right)\left(0.6\times0.745\times18478+5471\right)\right]$$

$$MPG_c = 27.9$$

(4) Assume that the same vehicle was tested by the Federal Highway Fuel Economy Test Procedure and a calculation similar to that shown in (b)(3) resulted in a highway fuel economy of MPG_h of 36.9. According to the procedure in § 600.113, the combined fuel economy (called $MPG_{c/h}$) for the vehicle may be calculated by substituting the city and highway fuel economy values into the following equation:

$$MPG_{c/h} = \frac{1}{\frac{0.55}{MPG_c}+\frac{0.45}{MPG_h}}$$

$$MPG_{c/h} = \frac{1}{\frac{0.55}{27.9}+\frac{0.45}{36.9}}$$

$$MPG_{c/h} = 31.3$$

(c) For 2008 and later model year vehicles, the combined fuel economy for the purpose of determining annual fuel costs under § 600.307–08(g) is determined by substituting the city and highway fuel economy into the following equation:

$$MPG_{c/h} = \frac{1}{\frac{0.43}{MPG_c}+\frac{0.57}{MPG_h}}$$

$$MPG_{c/h} = \frac{1}{\frac{0.43}{27.9}+\frac{0.57}{36.9}}$$

$$MPG_{c/h} = 32.4$$

42. Appendix III to Part 600 is revised to read as follows:

Appendix III to Part 600—Sample Fuel Economy Label Calculation

Suppose that a manufacturer called Mizer Motors has a product line composed of eight car lines. Of these eight, four are available with the 3 liter, 6 cylinder and 3-way catalyst engine. These four car lines are:

Ajax

Boredom III

Dodo

Castor (Station Wagon)

A car line is defined in subpart A as a group of vehicles within a make or division which has a degree of commonality in construction. Car line does not consider any level of decor or opulence and is not generally distinguished by such characteristics as roofline, number of doors, seats, or windows. Station wagons and light duty trucks are, however, identified separately from the remainder of each car line. In other words, a Castor station wagon would be considered a different car line than the normal Castor car line made up of sedans, coupes, etc.

The engine considered here is defined as a basic engine in subpart A of this part. A basic engine is a unique combination of fuel system, number of cylinders, catalyst usage and engine displacement. A model type is a unique combination of car line, basic engine, and transmission class. Thus Ajax is a car line but Ajax 3 liter, 6 cylinder manual transmission is a model type whereas Ajax 3 liter, 6 cylinder automatic transmission is a different model type.

The following calculations provide an example of the procedures described in subpart C of this part for the calculation of vehicle configuration and model type fuel economy values. In order to simplify the presentation, only city fuel economy values are included. The procedure is identical for highway and combined fuel economy values.

Step I. Input data as supplied by the manufacturer or as determined from testing conducted by the Administrator.

Manufacturer—Mizer Motors.

Basic Engine: (3 liter, 6 cylinder, 3-way catalyst).

Test vehicle carline	Engine code	Transmission	Inertia weight	Axle ratio	Avg. MPG	Label MPG [1]	Veh config. sales
Ajax	1	M–3	3500	2.73	16.1001	16	15,000
Ajax	2	A–3	3500	2.56	15.9020	16	35,000
Boredom III	4	M–3	4000	3.08	14.2343	14	10,000
Ajax	3	M–4	4000	3.36	15.0000	15	15,000
Boredom III	8	A–3	4000	2.56	13.8138	14	25,000
Boredom III	5	A–3	4500	3.08	13.2203	13	20,000
Castor	5	A–3	5000	3.08	10.6006	11	40,000

[1] The vehicle 5-cycle configuration fuel economy values, rounded to the nearest mile per gallon, are the fuel economy values that would be used on specific labels for that vehicle configuration.

Step II. Group vehicle fuel economy and sales data according to base level combinations within this basic engine.

Base level	Transmission	Inertia weight	Miles per gallon	Projected veh. config. sales
A	Manual—3	3,500	16.1001	15,000
B	Automatic	3,500	15.9020	35,000
C	Manual—3	4,000	14.2343	10,000
C	Manual—4	4,000	15.0000	15,000
D	Automatic	4,000	13.8138	25,000
E	Automatic	4,500	13.2203	20,000
F	Automatic	5,000	10.6006	40,000

Step III. Determine base level fuel economy values.

