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40 CFR Part 80

Regulation To Mitigate the Misfueling of Vehicles and Engines With Gasoline Containing Greater Than Ten Volume Percent Ethanol and Modifications to the Reformulated and Conventional Gasoline Programs; Proposed Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 80

[EPA–HQ–OAR–2010–0448; FRL–9215–4]

RIN 2060–AQ17

Regulation To Mitigate the Misfueling of Vehicles and Engines With Gasoline Containing Greater Than Ten Volume Percent Ethanol and Modifications to the Reformulated and Conventional Gasoline Programs

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: EPA is proposing a regulatory program to help mitigate the potential for misfueling of certain engines, vehicles and equipment with gasoline containing greater than 10 volume percent ("vol%") ethanol up to 15 vol% ethanol (E15). This proposal is in conjunction with the Agency's partial waiver, pursuant to Clean Air Act section 211(f)(4), which allows for the introduction into commerce of gasoline-ethanol blends containing up to 15 vol% ethanol for use in model year 2007 and newer on-highway light-duty motor vehicles. The E15 waiver is limited in scope to a portion of the light-duty fleet, and the proposed misfueling mitigation program will help avoid the misfueling of all other engines, vehicles, and equipment with unapproved fuels. This proposed rule would require all E15 gasoline fuel dispensers to have a label if a retail station chooses to sell E15 and seeks comment on separate labeling requirements for fuel blender pumps and fuel pumps that dispense E85. Similar to the prohibition in section 211(f)(1), the proposed rule would prohibit the use of gasoline containing greater than 10 vol% ethanol in vehicles and engines not covered by the partial waiver for E15. In addition, the proposed rule would require product transfer documents specifying ethanol content and Reid Vapor Pressure (RVP) to accompany the transfer of gasoline blended with ethanol and a national survey of retail stations to ensure compliance with the these requirements. The proposed rule would also modify the Reformulated Gasoline ("RFG") program by updating the Complex Model to allow fuel manufacturers to certify batches of gasoline containing up to 15 vol% ethanol.

DATES: Comments must be received on or before January 3, 2011. Under the Paperwork Reduction Act, comments on the information collection provisions are best assured of full consideration if the Office of Management and Budget (OMB) receives a copy of your comments on or before December 6, 2010, thirty days after date of publication in the **Federal Register**.

Hearing: We will hold a public hearing on November 16, 2010 at the Millennium Knickerbocker Hotel in Chicago, IL. The hearing will start at 10 a.m. local time and continue until everyone has had a chance to speak. If you want to testify at the hearing, notify the contact person listed under **FOR FURTHER INFORMATION CONTACT** by November 8, 2010.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–HQ–OAR–2010–0448, by one of the following methods:

- *http://www.regulations.gov:* Follow the on-line instructions for submitting comments.
- *E-mail: E15@epa.gov.*
- *Fax:* (202) 566–1741.
- *Mail:* Air and Radiation Docket, Docket ID No. EPA–HQ–OAR–2010–0448, Environmental Protection Agency, Mailcode: 6102T, 1200 Pennsylvania Avenue, NW., Washington, DC 20460. Please include a total of two copies.
- *Hand Delivery:* EPA Docket Center, Public Reading Room, EPA West Building, Room 3334, 1301 Constitution Avenue, NW., Washington, DC 20460. 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–2010–0448. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *http://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 *http://www.regulations.gov* or e-mail. The *http://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 *http://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 "What Should I Consider as I Prepare My Comments for EPA?" in the **SUPPLEMENTARY INFORMATION** section of this document.

Docket: All documents in the docket are listed in the *http://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 *http://www.regulations.gov* or in hard copy at the Air and Radiation Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave., NW., Washington, DC. 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, and the telephone number for the Air Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: Julia MacAllister, Office of Transportation and Air Quality, Assessment and Standards Division, Environmental Protection Agency, 2000 Traverwood Drive, Ann Arbor, MI 48105; Telephone number: 734–214–4131; Fax number: 734–214–4816; E-mail address: *macallister.julia@epa.gov,* or Assessment and Standards Division Hotline; telephone number (734) 214–4636; E-mail address *asdinfo@epa.gov.*

SUPPLEMENTARY INFORMATION:

Does This Action Apply to Me?

Entities potentially affected by this action include those involved with the production, importation, distribution, marketing, or retailing of diesel fuel and production of gasoline. Categories and entities affected by this action include:

Category	NAICS [1] codes	SIC [2] codes	Examples of potentially regulated entities
Industry	324110	2911	Petroleum refineries.
Industry	325193	2869	Ethyl alcohol manufacturing.
Industry	424710	5171	Petroleum bulk stations and terminals.
Industry	424720	5172	Petroleum and petroleum products merchant wholesalers.
Industry	454319	5989	Other fuel dealers.
Industry	447190	5541	Gasoline service stations. Marine service stations. Truck stops.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be affected by this action; however, other types of entities not listed in the table could also be affected. To determine whether your entity is affected by this action, you should examine the applicability criteria of Parts 79 and 80 of title 40 of the Code of Federal Regulations. If you have any question regarding applicability of this action to a particular entity, consult the person in the preceding **FOR FURTHER INFORMATION CONTACT** section.

What should I consider as I prepare my comments for EPA?

A. *Submitting CBI.* Do not submit this information to EPA through *http://www.regulations.gov* or e-mail. Clearly mark the information that you claim to be CBI. For CBI information on a disk or CD ROM that you mail to EPA, 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 claimed as CBI. In addition to one complete version of the comment that includes 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. Information marked as CBI will not be disclosed except in accordance with procedures set forth in 40 CFR Part 2.

B. *Tips for Preparing Your Comments.* When submitting comments, remember to:

- Identify the rulemaking by docket number and other identifying information (subject heading, **Federal Register** date and page number).
- Follow directions—The agency may ask you to respond to specific questions or organize comments by referencing a Code of Federal Regulations (CFR) part or section number.
- Explain why you agree or disagree; suggest alternatives and substitute language for your requested changes.
- Describe any assumptions and provide any technical information and/or data that you used.
- If you estimate potential costs or burdens, explain how you arrived at your estimate in sufficient detail to allow for it to be reproduced.
- Provide specific examples to illustrate your concerns, and suggest alternatives.
- Explain your views as clearly as possible, avoiding the use of profanity or personal threats.
- Make sure to submit your comments by the comment period deadline identified.

C. *Docket Copying Costs.* You may be charged a reasonable fee for photocopying docket materials, as provided by 40 CFR Part 2.

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I. Overview

In today's action, the U.S. Environmental Protection Agency (EPA or the Agency) is proposing regulations to mitigate the potential for misfueling of vehicles and engines with gasoline containing up to 15 vol% ethanol (E15).[1] These regulations are being proposed in conjunction with today's action by EPA granting of a partial waiver for ethanol blends up to 15 vol% ethanol under section 211(f)(4) of the Clean Air Act (CAA or the Act). This partial waiver will allow the introduction into commerce of E15 for use in 2007 model year (MY) and newer light-duty motor vehicles. In partially granting the E15 waiver, EPA imposed a number of conditions on the refiners and renewable fuel producers subject to the waiver. These conditions are designed to help ensure that E15 is introduced into commerce for use in MY2007 and newer light-duty motor vehicles and flexible-fueled vehicles, and not for use in any other vehicles or engines. Some of the regulatory provisions proposed today parallel those conditions and are expected to be a more efficient way to help ensure that the conditions of the E15 partial waiver decision are met and to minimize in-use emissions increases that might result from misfueling vehicles and engines with E15. The proposed safeguards would also promote the successful introduction of E15 into commerce.

We are proposing four requirements as part of our misfueling mitigation regulations. The first requirement, consistent with the partial waiver being granted today, is a prohibition against using E15 in MY2000 and older motor vehicles, heavy-duty gasoline engines and vehicles, on and off-highway motorcycles,[2] and nonroad engines, vehicles, and equipment.[3] This prohibition is similar in nature to the prohibition on producers of fuels and fuel additives under section 211(f)(1); however, the prohibition in section 211(f)(1) only applies to these upstream parties. The prohibitions proposed today would apply at the retail level as well as upstream. The conditions on the partial waiver and the regulations proposed today are similar in nature and have a common goal—ensuring that E15 is used in appropriate motor vehicles covered by the partial waiver, and is not used in other motor vehicles and engines. Since the Agency is deferring a decision for MY2001–2006 light-duty motor vehicles, we are not proposing a prohibition with respect to the fuel used in these motor vehicles at this time. DOE testing of MY2001–2006 light-duty motor vehicles is ongoing and EPA expects to make a waiver determination for these vehicles shortly after the results of the DOE testing are available. If EPA does not grant an E15 waiver for MY2001–2006 light-duty motor vehicles, then we would expect to include the same prohibitions for these MY motor vehicles in the final rulemaking.

Second, we are proposing labeling requirements for fuel pumps that dispense E15 to effectively inform consumers regarding the appropriate fuel to be used in vehicles and engines. Third, EPA proposes that product transfer documents (PTDs) from refiners, gasoline terminals, and oxygenate blenders specify the ethanol content or approved level of ethanol addition, of the fuel being sold to retail stations or wholesale purchaser-consumer to ensure that retail stations and wholesale purchaser-consumers know the level of ethanol content they are buying so that, in turn, the retail pumps can be properly labeled. Fourth, EPA proposes a national survey requirement on ethanol producers and the blenders of E15 (*e.g.,* refiners, gasoline terminals, oxygenate blenders) to ensure that retail station pumps are in fact being labeled properly. EPA is seeking comment on including an RVP component to this national E15 labeling survey to help ensure that summertime RVP requirements are being met throughout the gasoline distribution chain. To avoid confusion for consumers when pumps are not labeled, the Agency is also seeking comment on requiring the labeling of non-E15 pumps. The Agency has used such misfueling mitigation strategies to implement several fuel programs over the past thirty years, including the unleaded gasoline program, the RFG program, and the diesel sulfur program. The Agency believes that the misfueling mitigation measures proposed in this rulemaking, coupled with the E15 waiver and a substantial consumer education and outreach effort by industry, can be an effective strategy to help reduce misfueling and the associated emissions impacts while enabling the use of E15 in appropriate vehicles.

The misfueling mitigation program proposed today generally mirrors the misfueling conditions in today's partial waiver decision. While the waiver provides an opportunity for a fuel or fuel additive manufacturer to meet the conditions, the Agency believes that the proposed safeguards would provide the most practical method of addressing the purposes and satisfying the conditions of today's partial waiver decision.

These misfueling mitigation regulations are proposed under CAA section 211(c), based on the projected emission increases that would be avoided by deterring the use of E15 in older motor vehicles, heavy-duty gasoline engines and vehicles, motorcycles and nonroad products. Engineering judgment supported by test data, where available, forms the basis for our technical review and conclusions. Our engineering assessment described in Section VI identifies a number of emissions related concerns with the long-term use of E15 in MY2000 and older light-duty motor vehicles, heavy-duty gasoline engines and vehicles, motorcycles, and nonroad products. For motor vehicles these concerns include the potential for catalyst deterioration or catalyst failure as well as material compatibility issues that could lead to extremely elevated exhaust and evaporative emissions. For nonroad products and for motorcycles the misfueling concerns include not only the potential for elevated exhaust and evaporative emissions but also the potential for engine failure from overheating. While it is not possible to quantify precisely the frequency at which motor vehicles and nonroad products might experience these problems with the use of E15, we believe that emissions related problems could potentially occur with enough frequency that the resulting emission benefits from avoiding misfueling would outweigh the relatively low cost imposed by the proposed regulations. This would justify the proposed rule,

[1] For purposes of this preamble, E15 refers to gasoline-ethanol blended fuels that contain greater than 10 vol% and no more than 15 vol% ethanol content.

[2] For purposes of this preamble on and off-highway motorcycles are referred to collectively as "motorcycles."

[3] For purposes of this preamble, nonroad engines, vehicles, and equipment are referred to as "nonroad products."

even if a very low percentage of vehicle and engines experiences problems.

As described below in Section VI and in the E15 partial waiver decision document,[4] our assessment indicates that manufacturers have designed at least MY2007 and newer light-duty motor vehicles to be durable for use on gasoline blends up to E15. This conclusion is primarily based on the recently completed catalyst durability test program conducted by the Department of Energy (DOE) wherein they tested 19 vehicle models representative of the Tier 2 motor vehicle fleet out to their full useful life. The study found that Tier 2 motor vehicles continued to meet their emissions standards after operating on E15 for full useful life mileage accumulation. Additionally, according to our analysis of the DOE test data, for Tier 2 motor vehicles we found no statistically significant increases in the emissions of regulated pollutants for motor vehicles operating on E15, and no apparent material compatibility issues, when compared to vehicles that were operated on E0.[5] These results confirm our engineering assessment that MY2007 and newer motor vehicle's emissions should be less sensitive to the increased ethanol content in E15. This engineering assessment is based on the advances in motor vehicle materials and technology in response to in-use experience with E10 and the requirement that motor vehicles comply with a series of important new EPA emission requirements over the years, *e.g.,* enhanced evaporative emission standards and E10 durability testing, supplemental FTP emission standards, CAP2000 in-use durability requirements, and the Tier 2 motor vehicle standards themselves.

For MY2001–2006 light-duty motor vehicles, it is currently less clear whether they could experience significant emission increases when fueled on E15 like MY2000 and older motor vehicles, or continue to function properly like the newer 2007 and newer motor vehicles. On the one hand we believe that many of the same elements for ethanol compatibility of MY2007 and newer light-duty motor vehicles also apply to MY2001–2006 light-duty motor vehicles (*e.g.,* enhanced evaporative emission standards, SFTP, CAP2000). On the other hand, they were not all required to demonstrate evaporative emission system durability on E10 or to upgrade their catalyst and emission control systems to the extent needed to comply with the Tier 2 standards. Furthermore, currently available test data on these model year vehicles is much more limited. DOE is in the process of developing relevant data for these model year vehicles. Specifically, DOE is conducting catalyst durability testing on six motor vehicle models certified to NLEV standards and two motor vehicles certified to Tier 1 standards scheduled to be completed in November, 2010. Additionally, a study of in-use motor vehicles by Rochester Institute of Technology on E20[6] suggests such motor vehicles may operate acceptably on E20—and by interpolation E15. However, the mileage accumulation of RIT test vehicles is limited and the study is still ongoing until November 2010. This additional information, as well as information gathered through comment on this proposal and any final decision on a section 211(f) waiver for MY2001–2006 light-duty motor vehicles, will be considered in the decisions made for the final rule.

In addition to misfueling mitigation measures, today's action also proposes slight modifications to the Reformulated Gasoline and Antidumping fuels programs to open the way for refiners and importers to produce and certify gasoline containing up to 15 vol% ethanol. To measure compliance with the RFG and anti-dumping standards, the emissions performance of gasoline is calculated using a model, called the Complex Model, which predicts the emissions of each regulated pollutant based on the measured values of certain gasoline properties. For gasoline to be sold in the U.S., it must comply with the RFG and Antidumping standards and refiners are required to certify that their fuel meets the standards by using the Complex Model. Currently, the equations in the model are limited to an oxygen content of no more than 4.0% by weight in gasoline, which is the maximum possible amount of oxygen in E10. EPA is proposing to modify the Complex Model to allow fuel manufacturers to certify batches of E15 fuel.

Finally, EPA proposes to require that Reid Vapor Pressure (RVP) be identified on PTDs from fuel refineries to oxygenate blenders for conventional gasoline to ensure that EPA summertime RVP requirements are met. This is necessary because the waiver announced today is for blends that meet the summertime gasoline volatility standards for conventional gasoline.[7] In order to introduce a fuel that meets both the Federal summertime RVP standards and contains between 10 and 15 vol% ethanol, fuel refiners would have to create a fuel or blendstock that has approximately 1.0 psi lower RVP than a fuel or blendstock intended for E10 due to the interaction between gasoline volatility and ethanol when blended. Oxygenate blenders would need to know the RVP of a blendstock or have the intended ethanol content of a blendstock be specified on the PTD to ensure that they know the correct amount of ethanol that should be blended into a fuel. The Agency is not proposing to change RFG PTD requirements found at 40 CFR 80.77 since RVP is carefully controlled throughout the distribution chain in order to comply with summertime RFG VOC emissions performance standards.

II. Background

A. Statutory Authority

CAA section 211(f)(1) makes it unlawful for any manufacturer of any fuel or fuel additive to first introduce into commerce, or to increase the concentration in use of, any fuel or fuel additive for use in motor vehicles manufactured after model year 1974 unless it is substantially similar to any fuel or fuel additive utilized in the certification of any model year 1975, or subsequent model year, vehicle or engine under section 206 of the Act.

Section 211(f)(4) of the Act provides that upon application by any fuel or fuel additive manufacturer, the Administrator may waive the prohibition of section 211(f)(1). A waiver may be granted if the Administrator determines that the applicant has established that the fuel or fuel additive, and the emission products of such fuel or fuel additive, will not cause or contribute to a failure of any emission control device or system (over the useful life of the motor vehicle, motor vehicle engine, nonroad engine or nonroad vehicle in which such device or system is used) to achieve compliance with the emission standards to which the vehicle or engine has been certified. In other words, the Administrator may grant a waiver for an

[4] *See Partial Grant and Partial Denial of Clean Air Act Waiver Application Submitted by Growth Energy to Increase the Allowable Ethanol Content of Gasoline to 15 Percent; Decision of the Administrator* elsewhere in this issue of the **Federal Register.**

[5] *See Partial Grant and Partial Denial of Clean Air Act Waiver Application Submitted by Growth Energy to Increase the Allowable Ethanol Content of Gasoline to 15 Percent; Decision of the Administrator* elsewhere in this issue of the **Federal Register.**

[6] *The effect of E20 ethanol fuel on vehicle emissions,* B Hilton and B Duddy, Center for Integrated Manufacturing Studies, Rochester Institute of Technology, June 26, 2009. *See* Docket ID No. EPA–HQ–OAR–2010–0448.

[7] *See* section IV.A. for more information on the 1.0 psi RVP waiver.

otherwise prohibited fuel or fuel additive if the applicant can demonstrate that the fuel or fuel additive will not cause or contribute to engines, vehicles or equipment failing to meet their emissions standards over their useful life.

EPA previously issued a "substantially similar" interpretive rule for unleaded gasoline which allows oxygen content up to 2.7% by weight for certain ethers and alcohols.[8] E10 contains approximately 3.5% oxygen by weight, which means E10 is not "substantially similar" to certification fuel under the current interpretation. As explained at 44 FR 20777 (April 6, 1979), E10 received a waiver of the substantially similar prohibition by operation of law since EPA did not grant or deny a waiver request for a fuel containing 90% unleaded gasoline and 10% ethyl alcohol within 180 days of receiving that request. This waiver by operation of law was based on the then current terms of CAA section 211(f)(4), which has subsequently been amended.