A. For all the base levels except the base level which includes 4,000 pound, manual transmission data, the base level fuel economy is as noted in Step II since only one vehicle configuration was tested within each of these base levels.

3,500 lb/manual transmission	16.1001 mpg.
3,500 lb/automatic transmission	15.9020 mpg.
4,000 lb/automatic transmission	13.8138 mpg.
4,500 lb/automatic transmission	13.2203 mpg.
5,000 lb/automatic transmission	10.6006 mpg.

B. Since data from more than one vehicle configuration are included in the 4,000-pound, manual transmission base level, this fuel economy is harmonically averaged in proportion to the percentage of total sales of all vehicle configurations tested within that base level represented by each vehicle configuration tested within that base level.

Base level fuel economy =

$$\frac{1}{\left[\begin{array}{l}\text{Fraction of total sales of configurations}\\ \text{tested represented by}\\ \text{configuration No. 1 sales}\end{array}\right]\left[\frac{1}{\begin{array}{c}\text{Configuration}\\ \text{No. 1 fuel economy}\end{array}}\right]\left[\begin{array}{l}\text{Fraction of total sales}\\ \text{of configurations tested}\\ \text{represented by configuration}\\ \text{No. 2 sales}\end{array}\right]\left[\frac{1}{\begin{array}{l}\text{Configuration}\\ \text{No. 2 fuel economy}\end{array}}\right]}$$

Base level: Manual transmission, 4000 pounds:

$$\frac{1}{\left[\frac{10000}{25000}\right]\frac{1}{14.2343}+\left[\frac{15.000}{250000}\right]\frac{1}{15.0000}}=14.6840 \text{ miles per gallon}$$

Therefore, the 4000 pound, manual transmission fuel economy is 14.6840 miles per gallon.

Note that the car line of the test vehicle using a given engine makes no difference—only the weight and transmission do.

Step IV. For each model type offered by the manufacturer with that basic engine, determine the sales fraction represented by each inertia weight/transmission class combination and the corresponding fuel economy.

Ajax	Manual	1.0000 at 3,500 lb	16.1001
	Automatic	0.3000 at 3,500 lb	15.9020
		0.7000 at 4,000 lb	13.8138
Dodo	Manual	0.4000 at 3,500 lb	16.1001
		0.6000 at 4,000 lb	14.6840
	Automatic	0.3000 at 3,500 lb	15.9020
		0.7000 at 4,000 lb	13.8138
Boredom III	Manual	1.0000 at 4,000 lb	14.6840
	Automatic	0.2500 at 4,000 lb	13.8138
		0.7500 at 4,500 lb	13.2203
Castor	Automatic	0.2000 at 4,500 lb	13.2203
		0.8000 at 5,000 lb	10.6006

Step V. Determine fuel economy for each model type (that is, car line/basic engine/transmission class combination).

$$\text{Ajax, 3 liter, 6 cylinder, automatic MPG} = \frac{1}{\frac{\text{The fraction of Ajax vehicles using the 3 liter, 6 cylinder engine which fall in the 3500 lb inertia weight class with an automatic transmission}}{\text{Fuel economy for 3 liter, 6 cylinder 3500 lb automatic transmission base level}}+\left[\frac{\text{The fraction of Ajax vehicles using the 3 liter, 6 cylinder engine which fall in the 4000 lb inertia weight class with an automatic transmission}}{\text{Fuel economy for 3 liter 6 cylinder 4000 lb automatic transmission base level}}\right]}$$

$$=\frac{1}{\left[\frac{0.3000}{15.9020}\right]+\left[\frac{0.7000}{13.8138}\right]}=14.3803 \text{ mpg}$$

Similarly,

Ajax 3 liter, 6 cylinder, manual MPG = 16.16 MPG [1]

$$\text{Dodo 3 liter, 6 cylinder manual MPG} = \frac{1}{\left[\frac{0.4000}{16.1001}\right]+\left[\frac{0.6000}{14.6840}\right]}=15.2185=15 \text{ MPG}^{1}$$

[1] The 5-cycle model type fuel economy values, rounded to the nearest mile per gallon, are the fuel economy values as used on general labels for that model year.