Section 211(c)(1) of the Act allows the Administrator, by regulation, to "control or prohibit the manufacture, introduction into commerce, offering for sale, or sale of any fuel or fuel additive for use in a motor vehicle, motor vehicle engine, or nonroad engine or nonroad vehicle (A) if, in the judgment of the Administrator, any fuel or fuel additive or any emission product of such fuel or fuel additive causes, or contributes, to air pollution or water pollution (including any degradation in the quality of groundwater) that may reasonably be anticipated to endanger the public health or welfare, or (B) if emission products of such fuel or fuel additive will impair to a significant degree the performance of any emission control device or system which is in general use, or which the Administrator finds has been developed to a point where in a reasonable time it would be in general use were such regulation to be promulgated." Today's proposed misfueling regulations are based on this authority in section 211(c)(1), as well as our recordkeeping and information collection authority under sections 208 and 114.

B. E15 Waiver Request

On March 6, 2009, Growth Energy and 54 ethanol manufacturers submitted an application to EPA for a waiver under section 211(f)(4) of the CAA. This application sought a waiver for ethanol-gasoline blends of up to 15 vol% ethanol.[9] On April 21, 2009, EPA published notice of the receipt of the application, and, as required by CAA section 211(f)(4) of the Act, EPA requested public comment on all aspects of the waiver application, to assist the Administrator in determining whether the statutory basis for granting the waiver request for ethanol-gasoline blends containing up to 15 vol% ethanol had been met. (*See* 74 FR 18228).

In a separate action today, EPA waived the prohibition in CAA section 211(f)(1) to allow introduction into commerce of E15 for use in MY2007 and newer light-duty motor vehicles, including passenger cars, light-duty trucks and medium duty passenger vehicles (hereafter light-duty motor vehicles). EPA is deferring a decision concerning MY2001–2006 light-duty motor vehicles, and has denied the waiver for all other motor vehicles.[10] EPA's partial waiver decision is based on a determination that E15 will not cause or contribute to a failure of MY2007 and newer light-duty motor vehicles to achieve compliance with the emissions standards to which they were certified under section 206 of the CAA over their useful lives. EPA is still evaluating the effect of E15 on MY2001–2006 light-duty motor vehicles to determine whether a waiver of CAA section 211(f)(1) is appropriate for use of E15 in those motor vehicles. EPA also decided that it could not make such a determination and therefore was denying the waiver for all other motor vehicles, including MY2000 and older light-duty motor vehicles. EPA requests comment and additional information regarding the use of E15 in MY 2000 and older motor vehicles.

EPA issued the partial waiver with several conditions, some of which would be fulfilled by the safeguards being proposed today. The conditions apply to the upstream parties subject to the waiver (refiners, producers of ethanol and oxygenate blenders that introduce E15 into commerce), and are designed to ensure that when E15 is introduced into commerce, it will only be used in the appropriate light-duty motor vehicles. Some of the conditions call for the ethanol blenders, fuel manufacturers, and fuel additive manufacturers (ethanol producers) to take various actions to control the distribution and use of their product so that E15 is only used in approved motor vehicles. The partial waiver imposes different conditions on the different parties. Ethanol blenders, fuel manufacturers, and ethanol producers that introduce E15 into commerce are all responsible for making sure that appropriate labeling occurs on fuel pumps to mitigate potential misfueling. However, this condition, in particular, may be difficult for these parties to satisfy given their limited control over actions taken at retail, which, as discussed below, prompted today's proposal for fuel pump labels. All three parties are also responsible for conducting fuel pump labeling surveys to ensure that pumps are properly labeled and that the correct ethanol blends are loaded into the appropriate tanks at retail stations. Ethanol blenders and fuel manufacturers must also use PTDs to properly document information regarding the ethanol blends to help ensure proper blending and distribution.

In June 2010 EPA received a request from ADM to consider, within the context of the E15 waiver application, a waiver for E12 for all motor vehicles.[11] As discussed in the E15 waiver decision document, EPA concluded that there was insufficient basis to support such a waiver for motor vehicles or nonroad products beyond the MY2007 and newer model year light-duty motor vehicles for which the E15 waiver was being granted.

C. Reasons for the Proposed Actions in This Rulemaking

The proposed rules would directly prohibit or control the distribution and use of E15. The rules would apply to parties such as retail stations that are not directly subject to the conditions on the waiver. Collectively, these provisions would mitigate misfueling and maximize the likelihood that E15 is only used in approved motor vehicles. This would also promote the successful introduction of E15 into commerce. The specific provisions are discussed in detail in Sections III–V.

In this action, the Agency is proposing to use its authority to help minimize the potential for emissions increases associated with misfueling with E15. Importantly, the proposed safeguards would also assist the ethanol producers and blenders in carrying out the conditions of the waiver. EPA realizes that ethanol blenders, fuel manufacturers, and ethanol producers

[8] *See* 56 FR 5352 (February 11, 1991).

[9] Since E15 has greater than 2.7 wt% oxygen content, E15 needs a waiver under CAA section 211(f)(4).

[10] *See Partial Grant and Partial Denial of Clean Air Act Waiver Application Submitted by Growth Energy to Increase the Allowable Ethanol Content of Gasoline to 15 Percent; Decision of the Administrator* elsewhere in this issue of the **Federal Register.**

[11] Woertz, P.A. Letter to Lisa P. Jackson. 7 June 2010. *See* Docket ID EPA–HQ–OAR–2009–0211.

may have difficulty satisfying the conditions outlined in the E15 partial waiver decision, particularly the fuel pump labeling requirements. Most retail stations are independently owned and operated, which may make it difficult for the ethanol blenders, fuel manufacturers, and ethanol producers to ensure that labels are properly placed on fuel pumps dispensing E15. Under CAA section 211(f)(4), EPA is limited in what kind of conditions it can place on a waiver decision and on whom those conditions may be placed. For example, EPA placed the partial waiver conditions on the ethanol blenders, fuel manufacturers, and ethanol producers, the parties subject to the prohibition in section 211(f)(1), and not on the retail stations. This makes it difficult to ensure effective or complete pump labeling and misfueling mitigation. Without Agency action that requires the provisions proposed in today's rulemaking (*i.e.* fuel pump labeling, PTDs, and a national survey), the conditions contained in the E15 partial waiver decision would likely make the distribution of E15 impracticable. However, under CAA section 211(c), EPA has the authority to adopt appropriate controls or prohibitions on the distribution and sale of fuels and fuel additives to avoid emissions increases. EPA's proposed use of this authority would also assist the ethanol blenders, fuel manufacturers, and ethanol producers in carrying out the conditions of the partial waiver so the conditions on the E15 partial waiver are properly implemented. Today's rulemaking also provides EPA with additional tools for regulatory oversight of the ethanol blenders, fuel manufacturers, and ethanol producers introducing E15 into commerce.

D. Federalism Implications

As mentioned in Section II.A, the proposed prohibition regarding use of E15 in MY2000 and older vehicles, heavy-duty gasoline engines and vehicles, motorcycles, and nonroad engines, vehicles, and equipment is based on the authority in section 211(c)(1) of the Act, as well as our recordkeeping and information collection authority under sections 208 and 114. Section 211(c)(4)(A) of the CAA provides that no State or political subdivision thereof may prescribe or attempt to enforce "for purposes of motor vehicle emission control" any control or prohibition "respecting any characteristic or component of a fuel or fuel additive" in a motor vehicle or motor vehicle engine if EPA has prescribed a control or prohibition applicable to such characteristic or component of the fuel or fuel additive under section 211(c)(1). This prohibition applies to all States except California, as provided in section 211(c)(4)(B). Also, section 211(c)(4)(A) applies only to controls or prohibitions respecting any characteristics or components of fuels or fuel additives for motor vehicles or motor vehicle engines, that is, highway vehicles. Therefore, a State control or prohibition would be preempted under section 211(c)(4)(A), only if it is "for the purposes of motor vehicle emission control." Further, even if a State rule is established for purposes of motor vehicle emission control, it will not be preempted under section 211(c)(4)(A) unless it is for the same "characteristic or component of a fuel or fuel additive in a motor vehicle or motor vehicle engine" for which EPA has prescribed a control or prohibition under section 211(c)(1)(A). Today's action proposes a rule that would limit the ethanol content in fuel used in certain vehicles and engines as well as proposes misfueling mitigation measures to effectuate that limitation.

The Agency is not aware of any State rules or laws that would be preempted by today's proposed rule if adopted. States have not controlled ethanol volumes in gasoline for purposes of motor vehicle emission control. Also, our rule would not require States to change their existing labels. The rule as proposed would impose no substantial direct costs, nor would it have any substantial direct effects on State or local governments. EPA requests comments on the issue of preemption of State fuel programs.

Further, EPA consulted with State and local officials early in the process of developing the proposed action to permit them to have meaningful and timely input into its development. EPA met with members of the National Association of Clean Air Agencies (NACAA) to discuss the nature of today's proposed rule. Additionally, we provided State and local governments an opportunity to provide comment on the implementation of misfueling mitigation measures for a partial E15 waiver in both the RFS2 NPRM (*see* 74 FR 25016) and the E15 waiver request notice (*see* 74 FR 18228). We received comments from only one State on this issue in the RFS2 NPRM, and it supported efforts for properly labeling fuel pumps containing gasoline-ethanol blends.

III. Misfueling Mitigation Measures

As explained above, CAA section 211(c) grants the Agency authority to control or prohibit the distribution of a fuel or fuel additive when it will significantly impair emission controls or the emission products from that fuel will cause or contribute to air pollution that we reasonably anticipate may endanger public health or welfare. As more fully discussed in Section VI, we are proposing to prohibit use of E15 in MY2000 and older light-duty motor vehicles, and in all heavy-duty gasoline engines and vehicles, motorcycles and nonroad products based on the projected increased emissions that would occur from using E15 in those motor vehicles and nonroad products. We are also proposing to prohibit gasoline retail stations and wholesale purchaser-consumer facilities from selling E15 for use in these products if pumps at those locations are not properly labeled. Since the Agency is deferring a decision for MY2001–2006 light-duty motor vehicles, we are not proposing a prohibition for fuel used in these motor vehicles at this time. DOE testing of MY2001–2006 light-duty motor vehicles is ongoing and EPA expects to make a waiver determination for these vehicles shortly after the results of the DOE testing are available. If EPA does not grant an E15 waiver for MY2001–2006 light-duty motor vehicles, then we would expect to include the same prohibitions for these MY motor vehicles in the final rulemaking .[12]

EPA is proposing a misfueling mitigation strategy to effectuate those proposed prohibitions and to more generally limit the use of E15 to MY2007 and newer light-duty motor vehicles as approved today in the E15 partial waiver decision. We believe that there are four important components to an effective misfueling mitigation strategy for reducing the potential for misfueling with E15. First, effective labeling is a key factor. Labeling is needed to inform consumers of the potential impacts of using E15 in vehicles and engines not approved for its use, to mitigate the potential for intentional and unintentional misfueling of these vehicles and engines. Labeling is also done at the point of sale where the consumer most likely will be choosing which fuel to use. Second, retail stations and wholesale purchaser-consumers need assurance regarding the ethanol content of the fuel that they purchase so they can direct the fuel to the appropriate storage tank and properly label their fuel pumps. The use of proper

[12] Even though we are not proposing an actual prohibition for motor vehicles MY2001–2006, it is still unlawful to use E15 in these motor vehicles until an E15 waiver is granted for these motor vehicles.

documentation in the form of PTDs has proven to be an effective means of both ensuring that retail stations know what fuel they are purchasing and as a possible defense for retail stations in cases of liability in the event of a violation of EPA standards. Third, national labeling and fuel sampling surveys are necessary to ensure that retail stations are complying with labeling requirements, ethanol blenders are not blending more than the stated amount of ethanol on PTDs, and assuring downstream compliance for fuel refiners. The Agency has used this general strategy to implement several fuel programs over the past thirty years, including the unleaded gasoline program, the RFG program, and the diesel sulfur program. EPA solicits comments on all of these provisions as more fully described below.

The fourth component of an effective misfueling mitigation strategy is effective public outreach and consumer education. Outreach to consumers and stakeholders is critical to mitigate misfueling incidents that can result in increased emissions and vehicle or engine damage. Consumers will need to be engaged through a variety of media to ensure that accurate information is conveyed to the owners and operators of vehicles and engines.

The misfueling mitigation program proposed today generally mirrors the misfueling conditions in today's partial waiver decision. While the waiver provides an opportunity for a fuel or fuel additive manufacturer to meet the conditions, the Agency believes that the proposed the measures would provide the most practical method of meeting the purposes of and satisfying the conditions of today's partial waiver decision.

A. Labeling Requirements

Today's rule proposes to require that retailers and wholesale purchaser-consumers who choose to sell or dispense E15 must label any dispensers of this gasoline-ethanol blend. We are also seeking comment on requiring that dispensers of other gasoline-ethanol blends that contain 10 vol% ethanol or less to be labeled at such time as a retail station chooses to dispense E15 to help alleviate any confusion to consumers. Additionally, we seek comment on requiring labels for E85 pumps and blender pumps.

1. E15 Labels

We are proposing requirements that gasoline pumps dispensing E15 be labeled. The label would have to indicate that the fuel contains up to 15 vol% ethanol—that is, the fuel is a gasoline-ethanol blend that contains greater than 10 vol% ethanol but not more than 15 vol% ethanol. Retailers and wholesale purchaser-consumers who choose to sell E15 would be required to label pumps dispensing E15, clearly indicating that the fuel should not be used in MY2000 and older motor vehicles, motorcycles, heavy-duty gasoline engines and vehicles, or any nonroad products. However, EPA also proposes that the label would be modified if the E15 waiver is extended to earlier model year vehicles and/or nonroad products.

Based on the Agency's experience with fuel pump labeling for Ultra-Low Sulfur Diesel (ULSD) and Low Sulfur Diesel (LSD) (*see* 40 CFR 80.570), there are four important elements to an effective label for misfueling. The Agency proposes that the language of the E15 label would have four components: (1) An information component; (2) a legal approval component; (3) a technical warning component; and (4) a legal warning component. Together, these four components highlight the critical information necessary to inform consumers about the impacts of using E15.

a. Information Component

The first component informs consumers of the maximum ethanol content the fuel may contain. For E15, the Agency proposes that the information component of the label should contain two aspects, both an acronym for the fuel (in this case E15) and a description of what the acronym means (in this case informing consumers that the fuel may consist of a range of ethanol up to a maximum of 15 vol% ethanol by volume). We propose that this component of the label read:

This fuel contains 15% ethanol maximum

We propose that this label be applied to any fuel dispenser with greater than 10% ethanol but not more than 15 vol% ethanol. Thus, in the case of any mid-grade fuel that might be blended from E10 and E15, it would also be required to have the E15 label.

b. Legal Approval Component

The second component of the label language would include information that informs consumers of what vehicles and engines are approved to use E15, mirroring EPA's decisions taken in the waiver context. Since EPA granted a partial waiver of E15 limiting its legal use to MY2007 and later light-duty motor vehicles, its use is only permitted in these motor vehicles. Based on the partial waiver, the Agency proposes that this portion of the label read as follows:

Use only in:
2007 and newer gasoline cars
2007 and newer light-duty trucks
Flex-fuel vehicles.

As discussed elsewhere in today's proposal, if EPA decides to include more model years in a subsequent waiver decision based on the findings of the testing program, then the model year distinction on the label would also need to be adjusted accordingly. We anticipate this will occur before this rulemaking is finalized, and we will make that adjustment in the final rule. Therefore, the proposed language could read as follows:

Use only in:
2001 and newer gasoline cars
2001 and newer light-duty trucks
Flex-fuel vehicles.

c. Technical Warning Component

The third component of the label language would alert consumers that use of E15 in other engines, vehicles, and equipment might cause damage to these products. Our experience with past labeling provisions supports the need for both the legal and technical warning so that consumers are informed of the reason for the prohibition. As discussed more fully in Section VI, it appears that use of E15 in these particular products may not only lead to increased emissions but also has the potential, even if limited in nature, to lead to damage of motor vehicle and nonroad product components. Without this component to the label, consumers may more likely be tempted to misfuel—particularly if the price in the marketplace for E15 is lower than E10. Therefore, EPA proposes the following language: "This fuel might damage other vehicles or engines."

d. Legal Warning Component

The fourth component of the label would inform consumers that using E15 in a vehicle or engine not approved for E15 use violates Federal law. This is similar to the approach used to mitigate the use of LSD in 2007 and newer on-highway diesel engines. Based on that experience, EPA believes that explicitly notifying consumers that E15 is prohibited by Federal law for use in MY2000 and older motor vehicles, heavy-duty gasoline engines and vehicles, on and off-highway motorcycles, and all nonroad products will result in consumers being less likely to misfuel.

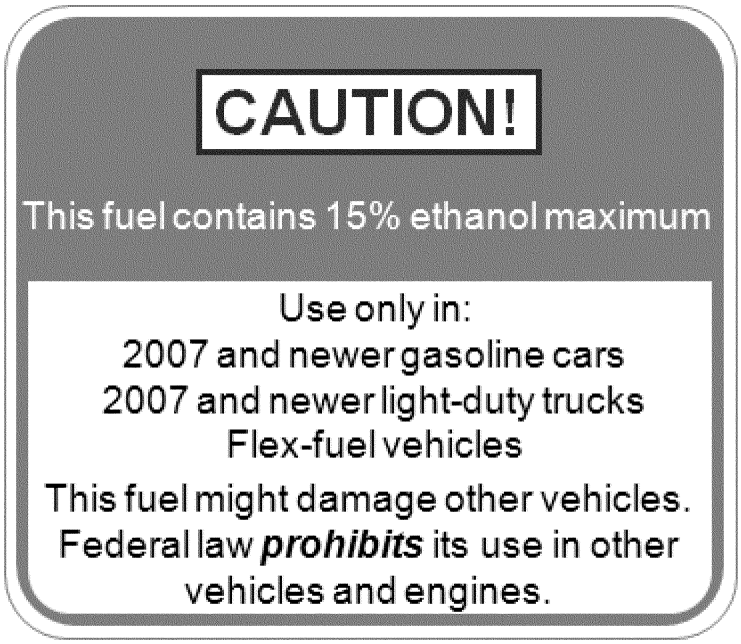
Based on the language currently used on the LSD label (*see* 40 CFR 80.570), the Agency proposes that the label read

as follows: "Federal law prohibits its use in other vehicles and engines."