$$\text{Dodo 3 liter, 6 cylinder automatic MPG} = \frac{1}{\left[\frac{0.3000}{15.9020}\right] + \left[\frac{0.7000}{13.8138}\right]} = 15.2185 = 15\ \text{MPG}^1$$

Boredom III 6 liter 6 cylinder manual MPG=14.6840=15 mi./gal.7 [1]

$$\text{Boredom III 6 liter, 6 cylinder automatic MPG} = \frac{1}{\left[\frac{0.2500}{13.8138}\right] + \left[\frac{0.7500}{13.2203}\right]} = 13.3638 = 13\ \text{MPG}^1$$

$$\text{Castor 3 liter, 6 cylinder automatic MPG} = \frac{1}{\left[\frac{0.2000}{13.2203}\right] + \left[\frac{0.8000}{10.6006}\right]} = 11.0381 = 11\ \text{MPG}^1$$

Note that even though no Dodo was actually tested, this approach permits its fuel economy figure to be estimated, based on the inertia weight distribution of projected Dodo sales within a specific engine and transmission grouping.

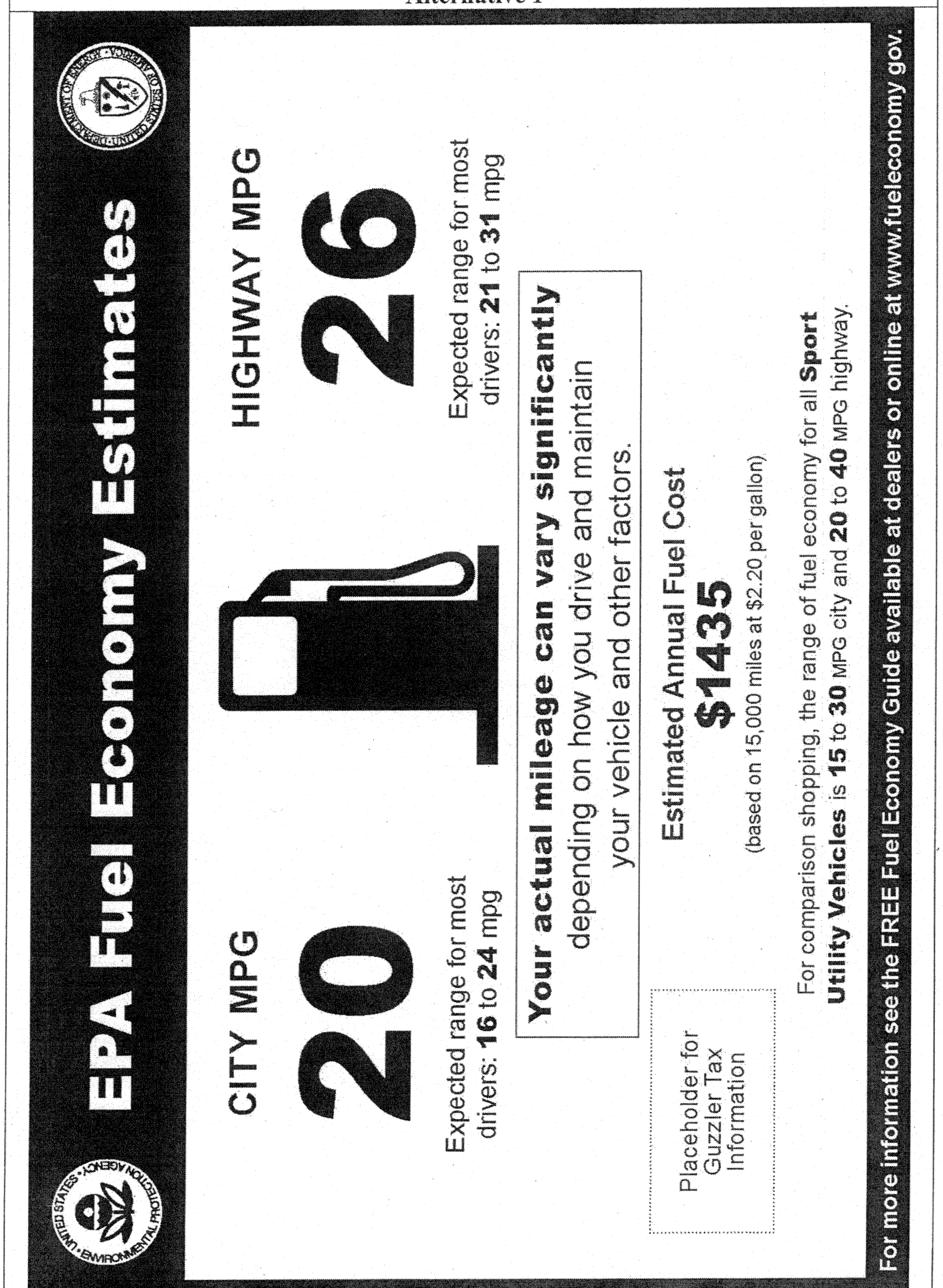
43. A new Appendix IV is added to read as follows:

Appendix IV to Part 600—Fuel Economy Label Formats for 2008 and Later Model Year Vehicles

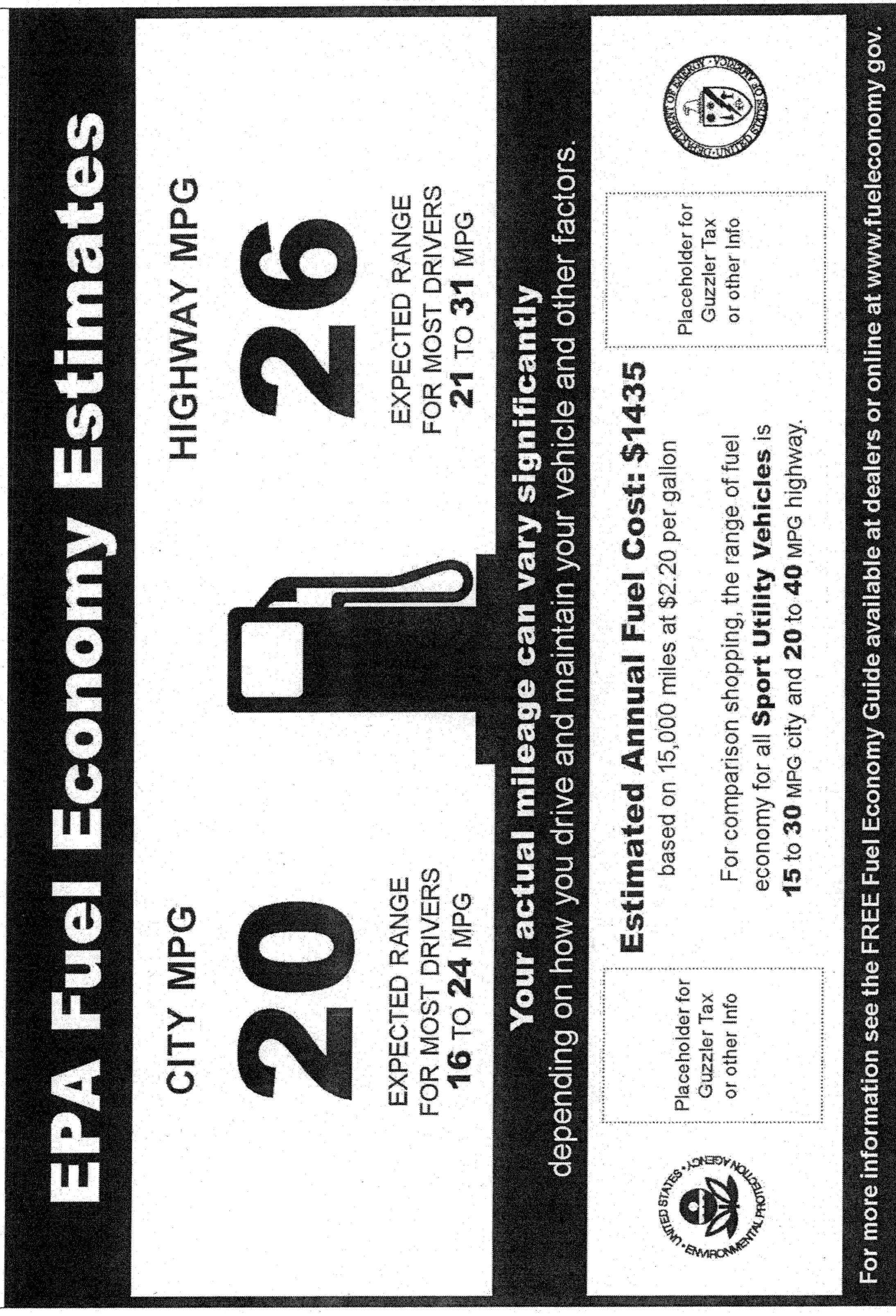
Gasoline-fueled vehicle label