The Agency has traditionally had "WARNING" language appear before the legal warning component to better draw consumers' attention to the prohibition of using a fuel in certain vehicles and engines (*e.g.* LSD in 2007 and newer highway diesel vehicles). After consultation with stakeholders, it was suggested that the Agency should both change "WARNING" to "CAUTION!" and place this language at the top of the label. This would draw consumer attention to the label and help mitigate both intentional and unintentional misfueling. Therefore, we propose to have the word "CAUTION!" appear at the top of the label before the information component. The Agency also considered the use of the word "ATTENTION" instead of "WARNING" or "CAUTION." We specifically seek comment on using the term "CAUTION!" versus "WARNING" or "ATTENTION". In addition, the Agency is also interested in whether using "STOP", with or without including a depiction of a stop sign, would be an appropriate way to draw consumers' attention to the label. We seek comment on whether there are other words that would better convey the message to consumers.

e. E15 Label Proposal

Taken together, the Agency proposes the following E15 label:



EPA seeks comment on all aspects of the label language. For example, we seek comment on whether any additional label language should be required or whether any language should be removed. In particular, we seek comment on ways to portray the information in ways that are the most concise and meaningful to consumers. EPA proposes that the pump labels for E15 be required to be placed on pumps that will dispense E15 prior to any commercial sale of E15.

One issue that arose from the labeling provisions of the diesel sulfur program was that the diesel sulfur labeling provisions were written in a way that allowed flexibility in color and design, causing retailers difficulty with coming up with a suitable design that satisfied EPA labeling requirements at the least possible cost. To help address this issue, stakeholders met with EPA to discuss standardized label designs that would both satisfy EPA diesel sulfur requirements and make it easier for retail stations to procure labels. Labeling templates were designed and made available to retail stations to use. Based on this experience, we are proposing more explicit specifications for the E15 label, covering not only the content, but also the appearance of the E15 pump label.

In today's rulemaking, we are proposing similar appearance and placement requirements for the E15 labels that were required for the diesel sulfur program labels. We propose that the titles of the labels (*e.g.,* E15) must be 24-point, white, bold Arial font, the "CAUTION!" text should also be red, uppercase 16-point bold type, the text in the labels which describes the ethanol content of the fuel must be 20-point type and that all other required language in the labels must be 14-point black, Arial font. We propose that the word "prohibits" be in 14 point, black, bold, italic, Arial font. All text should be centered with the arrangement and spacing of the text consistent with the illustration. We further propose that the label be 3.625" width by 3.125" height and that the background for the area which includes "CAUTION!", the title (*i.e.* "E15"), and the ethanol content (*i.e.,* "15% Ethanol Maximum) shall be 1-inch wide and neon-orange in color, except that a rectangular white background large enough to encompass "CAUTION!" shall be superimposed on this neon-orange background. While we believe it is important to propose these specific label appearance requirements to aid in consumer recognition and avoid unnecessary burden on retailers in developing their own designs, we also recognize that there is a great deal of variation in the design of fuel pumps and dispensers throughout the nation. Consequently, we not only seek comment on all visual aspects of our proposed label, but also suggest that if changes are deemed necessary, regulated and other interested parties work together to provide us with a consensus recommendation in their comments, if possible.

In addition to content and appearance, the placement of the label on the pump is also of concern given the limited space available on the fuel pump itself. In the diesel sulfur program

we required that labels must be placed on the vertical surface of each pump housing and on each side that has gallon and price meters and that labels be on the upper two-thirds of the pump in a location where they are clearly visible (*see* 40 CFR 80.570(d)). We propose the same placement requirements for the E15 labels. However, since most States require labels for gasoline blended with ethanol and the Federal Trade Commission (FTC) requires labels specifying minimum octane levels across grades of gasoline, the addition of the proposed E15 label may impact placement of other labels required by State or Federal law. Furthermore, FTC has proposed a mid-level ethanol gasoline-blend label (described below) in addition to its octane label which may further confuse consumers and make E15 label placement difficult. The Agency seeks comment on the proposed placement of the E15 label in order to most effectively mitigate misfueling, while at the same time avoid interference with other labels on the pumps.

2. Additional Fuel Pump Labeling Requirements

In addition to the E15 label proposed above, the Agency is seeking comment on three additional fuel pump labels that would provide consistent labeling across all gasoline fuel pumps. First, the Agency seeks comment on requiring a label on gasoline dispensing fuel pumps that are dispensing fuels which contain ethanol in concentrations up to 10 vol% ("E10 label").[13] We further seek comment on whether E10 labels should be required at a retail station only if and when E15 is made available for sale at a particular retail station. Such an E10 label would have similar appearance and location requirements to the E15 label and the required label language would follow a similar form to that of the E15 label so as to standardize labels for consumers.

The purpose of such a label would be to enhance the effectiveness of the E15 label to protect against consumer misfueling and the associated emissions impacts. Without such labels, consumers may be confused regarding whether an unlabeled pump was appropriate for their vehicle or engine, undercutting the effectiveness and confidence in the E15 label. This approach is consistent with the labeling requirements we used in the diesel sulfur program where we required the use of labels specifying which type of diesel fuel (low-sulfur diesel, ultra-low sulfur diesel, *etc.*) was being dispensed from each pump dispensing diesel fuel.

However, since increasing the number of labels will increase the total cost to retail stations by requiring that all gasoline dispensing fuel pumps at a station be labeled, we seek comment on the appropriateness of such a requirement. The Agency seeks comment on the following E10 label language:

E10
(Contains up to 10% Ethanol)
For use in all gasoline vehicles and engines.

The Agency also seeks comment on requiring a label on pumps distributing E85 fuel. E85 is fuel that contains up to 85 vol% ethanol and at least 15 vol% gasoline, used by flex fuel vehicles (FFVs).[14] As we noted in the RFS2 NPRM, fuel retailers expressed concern that if E85 were priced low enough to encourage FFV owners to fuel on it more frequently, then owners of non-FFVs would also be enticed to misfuel on it (*see* 74 FR 24977). This could cause the vehicles and equipment to operate very poorly, increasing emissions, as well as cause potential long-term damage and long-term emissions increases. We believe that in most cases fuel pump labels warning that the use of E85 in non-flex fuel vehicles is illegal, can damage the vehicle, and can void vehicle manufacturer warranties may be a sufficient disincentive to mitigate intentional misfueling. Non-FFVs and nonroad products were not designed for operation on E85 and may experience serious emissions increases, operability, and driveability issues, particularly with prolonged use (*e.g.* accelerated catalyst deterioration, fuel system component failures, *etc.*).

Such an E85 label would have similar appearance and location requirements to the E15 label (discussed above) and the required label language would follow a similar form to that of the E15 label. The Agency seeks comment on the following E85 label language:

E85
(Contains up to 85% Ethanol)
For use in flex-fuel vehicles only.
WARNING
Federal law ***prohibits*** use in all other vehicles and engines.
May damage these vehicles and engines.

We request comment on whether the proposed labeling requirements would provide sufficient warning to consumers not to refuel non-flex-fuel vehicles with E85. Additionally the Agency seeks comment on the label language for the E85 label.

The Agency also seeks comment on requiring labels for so-called blender pumps. Blender pumps allow station owners to blend E85 and gasoline in their storage tanks to create intermediate gasoline-ethanol blends. This allows either station owners or potentially FFV drivers to choose which gasoline-ethanol blend they prefer, based on operating characteristics and price. During both the RFS2 and E15 waiver request comment periods, the Agency received several comments asking us to require labeling provisions for blender pumps to address misfueling. Similar to E85, consumers may misfuel their non-FFVs and engines on ethanol blends greater than 10% (greater than 15% for 2007 and newer light-duty motor vehicles) due to possible price differences between intermediate ethanol blends and gasoline. Non-FFVs and nonroad products were not designed for operation on such high levels of ethanol and may experience serious emission, operability, and driveability issues, particularly with prolonged use (*e.g.* accelerated catalyst deterioration, fuel system component failures, *etc.*).

Such a blender pump label would have similar appearance and location requirements to the E15 label (discussed above) and the required label language would follow a similar form to that of the E15 label. The Agency seeks comment on the following two blender pump label language options. The first option's language addresses a situation where a vehicle operator can "dial" their own gasoline-ethanol blend level.

E15–E85
(Contains between 15% and 85% ethanol)
For use in flex-fuel vehicles.
WARNING
Federal law ***prohibits*** use in all other vehicles and engines.
May damage these vehicles.

The second option's language is to provide for a specific blend of higher than 15 vol% ethanol content within this range, in which case the station owner would replace the option 1's language with the specific value. The language for option 2 would be as follows:

EXX
(Contains up to XX% Ethanol)
For use in flex-fuel vehicles.
WARNING
Federal law ***prohibits*** use in all other vehicles and engines
May damage these vehicles and engines.

On this label, "XX" is the exact maximum ethanol content a fuel dispensed from a particular blender

[13] If the fuel contains no ethanol, it could be labeled as such.

[14] FFVs are vehicles or engines that are designed to run on gasoline or gasoline-ethanol blends up to E85.

pump setting is expected to dispense that is greater than 15 vol% ethanol.

The blender pump labels would not need to specify blends containing between 10 and 15% ethanol because any such fuel pumps would be required to display the E15 label. However, since a blender pump may dispense several intermediate ethanol blends (*e.g.* E20, E30, E40, *etc.*), the label should specify a range of ethanol content from E15 through E85. Therefore, under this second option the blender pump would have multiple labels for each of the blends that the pump dispenses.

3. Stakeholder Labeling Suggestions

In anticipation of this proposal, EPA met with several stakeholders to discuss the potential label language used for the E15 label language. To date, the Agency has received label language suggestions from Growth Energy.[15] AllSAFE and the American Petroleum Institute provided EPA with their public comments to the FTC labeling proposal.[16] Copies of these labeling recommendations may be viewed in the docket.[17] We have considered the suggestions in these comments for our proposal, but nevertheless seek comment on whether and if so how to modify our label proposals based on these and other suggestions.

4. FTC Labeling Proposal

On February 26, 2010, the Federal Trade Commission (FTC) issued a proposed rulemaking that proposes explicit requirements for gasoline-ethanol blends that contain more than 10 vol% ethanol and less than 70 vol% ethanol ("Mid-Level Ethanol blends") (*see* 75 FR 12470). Since the FTC labeling proposal did not contemplate the granting of a waiver for E15, it would have to be modified to be consistent with our recent E15 partial waiver decision. In addition, as discussed above, we believe it is important that the label contain certain components and language necessary to both inform and warn the consumer that are not fully captured in the FTC labels.

Therefore, EPA is working with FTC to develop coordinated labeling requirements and seeks comment on how best to achieve this outcome. Preferably, one label would be developed that meets EPA and FTC labeling requirements, since imposing separate labeling requirements may confuse consumers and would ultimately limit the effectiveness of labeling to mitigate misfueling. Requiring two separate labels would also create issues concerning the placement of the E15 label and may impose an unnecessary burden on retail stations. Finally, we also believe that to ensure the effectiveness of all gasoline pump labels, it is important that they be of similar type and format (*i.e.* those for E10, E15, E85, and blender pumps).

5. Labeling Requirements and Liability for Misfueling

It is important to note that compliance with the labeling requirements specified in this rule does not protect responsible parties from liability for misfueling. Today's regulations not only impose labeling requirements but also a prohibition of the sale or offer for sale of E15 for use in unapproved engines, vehicles, and equipment (*see* section III.G below). Compliance with the labeling requirement does not ensure that the responsible parties have not made prohibited sales. In addition, our regulations do not address issues of common law or contract liability between private parties.

B. Product Transfer Document Requirements

Product transfer documents (PTDs) are customarily generated and used in the course of business and are familiar to parties who transfer or receive blendstocks, base gasoline for oxygenate blending and oxygenated gasoline. In addition, EPA has historically put in place certain requirements for PTDs for reformulated gasoline blends and blendstocks to help ensure downstream compliance with our fuel standards. The introduction of E15 into the marketplace results in the need for additional information on the PTDs that accompany the transfer of gasoline and the base gasoline/gasoline blendstocks used for oxygenate blending, both for reformulated gasoline and conventional gasoline. The type of additional information needed is different upstream versus downstream of the point of ethanol addition. We believe that the additions discussed below to existing PTDs are necessary to minimize misfueling, to help ensure downstream compliance with our fuel standards, and thereby to support the introduction of E15.

1. PTD Requirements Downstream of the Point of Ethanol Addition

Downstream of the point where ethanol blending takes place, information on the maximum ethanol concentration in the ethanol blend is needed to help ensure that fuel shipments are delivered into the appropriate storage tanks at retail and fleet fueling facilities.[18] Information on the maximum Reid Vapor Pressure (RVP) of E0, E10 and E15 blends is needed on PTDs to help ensure that the fuel is compliant with the applicable summertime RVP requirements. The RVP reported on the PTD for E10 and E15 blends could be based on the intended RVP that the manufacturer of the blendstock for oxygenate blending designed for as identified on the PTD for the blendstock.[19] Therefore, RVP testing after the addition of ethanol would not be necessary to provide the information on RVP that would be required on the PTD.

We are proposing that the following statements would be included on the PTDs for the various fuel blends:

For E0: "E0: Contains no ethanol.
The RVP does not exceed [Fill in appropriate value]"
For E10: "E10: Contains between 9 and 10 volume percent ethanol
The RVP does not exceed [Fill in appropriate value]"
For E15: "E15: Contains up to 15 volume percent ethanol
The RVP does not exceed [Fill in appropriate value]"
For EXX: "EXX—Contains up to XX% ethanol.

"EXX" refers to fuels blends above E15 up to and including E85 and fuel blends below 9 volume percent ethanol. The maximum potential ethanol content of the fuel would be required to be specified on the PTD in the place of "XX".

We request comment on whether additional language on E10 PTDs is needed to inform parties that a blend containing between 9 and 10 volume percent ethanol which benefits from the 1 psi RVP waiver may not be commingled with an E0 or E15 blend.[20] We request comment on whether any other additional information should be

[15] Buis, T. Letter to Karl Simon. 4 April 2010. *See* Docket ID No. EPA–HQ–OAR–2010–0448.

[16] *See* Docket ID No. EPA–HQ–OAR–2010–0448.

[17] Federal Trade Commission, "# 335; FTC File No. R811005; 16 CFR Part 306: The Federal Trade Commission Rule For Automotive Fuel Ratings, Certification and Posting: Notice of Proposed Rulemaking and Request for Comments." September 2010. Available at *http://www.ftc.gov/os/comments/fuelratingnprm/index.shtm.*

[18] Currently, ethanol blending typically takes place at the terminal. Evaluations are underway which may facilitate the shipment of ethanol-gasoline blends by pipeline to terminals. Hence, although the proposed PTD requirements regarding maximum ethanol content currently would typically apply to parties downstream of the terminal, parties upstream of the terminal may need to include information on maximum ethanol concentration on product PTDs in the future.

[19] This is dependent on the proper amount of ethanol being added to the blendstock, and on the product being segregated from all products with a different RVP.

[20] Such as, "Designed for the special RVP provisions for ethanol blends. Do not blend with gasoline containing less than 9 vol% ethanol or E15."

provided on the PTDs for ethanol fuel blends.

2. PTD Requirements Up to and Including the Point of Ethanol Addition

Upstream of the point where E10 and E15 blends are manufactured, information is needed on the PTDs for base gasoline or gasoline blendstock used for oxygenate blending (BOB) [21] to facilitate ethanol blender compliance with the applicable EPA summertime RVP requirements.[22] This information would need to include the maximum potential RVP of the BOB and the maximum ethanol concentration that may be added to the BOB.

To satisfy these needs, we are proposing that PTDs for BOBs for use in the manufacture of ethanol blends that are subject to summertime RVP controls include the maximum RVP of the BOB. We are also proposing that such PTDs in non-RFG areas indicate what ethanol concentration is suitable to be blended with the BOB. The RFG requirements found at 40 CFR 80.77 already contain requirements that PTDs indicate what oxygenate and oxygenate amount are suitable to be blended with the reformulated blendstocks for oxygenate blending (RBOBs).

We are proposing that the following statements would be included on the PTDs for BOBs in non-RFG areas:

"Suitable for blending with ethanol at a concentration up to 15 volume % ethanol" or, in the case of a BOB designed to take advantage of the 1psi allowance for E10 in 40 CFR 80.27(d)(2):

"Designed for the special RVP provisions for ethanol blends that contain between 9 and 10 volume % ethanol"

"The RVP of this blendstock/base gasoline for oxygenate blending does not exceed [Fill in appropriate value]"

As we are proposing and seeking comment on blendstock commingling prohibitions in addition to those already in place for RFG (*see* section III.D.) we also request comment on whether additional information is needed on the PTDs for BOBs to help ensure that these blending restrictions are observed. We request comment on whether the following language should be added to the PTD for a BOB designed to take advantage of the 1psi allowance for E10 in order to help prevent downstream violations of the RVP standards: "The use of this gasoline to manufacture a gasoline-ethanol blend with less than 9 vol% ethanol or E15 may cause an RVP violation." We request comment on whether any additional information should be provided on the PTDs for BOBs.

3. General PTD Requirements

We are proposing that on each occasion when any person transfers custody and/or ownership of any gasoline or base gasoline/gasoline blendstock used for oxygenate blending, the transferor would be required to provide the transferee with an appropriate PTD identifying the gasoline/blendstock/base gasoline and its characteristics (as defined below), as well as such general information as the names and addresses of the transferor and transferee, the volume of product being transferred, the location of the product on the date of transfer, and specific information described in this preamble. We are proposing that all parties would be required to retain PTDs for a period of not less than five years and would be required to provide them to EPA upon request. Five years is the normal record retention requirement for 40 CFR part 80 fuels programs, such as the reformulated gasoline (RFG) program.

We are proposing that PTDs would be required to be used by all parties in the distribution chain down to the point where the product is sold, dispensed, or otherwise made available to the ultimate consumer. We are proposing that product codes could be used to convey the information required as long as the codes are clearly understood by each transferee. However, we believe that product codes alone would not be sufficient for transfers to truck carriers, retailers, or wholesale-purchaser consumers. Hence, we are proposing that the full proposed text would need to be included on the PTD for transfers to truck carriers, retailers, or wholesale-purchaser consumers.

Parties would be afforded significant freedom with regard to the form PTDs take under this proposal, although we are proposing that the PTDs would be required to travel in some manner (paper or electronically) with the volume of blendstock or fuel being transferred. The addition of the proposed information to PTDs would not require any additional testing of fuel composition. Adoption of these proposed changes would add a one-time burden to program and implement new product codes and statements, as well as a continuing small burden associated with using product codes and statements on PTDs. Given this and the fact that PTDs are used in the course of business, we believe that the proposed new PTD requirements could be readily accommodated by industry. The increased burden which would result from the adoption of these proposed PTD requirements is detailed in section IX.B. of this preamble.

C. Retail Fuel Dispenser Label and Fuel Ethanol Content Survey

To help mitigate the potential for misfueling, oversight of fuel retailer compliance with the proposed E15 labeling requirements and of the actual ethanol content of the dispensed fuel in comparison to the information on the label is needed. To provide adequate oversight, EPA conditioned the E15 partial waiver on a requirement that ethanol blenders, ethanol producers, ethanol importers, petroleum refiners, and petroleum importers participate in a survey of compliance at fuel retail facilities.[23] The E15 partial waiver decision specified that an EPA-approved survey plan is to be in place prior to introduction of E15 to the marketplace and that the results of the survey must be provided to EPA for use in its enforcement and compliance assurance activities.

Today's notice contains our proposal on requiring a survey as part of a misfueling mitigation program. This proposal covers how the required survey should be formulated and conducted. As discussed in section III.G., we are proposing that the survey could be used to meet the periodic sampling and testing elements of a regulated party's affirmative defenses to presumptive liability in cases where instances of noncompliance with the applicable maximum ethanol content specification are discovered. Should EPA finalize the additional labeling requirements that we requested comment on in section III.A.2. of this proposal, evaluation of retailer compliance with these labeling requirements would also be included in the survey. Regardless of whether we finalize labeling provisions, testing on the ethanol content of the fuel delivered from all non-FFV dispensers would need to be included in the survey to help mitigate misfueling.

The survey requirements that we are proposing are based on an existing

[21] For purposes of this discussion, the blendstock or base gasoline (BOB) is typically referring to the fungible base gasoline produced at a refinery for the specific intention of adding ethanol. The fungible gasoline produced for this purpose is subject to all of the 40 CFR parts 79 and 80 regulations applicable to gasoline. However, under 40 CFR 80.101(d)(4), a refiner with direct control of the ethanol addition to the actual gasoline produced by that refiner may consider the final fuel including the ethanol when complying with part 79 and 80 regulations.

[22] *See* section IV of this preamble for a discussion of the RVP requirements for E15 and E10.

[23] *See Partial Grant and Partial Denial of Clean Air Act Waiver Application Submitted by Growth Energy to Increase the Allowable Ethanol Content of Gasoline to 15 Percent; Decision of the Administrator* elsewhere in this issue of the **Federal Register.**

survey of compliance with the EPA labeling requirements for retail diesel fuel dispensers, and with the maximum allowable sulfur content of the diesel fuel delivered from these dispensers under EPA's ULSD program. EPA recently codified the requirements for this diesel fuel survey in a direct final rule that became effective on July 12, 2010.[24] The reformulated gasoline (RFG) program also utilizes a compliance survey program to ensure seasonal RFG area requirements are met for predicted emissions performance based on average area fuel parameters. Based on the ULSD and RFG programs, we are proposing two options for obligated parties to satisfy the survey requirement. Survey Option 1 allows individual obligated parties to elect to individually survey gasoline and retail stations anywhere their fuel might be sold. Survey Option 2 allows obligated parties to form a consortium that contracts an independent survey association to conduct a national ethanol content and E15 labeling survey.

For Survey Option 1, we propose that obligated parties choosing the individual survey option must survey labels and ethanol content at retail stations wherever their gasoline may be distributed if it may be blended as E15. Prior to conducting such a survey a survey plan would have to be approved by EPA. We seek comment on all aspects related to Survey Option 1.

For Survey Option 2, we propose that the survey would consist of a nationwide program of sampling and testing designed to provide oversight of all retail stations that sell gasoline. Details of the proposed survey requirements are similar to those included in the ULSD and RFG programs. We propose that the survey organization would be required to submit survey plans on an annual basis that would be applicable from January 1 through December 31. We propose that EPA would review the first survey plan within two months of its receipt. We propose that the survey organization would be required to submit subsequent survey plans to EPA for approval by November 1 of the year proceeding the calendar year in which the sampling and testing program would be implemented. The Agency also proposes that proof that the amount of money necessary has been paid to the surveyor is sent to EPA no later than December 15 of the year proceeding the calendar year in which the sampling and testing program would be implemented. For the first annual survey, we propose that proof of payment be submitted to the Agency no later than one month before the sampling and testing program would be implemented. We seek comment on the deadlines for both the survey plan and proof of payment for the survey for the first survey and on subsequent surveys.

We propose that the sampling and testing program would ensure comprehensive geographic coverage nationally representative of gasoline sold at retail outlets by providing proportionate coverage of gasoline across three sampling strata. These three strata generally refer to: (1) Densely populated areas, which include Metropolitan Statistical Areas and the reformulated gasoline control areas; (2) transportation corridors, which are based on interstate highways outside the densely populated areas;[25] and (3) rural areas, which include all areas not included in the previous two strata. These areas would be subdivided into clusters, generally based on groupings of counties. The specific criteria used for selecting sampling areas for each survey plan would be subject to EPA approval. We seek comment on all aspects of the proposed elements that a survey plan should include.

Comment is specifically requested on the criteria which should be used to determine the minimum sample size for the survey. The sampling and testing program would need to both accurately estimate the proportion of retail stations that are non-compliant with E15 labeling and ethanol content requirements and provide a credible deterrent to deliberate or inadvertent violations of downstream enforcement standards. For the ULSD survey program, we require a minimum of 5,250 samples annually. For a national survey looking at all gasoline retail stations, we believe the minimum number of samples needs to be greater because there are more than three times the number of retail stations that sell gasoline compared with stations that sell diesel. We propose that the survey take a minimum of 7,500 samples spread across four quarterly surveys. We also propose a sample size equation similar to the one used to determine sample sizes for the ULSD survey program (*see* equation in the proposed regulations at 80.1502(b)(4)(v)(A)). This equation bases sample size on the proportion of retail stations that are non-compliant. We seek comment on both the minimum number of samples and the method for determining samples sizes.

Since initially E15 may be introduced into commerce in a limited geographical area, it may not be necessary to carry out the full survey or to carry it out nationwide. One way to potentially resolve this issue would be to limit the areas required to be surveyed to areas that are known to have E15 being distributed. Unfortunately, there are no reliable real-time data that show when E15 is first introduced into an area and it could take awhile for the proposed annual survey program to incorporate these new geographic areas. Additionally, the borders of such areas are difficult to define and constantly shift in response to market forces. This approach also undermines one of the stated purposes of the survey program, namely that the survey program helps deter either intentional or unintentional violations by increasing the likelihood of violators being randomly caught. If EPA allows only certain areas to be surveyed while excluding others, some parties may manufacturer, blend, or distribute E15 without properly identifying the fuel as E15 or properly labeling the fuel dispenser as dispensing E15. By the time the survey program caught up, motor vehicles and nonroad products not approved for E15 use may have been misfueled for a long time. On the other hand, if there were ways to properly identify areas that are distributing E15 real time, then limiting the survey to only those areas could considerably reduce the cost of compliance with the proposed survey requirements. The Agency seeks comment on ways to possibly limit surveys to only those areas that have E15 being introduced into commerce.

Another option to limit survey requirements would be to require a national survey, but have a lower minimum sample size that gradually increases over time. Since the proposed approach for determining sample sizes above 7,500 discussed above is based on the proportion of retail stations that are noncompliant with ethanol content and/or E15 labeling requirements, if there is very little E15 being introduced into the marketplace, the proportion of noncompliant retail stations would be small. In this case, 7,500 samples may be substantially higher than the number of samples required by the proposed method for determining sample sizes. Since this is most likely to occur at the beginning of the survey program, the survey program could gradually increase the annual minimum sample

[24] Alternative Affirmative Defense Requirements for Ultra-Low Sulfur Diesel and Gasoline Benzene Technical Amendment, 75 FR 26121, May 11, 2010.

[25] Transportation corridors would include areas immediately adjacent to the highways themselves and a swath within several miles on each side of the highway. For any given survey, a certain length of any specific highway might be deemed appropriate as a sampling unit or cluster.

size to reduce the burden to industry. For example, the Agency may only require a minimum of 2,000 samples the first full survey year (2012), 4,000 samples in 2013, 6,000 samples in 2014, and 7,500 samples in 2015. We seek comment on this gradual minimum sample size approach and all other issues related to determining the minimum number of samples for a national ethanol content and E15 labeling survey.

We also are proposing that the independent survey association would ship fuel samples on the same day that the sample was collected and that the sample be analyzed for ethanol content within 24 hours from the time the samples were acquired. Although having such a short delivery time for fuel samples to be analyzed may increase costs, this time period is both consistent with other fuel survey programs and would allow ethanol content and E15 labeling violations found by the survey to be corrected quickly to mitigate misfueling. We seek comment on the proposed amount of time allowed for samples to be shipped for the analysis of ethanol content.

For both survey options, we require that survey plans would include a methodology for determining when the survey samples will be collected, the locations of the retail outlets where the samples will be collected, the number of samples to be included in the survey, procedures that would prevent the advance notification of retail stations, and how individual retail stations will be determined for sampling. We propose that samples at retail stations be taken from all gasoline dispensers and have the samples tested for ethanol content and that retail stations be selected randomly with the probability of selection proportionate to the volume of gasoline sold at the retail outlet. We also propose that ethanol content be measured in accordance with a test method that meets the requirement of 40 CFR 80.46(g). We seek comment on these requirements for survey plans and whether any additional requirements are necessary. We also seek comment on all matters related to the national ethanol content and E15 labeling survey proposed today.

D. Program Outreach

Effective outreach to consumers and stakeholders is often essential to the successful implementation of environmental protection programs. To implement the RFS program, for example, EPA provides training seminars for stakeholders and manages dedicated telephone and e-mail support lines. Various industry representatives and organizations provided program information and coordination to their members and customers as well as to facilitate the introduction of new program requirements this past July.

In the case of E15, outreach to consumers and stakeholders may be critical to help mitigate misfueling incidents that can result in increased emissions or vehicle or engine damage. The potential for E15 misfueling incidents exists because consumers tend to choose the lowest priced fuel, and E15 may cost less than E10 since ethanol currently tends to be less expensive than gasoline.

A recent example of successful outreach to consumers and stakeholders is the coordinated work done in support of the ULSD program. ULSD was a new fuel with the possibility of consumer misfueling that could result in engine damage. With ULSD, the fuel industry trade association API took the lead in working with stakeholders to establish the Clean Diesel Fuel Alliance (CDFA), a collaboration of public and private organizations designed to ensure a smooth program transition by providing comprehensive information and technical coordination. The organizations represented in the CDFA include engine manufacturers, fuel retailers, trucking fleets, DOE and EPA. CDFA efforts to educate ULSD users include developing technical guidance and educational information, including a Web site (*http://www.clean-diesel.org*), as well as serving as a central point of contact to address ULSD-related questions.

The CDFA outreach model could prove beneficial in this case. EPA anticipates that all parties that may be involved in bringing higher gasoline-ethanol blends to market would participate in a coordinated industry-led consumer education and outreach effort. In the context of this program, potential key participants include ethanol producers, fuel manufacturers, automobile, engine and equipment manufacturers, States, non-governmental organizations, parties in the fuel distribution system, EPA, DOE, and USDA. Potential education and outreach activities a public/private group could undertake include serving as a central clearinghouse for technical questions about E15 and its use, promoting best practices to educate consumers or mitigate misfueling instances, and developing educational materials and making them available to the public.

Some stakeholders have also suggested that a Web site be created to inform consumers of the potential impacts of E15 on older motor vehicles, heavy-duty gasoline engines and vehicles, motorcycles, and nonroad products. Stakeholders have further suggested that, if a unique misfueling Web site is created, then EPA should require the Web site address to be displayed on the E15 label. EPA seeks comment on the appropriateness of a unique misfueling Web site and of including such a Web site address on the E15 label.

E. What other means of mitigating misfueling were considered?

EPA believes that the proposed misfueling mitigation approach will effectively and sufficiently mitigate misfueling based on our past experience. The Agency employed a similar and relevant misfueling mitigation program when ULSD was introduced in 2006. Retail stations and wholesale purchaser-consumers were required to have fuel dispenser labels indicating whether the diesel being dispensed was 500 ppm (low sulfur diesel or LSD) or 15 ppm (ULSD). MY2007 and newer on-highway diesel vehicles and engines were required to use ULSD and prohibited from using LSD. At the beginning of the ULSD program, we were aware of several instances where consumers, after checking the labels, had difficulty finding ULSD in some areas. Consumers were informed that misfueling would result in significant engine damage. We are not aware of any significant instances when misfueling occurred during this labeling program. This indicates that EPA outreach and information provided by the engine manufacturers, Clean Diesel Fuel Alliance, and other stakeholders, was effective in educating consumers and mitigating misfueling. Additionally, we feel that product transfer document requirements and the ULSD survey program were vital in implementing and enforcing this fuel transition. Based on the success of the ULSD program, we believe that similar requirements for E15 will be sufficient and successful.

Some have argued that the ULSD program example is not applicable in this case since the MY2007 and newer on-highway diesel vehicles and engines were at risk from misfueling, whereas for E15, it is primarily older motor vehicles (*i.e.*, MY2000 and older motor vehicles) that are at risk. While EPA believes that the potential for engine repair costs applies in both cases, the Agency also believes that similar misfueling mitigation measures can be effective for E15 as well. Coupled with an effective outreach and public education program, the proposed mitigation measures should deter

misfueling and encourage consumers to pay close attention to the E15 labels. Some have also argued that the ULSD program is not applicable because the ULSD program focused primarily on commercial truck drivers, who may be more cognizant of fuel choices due to the potential impact on their commercial investments, than the general public. We believe that consumers are also concerned about their private vehicles, and that the potential costs associated with misfueling (discussed below in section III.F) will have just as much of an impact in informing consumer fuel choices. As long as fuel dispensers are properly labeled and consumers are adequately informed of the associated risks of misfueling nonroad products and older motor vehicles on E15, we believe the proposed misfueling mitigation program will be effective.

While EPA believes that the misfueling mitigation provisions included in today's proposal will address potential misfueling concerns, we recognize that these provisions are not the only potential means for addressing misfueling concerns. EPA has received many suggestions for mitigating misfueling. For example, API conducted a scoping study, "Evaluation of Measures to Mitigate Misfueling of Mid- to High-Ethanol Blend Fuels at Fuel Dispensing Facilities," that includes many of these suggestions. That study may be found in the docket.[26]

One suggestion in API's study was to have full service attendants at gas stations that ensure E15 is only used in appropriate motor vehicles. While such a measure may be effective, its overall effectiveness is unknown and it would be a large burden on service stations to employ service attendants for this purpose. This option would come at an extremely large cost, and there would need to be significant training of new employees. API estimates the average annual cost per service station at $67,500 and the annual nationwide cost at $10.6 billion. Another suggestion was to have separate islands at service stations, with one for blends at E10 and below, and one for mid- and high-gasoline-ethanol blends. It was noted that this measure would also likely cause congestion at the pumps, be inconvenient for the consumer, reduce the number of pumps available for higher-demand fuels, and not prevent intentional misfueling. API estimates the cost of separate islands at $700 per station and $40 million nationwide, though they did not cost out the consumer implications.

Another option discussed is a measure in which keypads or touchscreens would be made available at each pump to allow consumers to input data about their motor vehicle or simply answer "yes" or "no" to the question of whether their motor vehicle is an FFV or non-FFV. If the motor vehicle is appropriate for the fuel, then the pump would allow fueling. If existing dispensers do not already have display screens, this strategy would require retail stations to install keypads or touchscreens at an approximate cost of $5,000 for dispensers that may be retrofitted, with the cost prohibitive for dispensers that may not be retrofitted. There may also be an additional cost per station of $10,000—$20,000 to install a central controller to accept motor vehicle information. Such a strategy may cause some congestion at the pumps. Intentional misfueling would not be prevented through such measure.

Also discussed in the report was a strategy in which retail stations would have a video or audio presentation play when a mid- to high- gasoline-ethanol blend pump is lifted from the dispenser. The presentation would provide information to the consumer about E10+, which motor vehicles may fuel with it, and why other motor vehicles should not. Optionally, the consumer could be required to confirm fueling with E10+ at the end of the presentation. The cost of such an alternative for those stations without display screens, is estimated to be $5,000; if the existing dispenser could not be retrofitted with a display screen, there would be additional and considerable costs incurred for replacing a dispenser. Costs for this option could be as high as $20,000 per station.

API also suggested that a different colored hand warmer or a different type of nozzle grip for fuel pumps with E15+ may help alert consumers to the new type of fuel without a large burden on retail stations. Hand nozzles for E15+ would be a different color than for other gasoline types, or would have a different texture from other hand grips. To be effective, one color or one type of grip should be used for E15+ on a national basis. Consumers would know by the color and/or texture that those pumps were for E15+. Some concerns about this option are that it would not be possible to distinguish nozzles that dispense both E10 and E15, some consumers may not notice the warmer or grip, and this would not prevent intentional misfueling. However, API believes that nozzle grips with different textures would be noticeable to most consumers, even those who do not read the pump labels. Also, hand nozzle grips are easy to install and replace as needed. API has estimated the cost at $5 to $11 per nozzle with a national cost of $800,000 to $1.6 million.

While many of the strategies discussed in the API study may be effective in communicating with the consumer about E15, EPA believes that the combination of pump labels, regulatory prohibition on misfueling, PTDs, a survey, and consumer outreach will adequately mitigate misfueling by consumers. The labels on the fuel pumps will notify consumers that the pump is for E15 and only certain MY motor vehicles should use that fuel. Consumer outreach will give the consumer more in-depth information, such as why older MY motor vehicles, heavy-duty gasoline engines and vehicles, motorcycles, and nonroad products should not fuel with E15 and what damage may occur from misfueling. The PTDs will help ensure that E15 is identified as such through the distribution chain, which will help prevent inadvertent mislabeling of fuel. Finally, a survey will identify where mislabeling (or no labeling) of E15 has occurred so that appropriate labels are used.

Other options that have been suggested may be too expensive, difficult to implement, and/or otherwise not likely acceptable to consumers. As such, EPA does not deem it appropriate to include these options in today's proposal. We seek comment on any other measures not proposed in the rule that the regulated industries and other interested parties feel may be necessary to mitigate misfueling. We seek comment on any other cost-effective mitigation measures that may be appropriate. If EPA considers requiring any other mitigation measures that are suggested by commenters in the final rule, EPA will conduct appropriate analyses of such measures, including the impacts on small businesses, before deciding whether to include such mitigation measures in the final rule.

F. Cost of Compliance

The cost of compliance with the provisions being proposed today include the periodic capital costs of labeling fuel dispensers, the onetime costs of the PTD requirements, and the annual cost of the survey requirements. The cost of the proposed labeling requirements is estimated at $1.04 million per year on an annualized basis. The cost of the proposed PTD

[26] American Petroleum Institute, "Evaluation of Measures to Mitigate Misfueling of Mid- to High-Ethanol Blend Fuels at Fuel Dispensing Facilities," EPA Docket # EPA–HQ–OAR–2010–0448.

requirements is estimated at $0.56 million per year on an annualized basis. The cost of the proposed survey requirements is estimated at $2.05 million per year. The total cost of all of the proposed requirements is estimated at $3.65 million per year. These estimated costs are detailed in the following sections. As discussed in section III.F.4, we believe that these costs will be more than offset by the avoided costs of repairing engines/vehicles that could otherwise have been damaged by misfueling in the absence of the implementation of the proposed requirements.