BILLING CODE 6560–50–P

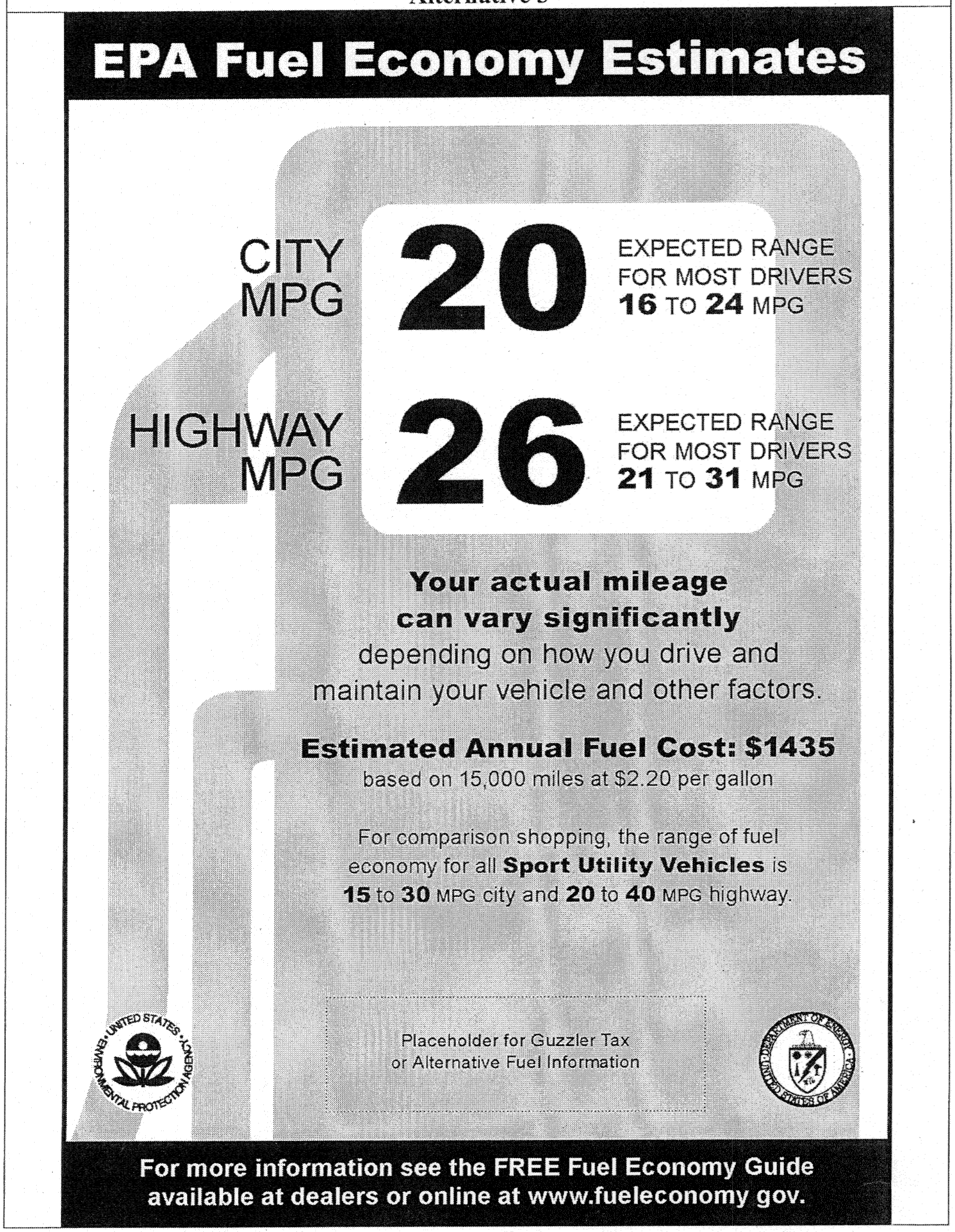
Alternative 1



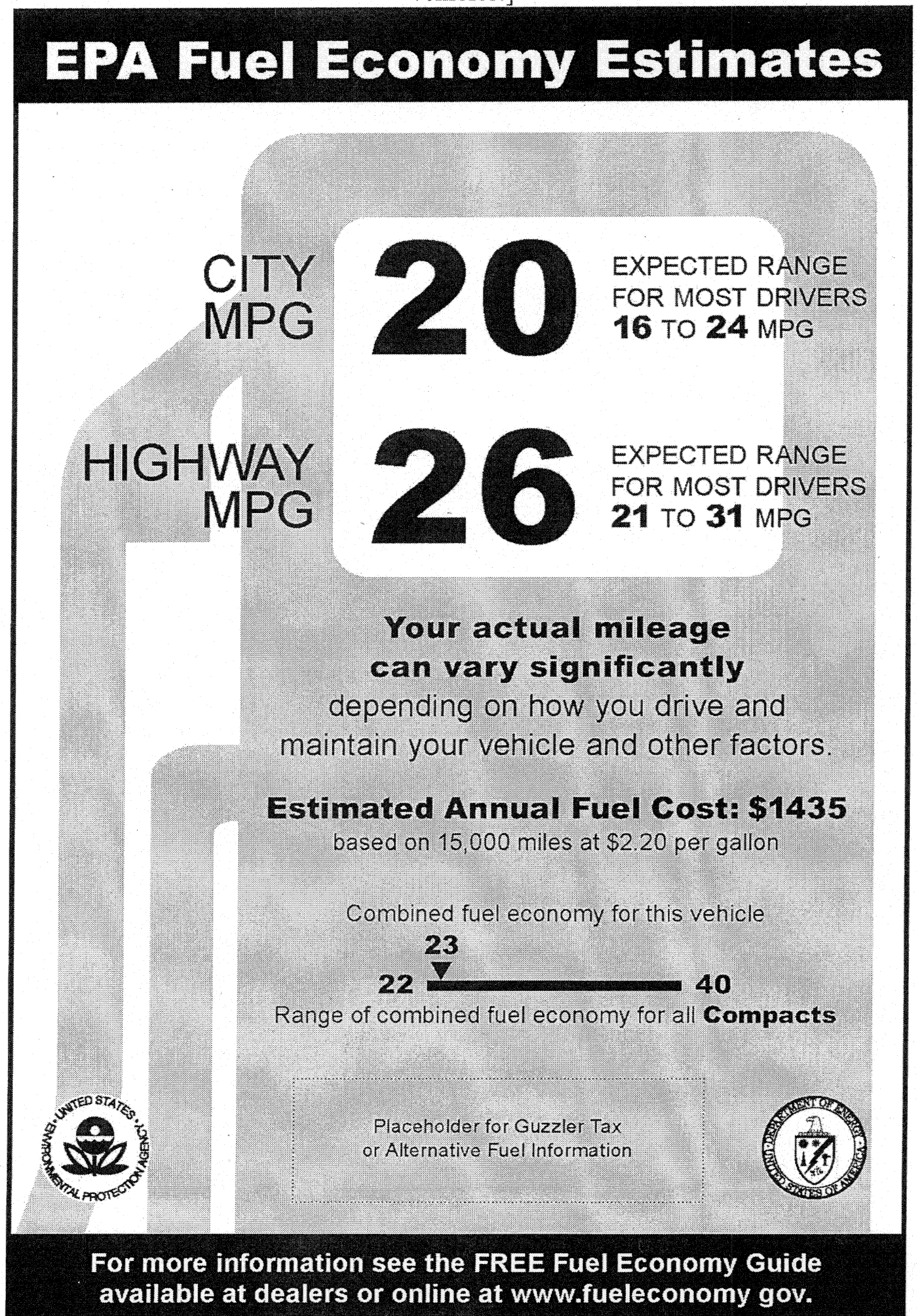
Alternative 2



Alternative 3



[Proposed Alternative showing graphic presentation of fuel economy range for comparable vehicles:]



[FR Doc. 06–451 Filed 1–31–06; 8:45 am]

BILLING CODE 6560–50–C