1. Labeling Costs

Our estimate of the cost of the proposed E15 fuel dispenser labeling requirement includes the cost to the fuel retailer of purchasing the label, the administrative cost to ensure that all gasoline dispensers are labeled appropriately, and the labor cost to replace fuel dispenser labels. Based on our past experience with labeling programs, the RFS2 NPRM and industry input, the cost of an E15 label is estimated to be $5.00 per label.[27] There are approximately 162,000 retail gas stations in the U.S. according to National Petroleum News.[28] The RFS2 Final RIA estimates that there is an average of 7.7 gasoline refueling positions per retail station.[29] Thus, for a retail facility that has 8 refueling positions, the total cost if all of the dispenser labels are replaced would be $40.00. A number of fuel retailers are small businesses. However, we believe that the minor cost of label replacement would not represent a significant additional burden to any fuel retailer. Specifically, making the conservative assumption that there will be the maximum number of pumps (8) even for small stations and assuming an 8 year life before labels need to be replaced, the annualized cost to a service station is $5 per year. The amount of gasoline sold at a small service station is estimated to be approximately 60,000 gallons/month.[30] Assuming an average cost of gasoline at $2.31/gal (per the EIA 2009 national average regular grade gasoline price) the annual revenue for a small service station from its gasoline sales is approximately $1.7 million.[31] Thus, the cost of the labels represents less than 0.001% of the total annual revenue of a small gas station from its gasoline sales.[32]

Although we are requesting comment on whether all gasoline fuel dispensers should be labeled,[33] today's notice only includes proposed labeling requirements for E15 fuel dispensers. Nevertheless, we are assuming all gasoline refueling positions would be relabeled for the purposes of estimating the costs of this proposal. This approach provides a conservatively high estimate of costs if only the proposed E15 labeling requirements are finalized. By multiplying the average number of gasoline refueling positions per retail facility, by the number of fuel retailers, and the cost per label, we arrived at an estimated cost of $6.23 million to replace all of the labels at gasoline refueling positions at all fuel retailers in the U.S. We assumed an 8 year label life before it needs to be replaced. Amortizing the periodic labeling costs using a 7% cost of capital, we estimate the annualized cost to comply with the proposed labeling provisions to be approximately $1.04 million per year. We request comments on these estimated costs.

2. PTD Costs

Section IX.B. of today's preamble contains a discussion of the costs of the PTD requirements proposed in today's notice.[34] There would be a one-time cost of $5.1 million to regulated parties to modify the formatting of their existing PTDs to accommodate the new information which would be required as a result of the implementation of today's proposal. After the one-time modification of PTD formatting is complete, we believe that there would be no significant additional costs associated with communicating the additional information that would be required by today's proposal to downstream parties in the distribution system (either in electronic or paper form). By amortizing the one-time reformatting costs over a period of 15 years at a 7% cost of capital, we arrive at an annualized cost of $560,000 for the proposed PTD requirements. We request comment on these estimated costs.

3. Survey Costs

The estimated costs of the proposed ethanol content and labeling survey are based on experience with the existing RFG and ULSD surveys and discussions with industry. The RFG survey includes all of the elements required in the proposed nationwide survey except the survey of compliance with the proposed labeling requirements. We estimate that the cost of adding the proposed survey of compliance with the proposed labeling requirements to the existing RFG survey at $50,000 per year. The cost to implement all of the proposed survey provisions for conventional gasoline is estimated at $2 million per year. Thus, the total cost of the proposed survey requirements is estimated to be $2.05 million per year.[35] We request comments on this estimate.

4. Avoided Motor Vehicle and Nonroad Product Repair Costs

We believe that proposed labeling and associated survey and PTD provisions will be an effective tool at mitigating unintentional misfueling based on our experience with other labeling provisions (such as ULSD). The resulting prevention of misfueling will not only minimize the potential emission increases that could result (as discussed in section VI.I.), but also avoid potentially costly highway motor vehicle, heavy-duty gasoline engines and vehicles, motorcycles, and nonroad product repairs that would be anticipated to far exceed the cost of the labels. For example, based on a poll of automobile repair facilities, fuel pump and catalyst replacements average $427 and $1,250, respectively. Similarly, for nonroad equipment, the cost for a fuel line repair of handheld equipment (*e.g.* trimmers, chainsaws) or non-handheld equipment (*e.g.* lawnmowers, generators) could cost $100-$400 (based on information received from repair facilities in Ann Arbor, Michigan and vicinity) and replacing this same equipment can range from $100 (consumer handheld) to $5,000 (commercial grade garden tractor) should the engine fail.[36] While there are no data to estimate the frequency at which these repairs or other potential complications (discussed in section VI) associated with misfueling on E15 might

[27] RFS2 NPRM RIA page 581 (EPA–420–D–09–001; May, 2009); available at: *http://www.epa.gov/otaq/renewablefuels/420d09001.pdf*).

[28] National Petroleum News, "2008 marketfacts", states that there were 161,768 gasoline retail facilities in 2008 *http://www.npnweb.com.*

[29] RFS2 Final RIA, page 232 (EPA–420–R–10–006; February 2010); available at: *http://www.epa.gov/otaq/renewablefuels/420r10006.pdf*).

[30] The National Association of Convenience Stores (NACS) 2006 State of the Industry Report states that for motor fuel retail stations that sell less than 75,000 gallons of all motor fuels, the average monthly throughput is 57,778 gallons.

[31] Energy Information Administration (EIA) annual national average gasoline price data *http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_nus_a.htm.*

[32] *See* section IX.D. of this notice for additional discussion of potential impacts from today's proposal on small businesses.

[33] Including E0, E10, E15, EXX, and E85 fuel dispensers. *See* section III.A. of this notice.

[34] Section III.B. contains a discussion of the proposed PTD requirements.

[35] *See* section III.C. for a discussion of the proposed survey provisions.

[36] While this analysis is focused on small SI engines, note that other nonroad equipment/vehicle categories can incur higher expenses due to the higher complexity of the equipment/vehicle compared to small SI engines.

occur, even if these potential complications were avoided on a tiny fraction of MY2000 and older motor vehicles and nonroad products as a result of the regulations (as opposed to actions taken independently by industry in response to conditions on the partial waiver), the savings would still far exceed the costs of compliance. We request comment on this assessment.

G. Compliance and Enforcement

1. What are the prohibited acts?

There is a long-standing prohibition, under CAA section 211(f)(1), that fuel manufacturers may not introduce gasoline-ethanol blends containing greater than 10 vol% ethanol into commerce for use in non-flex-fuel vehicles. The partial waiver modifies this prohibition so that gasoline-ethanol blends containing up to 15 vol% ethanol may legally be introduced into commerce by fuel manufacturers for use in MY2007 and later light-duty motor vehicles. The waiver does not apply to any MY heavy-duty gasoline engine or vehicle, motorcycle, or nonroad product.

We are proposing that all parties would be prohibited from selling, introducing into commerce or causing or allowing the sale or introduction into commerce of gasoline that has an ethanol content above 10 vol% ethanol into MY 2000 and older light-duty motor vehicles, any heavy-duty gasoline engine or vehicle, any motorcycle, and any nonroad product. We are also proposing that fuel distributors who transport or store a gasoline-ethanol blend, base gasoline or blendstock for ethanol blending would be prohibited from increasing the ethanol content to exceed the value noted on the PTD.[37] Since the Agency is deferring a decision for MY2001–2006 motor vehicles, we are not proposing a prohibition for fuel used in these motor vehicles at this time. DOE testing of MY2001–2006 light-duty motor vehicles is ongoing and EPA expects to make a waiver determination for these vehicles shortly after the results of the DOE testing are available. If EPA does not grant an E15 waiver for MY2001–2006 light-duty motor vehicles, then we would expect to include the same prohibitions for these MY motor vehicles in the final rulemaking. Even though we are not proposing an actual prohibition for motor vehicles MY2001–2006, it is still unlawful for fuel manufacturers to introduce E15 into commerce for use in these motor vehicles unless we grant an E15 waiver for these motor vehicles.

In addition to this general misfueling prohibition, there are several other prohibited acts that we are proposing in conjunction with the regulatory provisions being proposed today. We are proposing that retailers and wholesale purchaser consumers would be prohibited from dispensing E15 unless they comply with the proposed dispenser labeling requirements in section III.A. of today's preamble. We are proposing that ethanol blenders would be prohibited from introducing E15 into commerce without complying with the proposed ethanol content survey requirements in section III.C. of today's preamble.

In addition, there are several RVP related prohibitions that exist today that may need to be modified in light of E15. There is an existing prohibition with respect to exceeding applicable summertime RVP requirements.[38] We are proposing to prohibit the commingling of an E10 gasoline-ethanol blend with either E0 or E15 due to potential concerns about causing a violation of summertime RVP requirements unless the E10 blend had not taken advantage of the 1 psi RVP waiver. For the same reasons, prohibitions on the commingling of BOBs is necessary. Therefore we are proposing certain prohibitions against commingling conventional gasoline BOBs similar to the prohibitions for reformulated blendstocks for oxygenate blending (RBOBs) in 40 CFR 80.78 under the RFG program. Specifically, we are proposing to prohibit commingling an E10 BOB (produced to take advantage of the 1 psi RVP waiver) with an E15 BOB unless the resulting mixture is designated as an E10 BOB. We request comment on whether other modifications to these existing RVP related regulatory requirements are needed as a result of the introduction of E15.

2. What are the proposed liability and penalty provisions for noncompliance?

Today's proposed rule contains prohibition and liability provisions that are similar to those of the other fuels programs in 40 CFR Part 80.[39] Under the proposed regulation, regulated parties would be liable for committing certain prohibited acts, such as selling or distributing gasoline-ethanol blends with an ethanol content that exceeds the maximum for the intended end-use category of vehicles/engines, or causing/contributing to others committing prohibited acts. In addition, parties would be liable for a failure to meet certain affirmative requirements or causing others to fail to meet their affirmative requirements. All parties in the fuel distribution system would be liable for a failure to fulfill the recordkeeping and PTD requirements.

a. Presumptive Liability

All EPA fuels programs include a presumptive liability scheme for violations of prohibited acts. Under this approach, liability is imposed on two types of parties: (1) The party in the fuel distribution system that controls the facility where the violation was found or has occurred; and (2) those parties, typically upstream in the fuel distribution system from the initially listed party (such as any distributor of the fuel), whose prohibited activities could have caused the program nonconformity to exist.[40] This presumptive liability scheme has worked well in enabling us to enforce our fuels programs since it creates comprehensive liability for essentially all the potentially responsible parties. The presumptions of liability may be rebutted by establishing an affirmative defense.

To clarify the inclusive nature of these presumptive liability schemes, today's proposed rule would explicitly include as prohibitions causing another person to commit a prohibited act and causing the presence of a non-conforming gasoline-ethanol blend (such as a blend designated as containing less than 15 vol% ethanol which actually contains a greater concentration of ethanol) to be in the distribution system. This is consistent with the provisions and implementation of other fuels programs.

Today's proposed rule, therefore, provides that most parties involved in the chain of distribution would be subject to a presumption of liability for committing prohibited actions and causing violations by other parties. For example, an ethanol blender could be held presumptively liable for causing a gasoline-ethanol blend that exceeds the maximum ethanol content stated on the product's PTD to be present in the distribution system unless the blender provides an affirmative defense to

[37] A violation of this prohibition could cause or contribute to vehicle misfueling downstream.

[38] *See* 40 CFR 80.27.

[39] *See* section 80.5 (penalties for fuels violations); section 80.23 (liability for lead violations); section 80.28 (liability for volatility violations); section 80.30 (liability for diesel violations); section 80.79 (liability for violation of RFG prohibited acts); section 80.80 (penalties for RFG/CG violations); section 80.395 (liability for gasoline sulfur violations); section 80.405 (penalties for gasoline sulfur regulations).

[40] An additional type of liability, vicarious liability, is also imposed on branded refiners under these fuels programs.

demonstrate that it did not cause the exceedance. An ethanol blender could cause such an exceedance by adding too much ethanol to a blend or making an error on the PTD that they prepare. An ethanol manufacturer could be held presumptively liability for causing an exceedance of the maximum ethanol content requirements unless it could demonstrate that the ethanol it produced could not have caused the downstream violation.[41] Like other fuels regulations, a refiner also would be subject to a presumption of vicarious liability for violations by any downstream facility that displays the refiner's brand name, based on the refiner's ability to exercise control at these facilities. Carriers, however, would be liable only for violations arising from product under their control or custody and not for causing non-conforming gasoline to be in the distribution system, except where specific evidence of causation exists. A carrier might cause an exceedance of the ethanol content stated on the PTD for product in its custody by commingling products with dissimilar ethanol contents. For example, a carrier might cause the ethanol content of a product designated as E15 to exceed 15 vol% ethanol by transporting the product in a tank truck that had previously transported E85 that had not been properly drained.

b. Affirmative Defenses for Liable Parties

This proposal also includes affirmative defenses for each party that is deemed liable for a violation. Additionally, all presumptions of liability are rebuttable. The proposed defenses are similar to the defenses available to parties for violations of the RFG and diesel sulfur regulations. We believe that these defense elements set forth reasonably attainable criteria to rebut a presumption of liability. We are proposing that the affirmative defense require a party to demonstrate all of the following: (1) The party did not commit or cause the violation; (2) the party has PTDs indicating that the fuel was in compliance at its facility; and (3) except for retailers and wholesale purchaser-consumers, the party conducted a quality assurance program. For parties other than tank truck carriers, we are proposing that the quality assurance program would be required to include periodic sampling and testing of gasoline-ethanol blends for their ethanol content. For tank truck carriers, we are proposing that the quality assurance program would not need to include periodic sampling and testing of the gasoline-ethanol blend, but in lieu of sampling and testing, the carrier would be required to demonstrate evidence of an oversight program for monitoring compliance, such as appropriate guidance to drivers on compliance with applicable requirements and the periodic review of records concerning the quality of gasoline-ethanol blends and their delivery.

With respect to the assessment of liability for the introduction of E15 into any engines, vehicles or equipment that are not covered by the partial waiver for use of E15, EPA would typically not hold a self-service fuel retailer liable for customer misfueling if the retailer has labeled their dispensers appropriately and did not condone or facilitate such misfueling.

We are proposing that participation in the ethanol content survey could be used to meet some or all of the periodic sampling and testing elements of a regulated party's (*e.g.* branded refiners, ethanol blenders, and fuel distributors) affirmative defenses to presumptive liability in cases where instances of noncompliance with the applicable maximum ethanol content specification are discovered.[42] In addition to participation in the survey, we are proposing that ethanol blenders would be required to periodically test the accuracy of their equipment/methods used to add ethanol to gasoline. We are proposing that all other regulated parties could satisfy all of the periodic sampling and testing elements of their affirmative defenses to presumptive liability by participating in the survey.

As in other fuel regulations, branded refiners would be subject to more stringent standards for establishing a defense because of the control such refiners have over branded downstream parties. Under today's rule, in addition to other presumptive liability defense elements, we are proposing that branded refiners would also be required to show that the violation was caused by an action by another person in violation of law, an action by another person in violation of a contractual agreement with the refiner, or the action of a distributor not subject to a contract with the refiner for the transportation of the gasoline.

Based on experience with other fuels programs, we believe that a presumptive liability approach would increase the likelihood of identifying persons who cause violations of the prohibited acts in today's proposal. We normally do not have the information necessary to establish the cause of a violation found at a downstream facility. We believe that those persons who actually handle the fuel are in the best position to identify the cause of the violation, and that a rebuttable presumption of liability would provide an incentive for parties to be forthcoming with information regarding the cause of the violation. In addition to identifying the party that caused the violation, providing evidence to rebut a presumption of liability would serve to establish a defense for the parties that are not responsible. Presumptive liability is familiar to both the petroleum industry and EPA, and we believe that this approach would make the most efficient use of EPA's enforcement resources. For these reasons we are proposing a liability scheme based on a presumption of liability. We request comment on the proposed liability provisions.

c. Penalties for Violations

CAA section 211(d)(1) provides for penalties for violations of the fuels regulations. These penalty provisions subject any person that violates any requirement or prohibition of the rule to a civil penalty of up to $27,500 for every day of each such violation and the amount of economic benefit or savings resulting from the violation. Pursuant to 40 CFR 19.4, the amounts of civil penalties for these violations increased to $37,500 per day, plus the amount of any economic benefit or savings resulting from the violation, for violations that occurred after January 12, 2009. Today's proposal would subject any person who violates any of the proposed requirements or prohibitions to a civil penalty up to $37,500 for every day of each such violation and the amount of the economic benefit or savings resulting from the violation.

We propose that a violation of the requirements in today's notice would constitute a separate day of violation for each day the gasoline giving rise to the violation remains in the fuel's distribution system. The length of time the gasoline in question remains in the distribution system would be deemed to be twenty-five days unless there is evidence that the fuel remained in its distribution system a lesser or greater amount of time. These proposed penalty provisions are similar to those in the RFG, Tier 2 sulfur, and diesel sulfur programs. We request comment on the proposed penalty provisions.

[41] For example, an ethanol manufacturer might cause a downstream exceedance of maximum ethanol content requirements if they did not add the required amount of denaturant.

[42] *See* section III.C. of today's notice for a discussion of the ethanol content survey and section IV for a discussion of the RVP survey.

IV. Other Measures To Ensure Compliance

A. The 1.0 psi RVP Waiver for E10 Blends

One concern that was raised in the comment periods on the E15 waiver and RFS2 NPRM in addition to stakeholder meetings prior to this proposal was whether E15 would qualify for the 1.0 psi RVP waiver permitted under the Clean Air Act (CAA) section 211(h) for conventional gasoline. As discussed in the partial waiver decision document, we believe that E15 blends with higher volatility would cause vehicles to violate their evaporative emission standards in-use. Consequently, the waiver announced today is for E15 blends that meet the summertime gasoline volatility standards for conventional gasoline without any 1.0 psi RVP waiver, and the regulatory provisions proposed today reflect this decision. Furthermore, EPA interprets section 211(h)(4) of the CAA as limiting the 1.0 psi waiver to gasoline-ethanol blends that contain 10 vol% ethanol, including limiting the provision concerning "deemed to be in full compliance" to the same 10 vol% blends. EPA implemented CAA section 211(h)(4) through 40 CFR 80.27(d) which provides that gasoline-ethanol blends that contain at least 9 vol% ethanol and not more than 10 vol% ethanol qualify for the 1.0 psi waiver of the applicable RVP standard. Nevertheless, we seek comment on whether section 211(h) of the CAA could be interpreted such that E15 is eligible for the RVP provisions in section 211(h)(4) and whether this would have any impact on our E15 waiver decision.

In order to introduce a fuel that meets both the Federal summertime RVP standards and contains between 10 and 15 vol% ethanol, fuel refiners would have to create a fuel or blendstock that has approximately 1.0 psi lower RVP than a fuel or blendstock intended for E10 due to the interaction between gasoline volatility and ethanol when blended. Oxygenate blenders would need to know the RVP of a blendstock or have the intended ethanol content of a blendstock be specified on the PTD to ensure that they know the correct amount of ethanol that should be blended into a fuel. If an oxygenate blender or retail station blended more than 10 vol% ethanol into a fuel or blendstock produced with the expectation of taking advantage of the 1 psi waiver that applies to E10, the resulting blend would be in violation of summertime RVP standards.

Having E10 and E15 at different RVP levels in-use also raises the potential that mixtures of the two at retail would cause the blend to exceed the summertime RVP requirements. Many retail stations only have two underground storage tanks and those tanks typically contain regular and premium grade fuels. Since, in many cases, midgrade gasoline is made by blending regular and premium grade gasoline, the possibility exists that a midgrade fuel blended from a high-RVP E10 fuel and a low-RVP E15 fuel would exceed summertime RVP requirements. This fuel would not receive the 1.0 psi RVP waiver and selling such a fuel would violate RVP requirements.

These RVP related complications could be avoided by refiners producing a lower RVP blendstock for E10 as well. While there are cost and supply considerations refiners and fuel distributors may find it in their best interest to do so given the flexibility it affords. Regardless, the Agency believes that it would be possible to help alleviate some of these challenges with the slight modifications to the PTDs and the national fuel survey requirements discussed in Section III of this proposal. RFG already has similar requirements to those that we are proposing in today's rulemaking, and given the effectiveness we have had with the RFG program, we believe that the proposed approach would be an effective means of allowing fuel manufacturers to ensure that the correct amount of ethanol was blended into the appropriate blendstock or finished fuel with only slight additions at minimal costs. We believe that these PTD proposals are appropriate under our authority under sections 208 and 114 of the Clean Air Act.

1. National RVP Survey

In section III.C., we described our proposal for a national E15 labeling and ethanol content survey that is intended to ensure that fuel pumps would be properly labeled if retail stations chose to sell E15. In order to determine if the proposed labeling requirements are being met and the ethanol content is consistent with the label, fuel sampling and testing would be required to determine the ethanol content. Since fuel refiners will have difficulty ensuring that downstream summertime RVP requirements are met in non-RFG areas, adding testing for RVP to this survey would be a low-cost [43] approach to enforcing downstream RVP standards and help provide an affirmative defense for upstream parties in the event of a violation downstream. We seek comment on whether RVP survey requirements should be included as part of the national ethanol survey proposed in section III.C.

2. RVP and E15 Underground Storage Tank Transition

Another issue associated with the RVP standards is the potential comingling of a higher RVP E10 fuel that received the 1.0 psi RVP waiver with a lower RVP E15 that met summertime RVP requirements in underground storage tanks when a retail station decides to transition from selling E10 to E15. If the retail station does not completely remove all E10 from a tank before E15 is added to the tank, the retail station would create a fuel that violates RVP standards. The resulting blend would be above 10 vol% ethanol and would not qualify for the 1.0 psi waiver, but would have an RVP above the requirement for E0 and E15.

Section 211(t) of the Clean Air Act, as amended by the Energy Policy Act of 2005, allows retail stations to blend compliant RFG batches of non-ethanol blended and ethanol-blended gasoline in storage tanks twice a year as long as the duration of the blended period is no longer than 10 consecutive calendar days. However, the authority granted to the Agency for the transition of fuels in underground storage tanks was specifically limited to that case and we do not believe this provision authorizes a blending down of E10 and E15 over time in non-RFG areas.

We seek comment on the issue of tank transition from E10 to E15 fuels and if there are ways that the Agency could address this issue.

B. Credit for RFG Downstream Oxygenate Blending

Pursuant to 40 CFR 80.69, refiners of RBOB are permitted to take credit for downstream oxygenate blending toward compliance with RFG standards. To do so the refiner must direct the downstream oxygenate blender on the PTD to add a particular type and amount of oxygenate. However, these provisions may require some reconsideration. In light of the addition of E15 to the RFG marketplace, it may be more difficult to ensure that 15 vol% ethanol is in fact added downstream if the RBOB would also meet all other finished gasoline specifications with the addition of just 10 vol% ethanol. Oxygenate blenders could also be left in the untenable position of having a supply of RBOB for E15 blending and an inability to blend more than 10 vol%

[43] Based EPA discussions with industry, the costs of for RVP survey requirements as part of the E15 labeling survey would add approximately $200,000 dollars per year to the total costs of the survey.

ethanol. We request comment regarding how the final regulation should address this issue. For example, the regulation could limit the refiner's claimed ethanol content to 10 vol% ethanol unless: (A) The final blend would not comply with all gasoline specifications (*e.g.,* octane) without the addition of 15 vol% ethanol, or (B) until such time as the RBOB surveys for a particular RFG area indicates that there is a sufficient, stable market demand for E15. We request comment on this and other approaches to resolve this issue.

V. Modification of the Complex Model

A. Background of RFG Requirements

Reformulated gasoline (RFG) is gasoline that is required to be sold in certain parts of the country, and is required to be reformulated to meet certain performance standards for emissions of smog forming and toxic air pollutants. In 1990 Congress amended the CAA to require that RFG be sold in cities with the worst ozone pollution problems. In addition, other cities with significant smog problems were provided the opportunity to voluntarily opt-in to the RFG program. RFG is currently used in portions of 17 States and the District of Columbia. About 30% of gasoline sold in the U.S. is reformulated. In the 1990 Amendments, Congress also required that conventional gasoline (CG, or non-RFG) sold in the rest of the country become no more polluting than gasoline sold in 1990. Often referred to as "anti-dumping", this requirement ensures that refiners do not "dump" into conventional gasoline fuel components that are restricted in RFG and that increase environmentally harmful emissions.

EPA introduced the RFG program in 1995, as required by the CAA. The RFG program established emissions performance standards for volatile organic compounds (VOCs), nitrogen oxides (NO_X), and toxics. These standards are based on percent reductions from the average emissions of these pollutants in 1990 model year vehicles operated on a specified baseline gasoline. The program required an oxygen minimum standard of 2.0% by weight, however the Energy Policy Act of 2005 removed that requirement. For conventional gasoline, the program establishes emissions standards for exhaust toxics and NO_X designed to ensure that an individual refinery's or importer's gasoline will not have higher levels of these pollutants than the refinery's or importer's 1990 gasoline.

Refiners of RFG must comply with the RFG standards separately for each refinery. Refiners of conventional gasoline may comply separately for each refinery, or they may aggregate their refineries. Importers comply with both the RFG and conventional gasoline standards for the aggregate of the gasoline they import during the year.

B. The Complex Model

To measure compliance with the RFG and anti-dumping standards, the emissions performance of gasoline is calculated using a model, called the Complex Model, which predicts the emissions level of each regulated pollutant based on the measured values of certain gasoline properties. These properties are: Aromatics, olefins, sulfur, Reid Vapor Pressure (RVP), benzene, oxygen and distillation points, as well as the content of ethanol, ETBE, TAME and MTBE. Refiners and importers are required to measure these properties in each batch of gasoline they produce or import, using a prescribed test method, and calculate the emissions level of each pollutant for each batch of gasoline using the Complex Model. The emissions level as computed by the Complex Model is compared to the baseline emissions for each pollutant, and the percent reduction is then calculated. The standards for VOC, NO_X and toxics are stated in terms of percent reductions from the baseline. Thus, for fuel to comply with the standards, the percent reduction computed by the Complex Model must be equal to or greater than the standard for each pollutant. Under the Clean Air Act, baseline emissions must be based on 1990 vehicle technology, not current fleets, nor off-road equipment.

For gasoline to be sold in the U.S., it must comply with the standards. Refiners are therefore required to certify that their fuel meets the standards by using the Complex Model. Currently, the equations in the model are limited to an oxygen content of no more than 4.0% by weight in gasoline, which is the maximum amount of oxygen in gasoline containing 10 vol% ethanol, or E10.[44] In order for refiners to produce gasoline that will contain 15 vol% ethanol, the model must be modified to predict the effect of the additional oxygen.

The applicability of the Complex Model to gasoline certification has become limited as EPA's more recent clean gasoline standards take effect and provide even greater emission reductions beyond those of the RFG program. The NO_X emission performance requirements for RFG and conventional gasoline have not been required since January 1, 2007 when the Tier2 gasoline average sulfur standard of 30 ppm took effect (*see* 40 CFR 80.101(c)(3)(i)). Finally, beginning January 1, 2011, the air toxics emission standards for gasoline will be deemed met by compliance with the new MSAT2 nationwide benzene standard for gasoline, the volatility standard, and sulfur standard (*see* 40 CFR 80.41(e)(2) and (3)). The result is that beginning January 1, 2011, only the VOC equation in the Complex Model will continue to be binding and only for RFG. For conventional gasoline, there are no VOC performance standards; only RVP limits. Thus, compliance with the anti-dumping regulations does not require use of the Complex Model to evaluate VOC emissions.

The one exception to this is small refiners that take advantage of the option for delayed compliance with the MSAT2 benzene standard until January 1, 2015. They would still need the Complex Model for air toxics emission performance compliance during this interim period. However, since no small refiners are currently producing RFG, it would only be for CG. For CG, since refiners typically certify CG as E0, with oxygenate blended downstream, they should be unaffected by the increase in ethanol content from E10 to E15. Therefore, it appears that the only equation that needs to be modified in the Complex Model to allow refiners and importers to certify gasoline containing E15 after January 1, 2011 is the VOC equation.

Because emissions performance at issue is specified in the Act as the emissions performance of 1990 vehicle technology, we are not able to use current emission test data on motor vehicles using E15 gasoline as a basis for evaluating appropriate changes to the VOC equation. The test results from today's vehicle fleet would not represent the 1990 vehicle technology required to calculate the emission baseline. Instead, we relied on a study conducted in 1994 by Guerrieri, *et al.,* that examined the exhaust emissions from 1990 vehicles using gasoline with ethanol levels varying from 0 to 40 volume percent.[45] Figure V.B–1 shows data reported by Guerrieri *et al.*[46] The figure shows the average values of

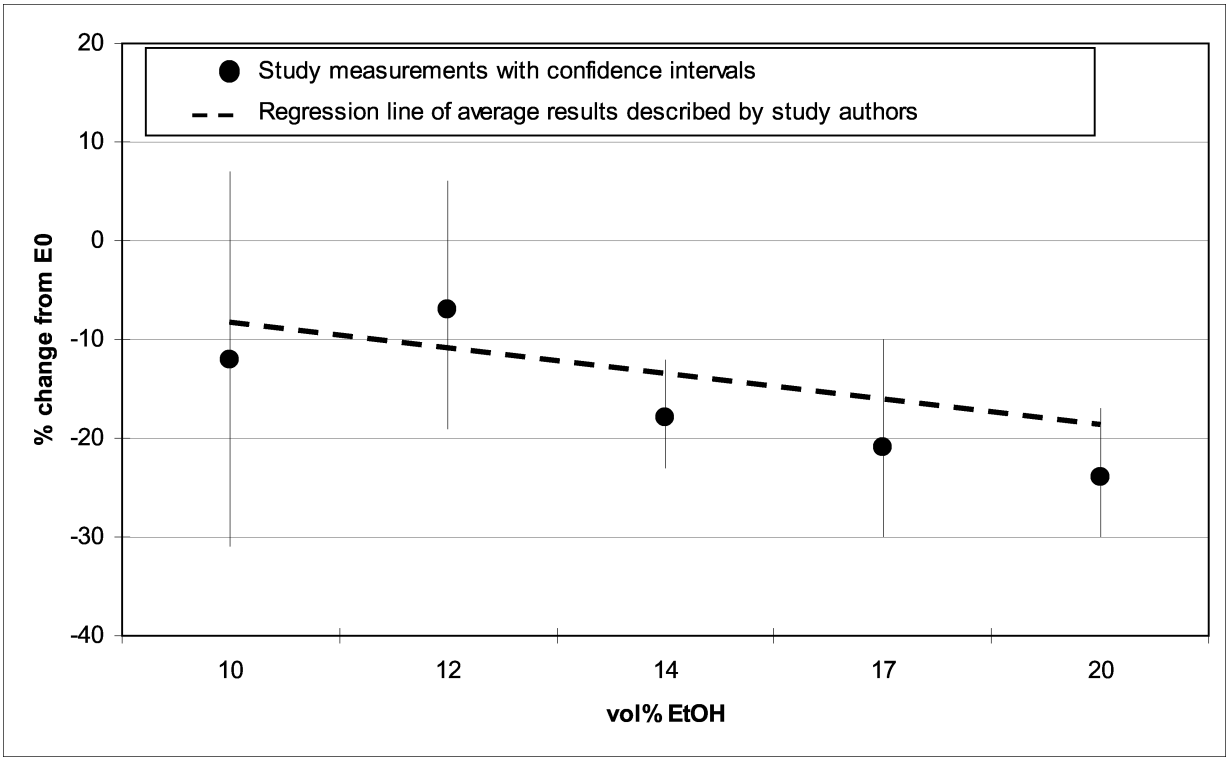
[44] Because the percent by weight of oxygen in the fuel varies depending on the density of the fuel, the limit in the Complex Model is currently 4.0% by weight to reflect the maximum amount of oxygen associated with E10. In most fuels, however, this volume is equivalent to 3.5% by weight oxygen.

[45] Guerrieri, David Al., Peter Caffrey, and Venkatesch Rao; *Investigation Into the Vehicle Exhaust Emissions of High Percentage Ethanol Blends*"; SAE Technical Paper Series; 950777; presented at International Congress and Exposition; Detroit, Michigan; March, 1995.

[46] Guerrieri, *et al.;* op. cit.

hydrocarbon emissions (representative of VOC) at several ethanol levels relevant to this discussion, as well as the uncertainty bars at each value. The study data showed that on average exhaust hydrocarbon emissions increased from E10 to E12, but then decreased beyond E12. While the study does not provide sufficient data to determine the precise VOC emission effect between E10 and E15, the linear regression results presented in the study (also shown in Figure V.B–1) indicate a decreasing trend in hydrocarbon emissions with increased ethanol in gasoline. Based on the study findings, we are reasonably confident that the average VOC emissions for ethanol blends greater than E10 up to and including E15 will be no worse than for E10, for 1990 technology motor vehicles. This outcome is consistent with our engineering judgment. As discussed in Section VI.C the general trend across vehicles of all ages is that the addition of ethanol to gasoline tends to lower VOC emissions due to its enleanment effect during open loop operation.

Figure V.B-1: Illustration of results of study by Guerrieri, *et al* for Total Hydrocarbons (THC)



Because the data available on 1990 vehicles is limited, we are not proposing to change the Complex Model to indicate decreasing VOC emissions with increased ethanol content between E10 and E15. Instead, we are proposing to modify the application of the Complex Model equations to treat VOC exhaust emissions at ethanol levels greater than E10 and up to E15 the same as for E10. We are therefore proposing in today's rule to modify the Complex Model to allow up oxygen levels up to 5.8% by weight to be input to the model but that the VOC emissions effects would be modeled the same as if it contained 4.0% by weight oxygen.[47] This will provide flexibility for the Complex Model to be used over a broader range of ethanol content. We request comment on whether the data and rationale discussed above are an appropriate basis for the proposed adjustment to the Complex Model to account for E15.

VI. Why are we proposing misfueling mitigation measures?

In previous sections we proposed to prohibit the use of E15 in MY2000 and older motor vehicles, heavy-duty gasoline engines and vehicles, motorcycles, and all nonroad products (which includes marine applications). This section provides the technical rationale supporting this decision. As discussed below, it appears that the unique physical and chemical properties of ethanol may impact these products when they are using gasoline-ethanol blends, particularly as many of these products were not designed to operate on such fuels. The potential impacts could be the impairment of the performance of their emission control devices or systems, which would likely lead to increased HC, CO and/or NO_X emissions.

Light-duty motor vehicles (*i.e.,* passenger cars and light-duty trucks) have evolved significantly over time, mainly in response to increasingly tighter emission standards, but also to improve fuel economy, vehicle driveability, and vehicle durability. The primary advancements in emissions control have been in the control of the air-to-fuel (A/F) ratio matched with advancements in catalyst formulations and designs with each new generation of motor vehicles. Today's motor vehicles are far more sophisticated and up to 99% less polluting than they were in the 1970s while also more tolerant of variables like fuel composition (*i.e.,* RVP, oxygen content). However, MY2000 and older light-duty motor vehicles have not benefitted from these

[47] The level of 5.8% by weight of oxygen is the potential maximum oxygen level associated with E15 due to lighter than average gasoline components. The typical weight of oxygen in E15 is 5.2%.

advancements in technology and could experience combustion and material compatibility problems leading to increased emissions if operated on E15. While motorcycles (highway and off-highway), heavy-duty gasoline engines and vehicles, and nonroad products have also evolved over time, since they have not been regulated as long, and have much more diverse applications, they do not reflect the same level of advanced technology across the board as do today's light-duty motor vehicles. Consequently, their engines and emission control systems may also be impacted in ways that affect emission performance if operated on E15.

On the other hand, the Agency believes that newer light-duty motor vehicles (vehicles designed to meet Tier 2 emissions standards) were designed with significantly more robust emission controls and fuel system components to regularly use gasoline-ethanol blends. For MY2001–2006 light-duty motor vehicles, EPA does not have enough data on which to base a decision at this point in time. DOE testing of MY2001–2006 light-duty motor vehicles is ongoing and will factor into the Agency's decisions for the final rule.

The sections that follow discuss in more detail the history of ethanol use in the U.S., the chemical and physical differences between ethanol and gasoline, and how these differences, especially combustion enleanment and material compatibility, could impact exhaust and evaporative components and emissions. Specifically, we discuss the ability of the following groups of vehicles and engines to handle E15: (1) MY2000 and older light-duty motor vehicles; (2) heavy-duty gasoline engines and vehicles; (3) motorcycles; (4) nonroad products; (5) MY2007 and newer light-duty motor vehicles; and (6) MY2001–2006 light-duty motor vehicles.

A. History of Ethanol Use in the U.S.

Any assessment of the impacts of E15 use in vehicles, engines, and equipment must begin with an understanding of the degree to which they were designed for the use of low level gasoline-ethanol blends. E10 is currently blended in significant quantities in most gasoline distributed and sold in most States, but this was not always the case. Most auto manufacturers today support the use of E10 in their vehicles and engines since their designs have evolved over time in response to the growing use of E10 across the country. However, the total fleet is made up of old and new vehicles, engines, and equipment with varying technologies and therefore varying compatibility with gasoline-ethanol blends.

Ethanol and ethanol-gasoline blends have a long history as automotive fuels in the United States. Inexpensive crude oil prices kept ethanol from making a significant presence in the transportation sector until the end of the 20th century when tax subsidies and environmental programs helped to spur growth. On November 9, 1978, the U.S. passed the Energy Tax Act which defined "gasohol" as a blend of gasoline with 10% alcohol by volume (excluding alcohol made from petroleum, natural gas or coal) and offered the fuel an excise tax exemption to encourage its use.[48] While the ethanol tax subsidy has been modified over the years, conventional ethanol continues to receive a $0.45/gallon tax credit and cellulosic ethanol is eligible for a $1.01/gallon credit.

Environmental programs have also been an important contributor to ethanol expansion in the United States. First, in the late 1980s and early 1990s, ethanol was used as a gasoline oxygenate (along with MTBE) to help reduce carbon monoxide (CO) emissions in various CO nonattainment areas. Then, ethanol was used as part of the requirements for reformulated gasoline in the worst ozone nonattainment areas beginning in the mid 1990s.

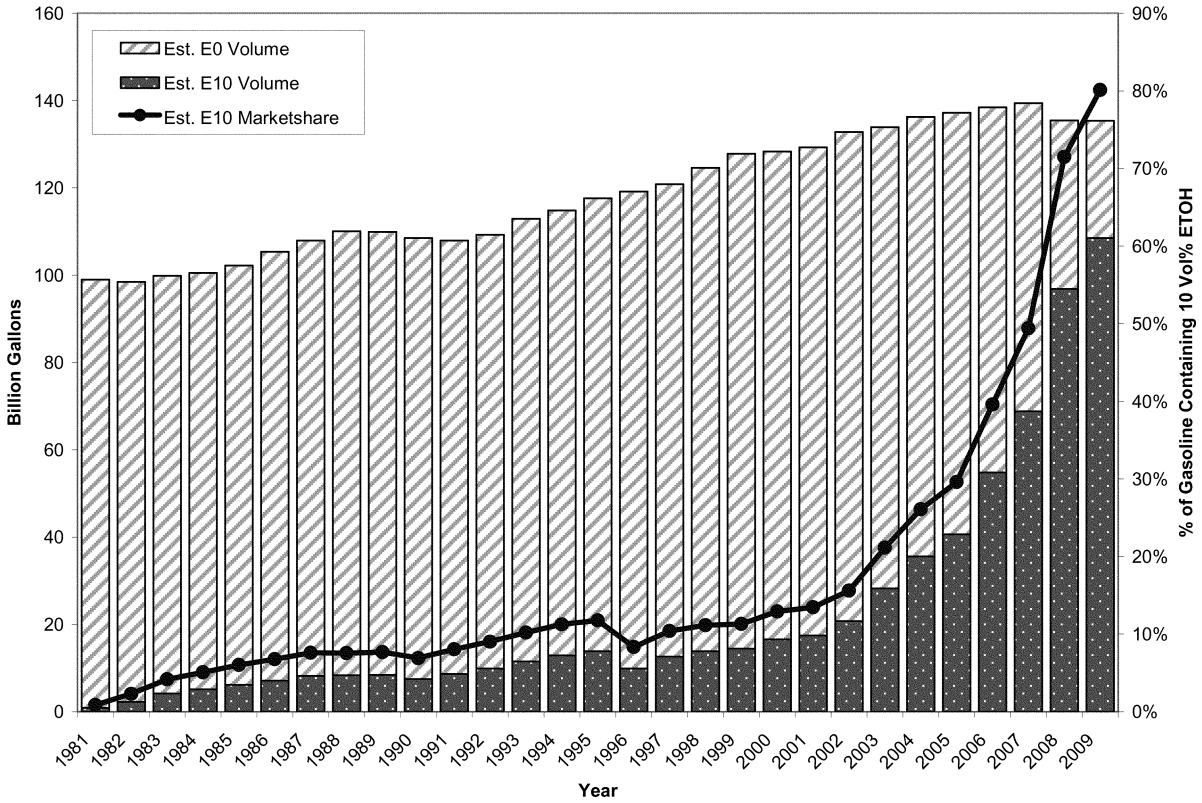
Tax subsidies and environmental programs resulted in the growth of the fuel ethanol market such that by the late 1990s, E10 represented slightly more than 10% of gasoline nationwide. By 1999, 35 States were blending ethanol into at least a portion of their gasoline.[49] However, its use remained concentrated in the Midwest, *e.g.,* Illinois, Ohio, and Minnesota. Ethanol did not begin expanding significantly beyond the Midwest until the early 2000s when States started banning the use of Methyl Tertiary-butyl Ether (MTBE) due to groundwater concerns. Ethanol quickly became the primary oxygenate in the gasoline market. With the removal of the RFG oxygen mandate by the Energy Policy Act of 2005 (EPAct), MTBE was removed from gasoline almost entirely by 2006. Ethanol replaced MTBE, broadening the fuel's use into California, the East Coast, and other RFG areas. From 2000 to 2006, the share of gasoline containing 10% ethanol by volume ("E10 market share") more than doubled as shown in Figure VI.A.-1. According to fuel survey and certification data, ethanol is the only oxygenate currently used in any significant quantity today.

[48] Refer to the Energy Tax Act of 1978, Public Law 95–618, enacted November 9, 1978.

[49] EIA, Motor Gasoline Outlook and State MTBE Bans, Table 2, available at: *http://www.eia.doe.gov/emeu/steo/pub/special/mtbeban.html* and FHWA, Estimate Use of Gasohol, 1999, available at: *http://www.fhwa.dot.gov/ohim/hs99/tables/mf33e.pdf.*

Figure VI.A.-1

Growth in E10 Market Share Over Time



Since 2006, E10's market share has continued to rise. The increase can be attributed primarily to rising crude oil prices which led to very favorable ethanol blending economics over most of the past 4–5 years, but also to the market certainty provided by the Renewable Fuel Standard (RFS) established by EPAct and later modified by the Energy Independence and Security Act of 2007 (EISA). EPAct required 7.5 billion gallons of renewable fuel to be blended into transportation fuel by 2012. In 2007, EISA expanded the RFS to 36 billion gallons by 2022. On March 26, 2010, EPA promulgated final RFS2 regulations to implement the EISA volumes.[50] While there are a number of renewable fuels that can be used to meet the RFS2 requirements, EPA projects a large percentage will come from ethanol. According to EIA, ethanol comprised 9.4% of total U.S. motor gasoline sales during the first half of 2010.[51] In other words, over 90% of motor gasoline sold today is E10.

As E10's market share has increased over the last few years, its prevalence has also expanded nationwide. A map showing today's estimated E10 penetration by State is provided in Figure VI.A–2. This State-level information, provided by HART Energy Consulting, does not reflect California's recent shift from 5.7 to 10 vol% ethanol. While vehicles, engines, and equipment in the Midwest have been experiencing E10 use for a number of years, this is not the case in most of the country. Even in much of the Midwest, E10 has become the dominant fuel only recently. It took many years for States to reach 25% E10 saturation and even longer for States to reach 50% E10 saturation. As shown in Figure VI.A–3, 23 States (including the District of Columbia) just recently reached 50% saturation between 2008 and 2009.[52] Alaska is the only State without significant ethanol blending. According to HART, only 10% of Alaska's gasoline is currently comprised of E10.

[50] 75 FR 14670 (March 26, 2010).

[51] Refer to EIA Monthly Energy Review September 2010 (Tables 10.3 and 3.7c, respectively).

[52] 1999–2004 state E10 marketshares based on FHWA ethanol and EIA total motor gasoline sales. 2005 ethanol usage based on EIA's National Emission Inventory Estimates. 2007–2009 based on HART estimates.

Figure VI.A-2

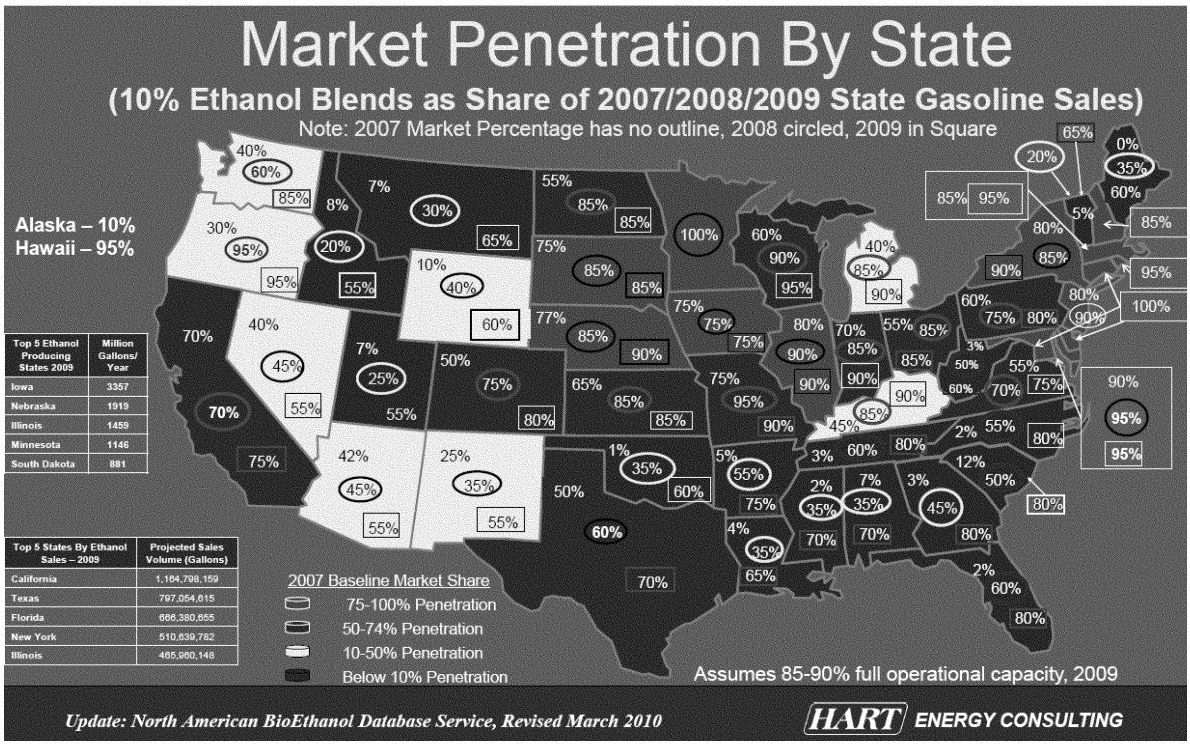
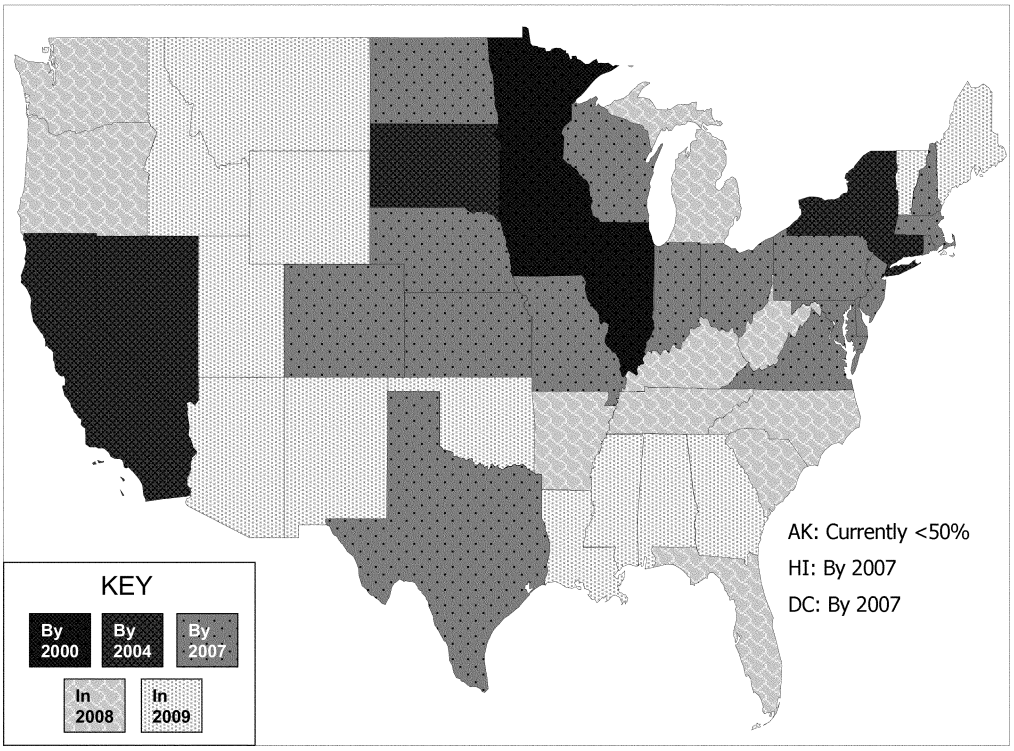


Figure VI.A-3

States Reaching 50% E10 Saturation by Year



B. Chemical and Physical Differences Between Ethanol and Gasoline

Understanding the chemical and physical differences between gasoline and ethanol is helpful in determining how increased ethanol concentrations in gasoline may impact vehicle and engine technologies and whether emission differences may occur. Throughout most of the 20th century, engines and vehicles were designed to run on gasoline. Engines can and have been designed for the use of ethanol, and in the case of FFVs, have been designed to operate effectively on both.[53] Over the last couple of decades, manufacturers have also taken varying steps to redesign their gasoline engines to be more compatible with blends of gasoline and ethanol up to 10 vol%.

Gasoline is a complex mixture of several hundred hydrocarbon molecules (organic compounds containing carbon and hydrogen) ranging in carbon number from four to twelve that are produced from various refinery streams. In contrast, fuel ethanol contains only one kind of molecule with two carbon atoms. Alcohols such as ethanol are derived from hydrocarbons by replacing the hydrogen atoms in their parent hydrocarbon (ethane is the parent of ethanol) with one or more hydroxyl groups containing oxygen and hydrogen.

Gasoline quality specifications are provided by ASTM D4814,[54] while ethanol quality specifications for blending in gasoline are provided by ASTM D4806.[55] Several properties of ethanol, as compared to typical gasoline and toluene, are listed below in Table VI.B–1. Since toluene is a common hydrocarbon used as an octane enhancer in gasoline, it is included below for comparison purposes.[56] Ethanol has been used successfully in gasoline for several decades as a volumetric fuel extender due to its beneficial Research Octane Number and Motor Octane Number blending values.

TABLE VI.B–1—PROPERTIES OF ETHANOL, GASOLINE AND TOLUENE [57] [58] [59]

Property	Gasoline (typical properties)	Toluene	Ethanol
Chemical Formula	Mixed C_4 to C_{12} Hydrocarbons	C_7H_8	CH_3CH_2OH.
Molecular Weight	95–115	92	46.
Oxygen Weight Percent		0	34.7.
Boiling Point °F	85–437	231	173.
Specific Gravity 60 °F/60 °F	0.72–0.78	0.87	0.79.
Research Octane Number	91–100	111	111.
Motor Octane Number	82–92	95	92.
(R + M)/2	87–92	103	102.
Net Heat of Combustion BTU/Gal [60]	117,000	126,000	76,000.
Latent Heat of Vaporization BTU/Gal [61]	800	1130	2600.
Solubility in Water, gram/100g H_2O	Trace	Trace	Infinite.
Stoichiometric A/F Ratio, Mass Air/Mass Fuel	14.6	13.5	9.0.
Vapor Flammability Limits Percent by Volume	0.6–8		3.5–15.
Vapor Pressure @ 100 °F psi	9–13		2.5.

Because gasoline is composed of different molecules of different lengths, it has a boiling range as well as a distillation curve. On the other hand, because ethanol is composed of a single type of molecule, it has a single boiling point and lacks the characteristic distillation curve of gasoline. Functional groups such as ethanol's hydroxyl group generally determine how a molecule will behave.

The question with the use of E15 is whether or not the vehicles, engines, equipment, and products that are designed for the properties of gasoline and/or E10 are also designed for the properties of E15. Some property differences between E10 and E15 may be dealt with in fuel blending such that the base gasoline can be adjusted in advance to accommodate the ethanol. This adjustment will ensure that the resulting blend meets a target specification for properties such as volatility and octane rating. On the other hand, some property differences between E10 and E15 are inherent to the ethanol fraction and cannot be accounted for by blending. For example, the impact of E15 versus E10 on engine combustion is a potential concern. How a vehicle or engine adapts to combust fuels with different ethanol concentrations depends on the vehicle hardware and software control strategies. Vehicles and engines operating on E15 may have hotter exhaust temperatures than the same vehicles and engines running on E10. In addition, material compatibility is time, temperature, and concentration dependent. Some material effects with E15 are possible that may not have been experienced with E10 in the past.

The following sections describe in greater detail the chemical and physical differences of gasoline and ethanol, particularly focusing on the effects of these differences when ethanol is blended with gasoline. This discussion lays the foundation for vehicle and engine specific discussion in sections VI.C.–VI.I.

1. Impact on the A/F Ratio—Combustion Enleanment

When gasoline is combusted in an engine, the stoichiometric A/F ratio (*i.e.,* the ideal ratio for complete combustion of the fuel and air into carbon dioxide and water vapor) is approximately 14.7 times the mass of air to fuel (14.7:1). For gasoline, any mixture less than 14.7:1 is

[53] In the U.S., the most common FFVs are also known as "E85" vehicles. They are designed to run on gasoline or a blend of up to 85 vol% ethanol (E85) and are equipped with modified components designed specifically to be compatible with ethanol's chemical properties.

[54] ASTM D4814, Standard Specification for Automotive Spark Ignition Fuel.

[55] ASTM D4806, Standard Specification for Denatured Fuel Ethanol for Blending with Gasoline for Use in Automotive Spark Ignition Fuel.

[56] SAE J1297, revised July, 2007, Surface Vehicle Information Report, Alternative Fuels.

[57] SAE J1297, revised July, 2007, Surface Vehicle Information Report, Alternative Fuels. Note: The values in Table 1 should be considered for relative comparisons only.

[58] SAE 861178, "The Properties and Performance of Modern Automotive Fuels," P. Dorn, A.M. Mourao, and S. Herbstman, Texaco Research Center, Beacon, N.Y.

[59] SAE 912413 "An Overview of the Technical Implications of Methanol and Ethanol as Highway Motor Vehicle Fuels," Frank Black, U.S. Environmental Protection Agency, Research Triangle Park, N.C.

[60] BTU/Gal = 279 J/L

[61] BTU/Gal = 279 J/L

considered to be a rich mixture (excess fuel), and any mixture more than 14.7:1 is a lean mixture (excess air/oxygen) given ideal test fuel and complete combustion. The addition of oxygenates such as ethanol (with its hydroxyl group) to gasoline alters the stoichiometric A/F ratio and therefore affects combustion. Engines/vehicles equipped with feedback controls can adjust the A/F ratio to stoichiometric conditions—around 14.0:1 for E10 and 13.8:1 for E15 (the ratio is lower as ethanol contains oxygen so less air is needed). However, for gasoline engines that do not have the ability to react to the desired stoichiometric A/F ratio for a different fuel (*e.g.,* gasoline-ethanol blends), combustion is enleaned. E10 would result in approximately 4% enleanment when compared with gasoline, E15 would result in approximately 6% enleanment. This means E10 and E15 have 4% and 6% more oxygen, respectively, than the stoichiometric A/F ratio.

Fuel metering components are sized to deliver an A/F mixture that optimizes emission performance, power output, fuel economy, and durability. If an engine is allowed to operate at a mixture that is leaner than it is designed for (too much oxygen for a given amount of fuel), it may run at a somewhat higher combustion temperature. This in turn can lead to changes in exhaust temperatures which may affect catalyst durability, and, especially in the case of nonroad products, engine durability, causing an increase in emissions. In addition, combustion instability from lean mixtures, which can cause misfire, can then lead to accelerated catalyst performance degradation or damage.

2. Polarity and Affinity for Water

Water is one of the most polar molecules (an uneven distribution of charge with the hydrogen atoms being positively charged and the oxygen atom negatively charged) while ethanol is only slightly polar and a hydrophilic (meaning water loving) molecule because of its hydroxyl group. Ethanol dissolves in water when the two are mixed together. Unlike ethanol, gasoline is considered to be a non-polar and hydrophobic hydrocarbon molecule which means that it does not attract water in the same way as ethanol does. As a result, gasoline and water are only very slightly soluble. If enough water is added to straight gasoline, two layers will form, known as phase separation: a water layer and a gasoline layer.

Ethanol is soluble in gasoline though to a lesser extent than it is in water. If a gasoline-ethanol blend is saturated with water, a reduction in ambient temperature may cause the ethanol and gasoline to separate into two layers. However, the presence of ethanol in gasoline will allow more water to be absorbed by the gasoline-ethanol blend before phase separation occurs. Some level of water carried through the fuel distribution system is generally acceptable and likely unavoidable given fuel exposure to moisture and humidity in normal dispensing and storage, either at the fuel station or on-board. However, excessive water in the fuel can lead to phase separation that can in turn cause stalling or permanent damage to most internal combustion engines.

3. Material Compatibility

The hydroxyl group of ethanol also reacts with natural rubber materials. Certain elastomers exposed to alcohols may swell or soften and lose strength.[62] Some plastics and fiberglass can become brittle leading to cracks and leaks.[63] Table VI.B.2.–1 shows the effects of gasoline and ethanol on some of the many elastomers that have been developed.[64] As noted from this table, polyfluorocarbons have been shown to be compatible with ethanol and ethanol blends. As discussed below in VI.C.2., the physical interaction of ethanol with certain elastomers also leads to increased permeation of ethanol and hydrocarbons through the walls of components made from such materials.

TABLE VI.B.2–1—EFFECTS OF GASOLINE AND ETHANOL ON ELASTOMERS

Elastomer	Volume swell (%) after 72 hour immersion in:		
	Gasoline	Ethanol	E10
Fluorocarbon (FKM)	0	2	3
Polyester urethane	11	19	37
Fluorosilicone (FMQ)	14	6	18
Butadiene-acrylonitrile (NBR)	43	8	51
Polyacrylate (ACM)	44	101	136
Chlorosulfonated polyethylene (CSM)	49	1	56
Ethylene-propylenediene terpolymer (ePDM)	137	13	124
Natural Rubber (NR)	169	2	176

Adapted from SAE 912413 "An Overview of the Technical Implications of Methanol and Ethanol as Highway Motor Vehicle Fuels," Frank Black, U.S. Environmental Protection Agency, Research Triangle Park, N.C.

4. Corrosion

Ethanol can also contribute to corrosion due to galvanic coupling or the absorption of water. Alcohols are better electrical conductors compared to gasoline so gasoline-ethanol blends could promote galvanic corrosion and galvanic-couple effects between electrochemically dissimilar alloys in the fuel system.[65, 66] The National Ethanol Vehicle Coalition and the Petroleum Equipment Institute have demonstrated that aluminum is sensitive to corrosion from ethanol. In addition, water in gasoline-ethanol blends can cause corrosion of metallic materials (such as brass, cast iron, copper, and various types of steel) as the

[62] SAE 912413 "An Overview of the Technical Implications of Methanol and Ethanol as Highway Motor Vehicle Fuels," Frank Black, U.S. Environmental Protection Agency, Research Triangle Park, N.C.

[63] SAE 912413 "An Overview of the Technical Implications of Methanol and Ethanol as Highway Motor Vehicle Fuels," Frank Black, U.S. Environmental Protection Agency, Research Triangle Park, N.C.

[64] Discussion of additional studies evaluating the impacts of gasoline-ethanol blends on materials used in vehicles and nonroad engines, vehicles, and equipment can be found in the subsections that follow.

[65] SAE 750124, "Racing Experiences with Methanol and Ethanol-Based Motor-Fuel Blends," T. Powell, Automotive Engineering Congress and Exposition, Detroit, Michigan, February 24–28, 1975.

[66] SAE 912413 "An Overview of the Technical Implications of Methanol and Ethanol as Highway Motor Vehicle Fuels," Frank Black, U.S. Environmental Protection Agency, Research Triangle Park, N.C.

water/ethanol layer becomes acidic if phase separation occurs.[67] The presence of water in the fuel distribution system also provides a suitable habitat for the growth of microbes which excrete acids that in turn are also detrimental to metallic fuel storage systems.[68] Contaminants in water may also impact additives used in finished fuel that are designed to maintain the integrity of the finished fuel.[69, 70, 71] Because of these corrosion concerns, actions are usually taken to accommodate ethanol in ethanol production, storage, and distribution systems, as well as in vehicles and engines. Such actions include the careful selection of materials and/or the use of appropriate ethanol compatible coatings on susceptible metal parts that come into contact with the ethanol fuel, as well as the use of corrosion and biocide additives.

5. Solvency

Ethanol can also act as a solvent for various materials. As such, ethanol has historically been known to remove or dissolve components built up in the fuel storage, handling and delivery systems (*e.g.* fuel tank, fuel lines, injectors, *etc.*). Once these components are loosened or partially dissolved, they are transported through the fuel system, and if excessive, may cause fuel filter, injector plugging or other component problems, all of which can lead to poor operability and degraded emission performance. Gasoline-ethanol blends may also pick up contaminants from storage tanks and delivery trucks. The amount of build-up is related to a combination of fuel composition properties and fuel usage patterns (*i.e.,* regular fuel usage versus infrequent, *etc.*). Non-automotive equipment may experience fuel filter plugging related more to extended storage periods where gasoline can deteriorate and lead to more deposits requiring a plugged fuel filter replacement.

6. Volatility

Fuel volatility is a measure of a fuel's vapor pressure or its tendency to vaporize. When ethanol is blended into gasoline, the hydrogen bonding between the ethanol molecules is weakened significantly and the alcohol "depolarizes." This results in higher Reid Vapor Pressures (RVP) for gasoline containing ethanol. Ethanol's effects on RVP have been well documented,[72, 73, 74] where low level ethanol blends, in general, will increase gasoline RVP by up to one pound per square inch with the maximum effect occurring at approximately 3 vol% ethanol concentration. The RVP of the base fuel will also influence just how much increase will occur by the addition of ethanol.[75] Increases in RVP result in increased vapor generation and increased evaporative emissions.

Additionally, while ethanol at certain levels may raise the general volatility of the gasoline-ethanol blend, because of ethanol's single boiling point and high latent heat of vaporization, the ethanol fraction may cause combustion difficulties and increased emissions during the start of some spark-ignition engines when the engines are cold, particularly at colder start temperatures. Further, once the engine is hot, the single boiling point can also cause difficulty in operating and starting a hot engine as observed in older motor vehicles when ethanol first became available. The ethanol would reach its boiling point in the fuel system and result in what is known as "vapor lock."

C. Model Year 2000 and Older Light-Duty Motor Vehicles

Ethanol impacts motor vehicles in three primary ways. First, as discussed in Section VI.B.1 above, ethanol enleans the A/F ratio which leads to increased exhaust gas temperatures and therefore potentially incremental deterioration of emission control hardware and performance over time. Second, over time, enleanment caused by ethanol can ultimately lead to catalyst failure. Third, ethanol can cause material compatibility issues which may lead to other component failure. Ultimately, all of these impacts may lead to exhaust and/or evaporative emission increases.

1. Enleanment

MY2000 and older light-duty motor vehicles have much less sophisticated emissions control systems compared to today's motor vehicles and, as described below, may experience conditions that lead to both immediate emission increases and increases over time if operated on E15. Vehicles produced prior to the mid-1980s were equipped primarily with carbureted engines. The A/F ratio of the carburetor is preset at the factory based on the expected operating conditions of the engine such as ambient temperature, atmospheric pressure, speed, and load. As a result, carburetors have "open loop" fuel control which means that the air and fuel are provided at a specified, predetermined ratio that is not automatically adjusted during motor vehicle operation. As fuel composition can vary, an engine with a carburetor and open loop fuel control would never know whether it achieved the desired A/F ratio. Since the motor vehicles at this time operated "open loop" all of the time with no ability to react for changes in the A/F ratio, the addition of ethanol to the fuel tended to make the A/F ratio leaner—closer to stoichiometry, which had the immediate effect of reducing HC and CO emissions, but increasing NO_X emissions. However, some of these older open loop systems already operate at the lean edge of combustion on current commercial fuels so an increase in ethanol may cause them to begin to misfire resulting in HC and CO increases.

As a result of the Clean Air Act, EPA established standards and measurement procedures for exhaust, evaporative, and refueling emissions of criteria pollutants. From 1975 into the 1980s, motor vehicles became equipped with catalytic converters, first with catalysts capable of oxidizing HC and CO, and then, in response to EPA's "Tier 0" standards, with three-way catalysts that also reduced NO_X. Motor vehicles produced in the 1980s and even more so in the 1990s as a result of more stringent California and Federal (*e.g.,* "Tier 1") standards evolved to incorporate more sophisticated and durable emission control systems. These systems generally included an onboard computer, oxygen sensor, and electronic fuel injection with more precise closed-loop fuel compensation and therefore A/F ratio control during more of the engine's operating range. However, even

[67] Nakaguichi, G.M., "Ethanol Fuel Modifications for Highway Vehicle Use-Final Report," U.S. DOE Contract EY–76–C–04–3683, NTIS document ALO–3683–T1, Washington, DC July, 1989.

[68] Microbiologically Influenced Corrosion of Galvanic Steel, Frederick J. Passman, PhD, Biodeterioration Control Associates, Princeton, NJ, USA., ASTM Workshop on Fuel Corrosivity, July, 2010.

[69] Behavior of Corrosion Inhibitor Acids In Fuel/Water Blends, Andrew McKnight, PhD, Innospec, Newark, DE, USA, ASTM Workshop on Fuel Corrosivity, July 2010.

[70] Interaction of Contaminants with Pipeline Corrosion Inhibitors, Joseph Stark, PhD, Baker Hughes, Sugarland, TX, USA, ASTM Workshop on Fuel Corrosivity, July 2010.

[71] Diesel Soap—Formation and Related Problems, Richard Chapman, BP Global Fuel Technology, Naperville, IL, USA, ASTM Workshop on Fuel Corrosivity, July 2010.

[72] J.L. Keller, "Methanol and Ethanol Fuels for Modern Cars, 44th Refinery Mid-year Meeting/Session on Fossil Fuels in 1980's, Reprint No. 08–79, May 15, 1979.

[73] F.W. Cox, Physical Properties of Gasoline/Alcohol Automotive Fuels, Presented at the Alcohol Fuel Technology Conference, May 28–31, 1979.

[74] SAE 912413 "An Overview of the Technical Implications of Methanol and Ethanol as Highway Motor Vehicle Fuels," Frank Black, U.S. Environmental Protection Agency, Research Triangle Park, N.C.

[75] SAE 861178, "The Properties and Performance of Modern Automotive Fuels," P. Dorn, A.M. Mourao, and S. Herbstman, Texaco Research Center, Beacon, N.Y.

with the use of closed loop systems through the late 1990s, the emission control system and controls remained fairly simple with a limited range of authority and were primarily designed to adjust for component variability (*i.e.,* fuel pressure, injectors, *etc.*) and not for changes in the fuel composition. During this period, ethanol was only available in very limited areas of the US so the manufacturers' designs of the emission controls and the durability of emission control hardware generally did not account for the increased oxygen content of ethanol. As a result, this generation of vehicles certified to Tier 0 and early Tier 1 emission standards operated leaner on ethanol, causing immediate emission impacts (lower HC and CO emissions, higher NO_X emissions) and may have also deteriorated at different rates when exposed to ethanol. These designs continued to evolve during the early period of the Tier 1 emission standards as manufacturers and component suppliers gained experience with vehicles in-use. However, the largest improvements to emission controls and hardware durability came after 2000 with the introduction of several new emission standards and durability requirements forcing manufacturers to better account for the implications of in-use fuels on the evaporative and exhaust emission control systems.

While most motor vehicles are operating today on E10, motor vehicles operated on E15 will likely run even leaner than those operated on E10 depending on the motor vehicle technology and operating conditions. Enleaned combustion leads to an increase in the temperature of the exhaust gases. This increase in exhaust gas temperatures has the potential to raise the temperatures of various exhaust system components (*e.g.,* exhaust valves, exhaust manifolds, catalysts, and oxygen sensors) beyond their design limits. However, based on past experience, the most sensitive component is likely the catalyst, particularly in older motor vehicles with early catalyst technology. Catalyst durability is highly dependent on temperature, time, and fuel gas composition. Catalyst temperatures must be controlled and catalyst deterioration minimized during all motor vehicle operation modes for the catalyst to maintain high conversion efficiency over the motor vehicle's life. This is particularly important during high load operation of a motor vehicle where high exhaust gas temperatures are encountered and the risk for catalyst deterioration is highest. Catalysts that exceed temperature thresholds will deteriorate at rates higher than expected, compromising the motor vehicle's ability to meet the required emission standards over its full useful life. Extended catalyst exposure to higher exhaust temperatures can accelerate catalyst thermal deactivation mechanisms (*e.g.,* sintering of active precious metal sites, sintering of oxygen storage materials, and migration of active materials into inert support materials). While this damage can occur at a highly accelerated rate with a sudden change in temperature (*e.g.,* with a misfire allowing raw fuel to reach the catalyst), it is more likely to occur over time from elevated exhaust temperatures as may be experienced with frequent or even occasional exposure to E15. This deterioration may adversely affect a motor vehicle's ability to control emissions, particularly after significant mileage accumulation.

Some motor vehicles may be able to manage catalyst temperatures by compensating for the oxygen in the fuel under all operating conditions, including high loads. This is achieved by using a closed-loop fuel system that measures the A/F ratio and makes the appropriate corrections to maintain the A/F ratio in the very tight ban of operation around stoichiometry necessary for optimum catalyst performance and reductions in HC, CO, and NO_X emissions. The part of the closed-loop fuel system that is responsible for the correction to the A/F ratio is referred to as "fuel trim." The fuel trim adds or removes fuel to the engine to maintain the required A/F ratio. If the measured A/F ratio has insufficient oxygen, or is "rich" compared to what the engine needs, the fuel trim will instruct the fuel injectors to inject less fuel, making the A/F ratio "leaner." The opposite is true if the measured A/F ratio has too much oxygen and needs to inject more fuel for a "richer" A/F ratio. The fuel trim is generally comprised of two major parts, short term fuel trim and long term or adaptive learned fuel trim. Learned fuel trim, also known as adaptive fuel trim, can also be applied to open loop operation such as high load or wide open throttle to alleviate the catalyst temperature increases caused by operating on E15 fuel. However, while this strategy was more common in later model years closer to MY2000, it was not consistently employed by all manufacturers. Some manufacturer models may have less range of authority than others and some may require longer periods of time to adapt. Hence, control algorithms and calibrations used by some manufacturers may be more effective than others.

The fuel trim has a limited range of adjustment in which it can continue to update the A/F ratio and maintain the fuel system at or near stoichiometry. For MY2000 and older light-duty motor vehicles, the fuel trim range is generally more limited than the range for newer light-duty motor vehicles, and MY2000 and older motor vehicles may use their full range of fuel trim adjustment to account for normal component deterioration. Injectors, sensors and changes to fuel pressure may shift with time and aging to use all of the fuel trim's range of adjustment. The additional oxygenate in E15 may actually shift the A/F ratio more than the earlier introduction of E10 if the engine's A/F ratio feedback cannot compensate because it has reached its adjustment limit. In short, MY2000 and older motor vehicles are at risk of having insufficient thermal margins to accommodate ethanol blends up to E15 due to the limits of their fuel trim range.

Test data to confirm or refute concerns over the use of E15 in older vehicles is very limited in scope and content. The available data do not prove or disprove the concerns, although there are several studies that support the potential for long term durability issues consistent with engineering theory. Three studies—the CRC Screening Study, DOE Pilot Study, and the Orbital Study—discussed in section IV.A. highlight in particular the concern with MY2000 and older motor vehicles. The CRC Screening Study (E–87–1) was a test program developed to look at the effects of mid-level ethanol blends on U.S. vehicles.[76] This screening study was the first phase of a two-phase study evaluating the effects of mid-level ethanol blends on emission control systems. The purpose of this first phase of the study was to identify vehicles which used learned fuel trims to correct open loop air-fuel rations. Under the test program a fleet of 25 test vehicles was identified and acquired with six of those vehicles being MY2000 and older. The study collected vehicle speed, oxygen sensor air-fuel-ratio, and catalyst temperature data for four fuels (E0, E10, E15, and E20). The results of the three ethanol blended fuels compared to E0 showed that four of the six MY2000 and older vehicles tested failed to apply long-term fuel trim to open loop operation in order to compensate for increasing ethanol levels. And that these

[76] *Mid-level Ethanol Blends Catalyst Durability Study Screening* (CRC Report: E–87–1), June 2009 ("CRC Screening Study"). *http://www.crcao.com/reports/recentstudies2009/E–87–1/E–87–1%20Final%20Report%2007_06_2009.pdf*

same four vehicles exhibited increased catalyst temperatures when operated on E20 as compared to E0. While the subsequent DOE Catalyst Study concluded that this learned fuel trim was not important for MY2007 and newer motor vehicles because they are durable (and therefore can handle E15) as discussed in section IV.A, there was no such follow on program for MY2000 and older motor vehicles so the durability of these vehicles on E15 is unknown.

Another study suggests that many MY2000 and older motor vehicles may also have emission exceedances if operated on E15. In 2003, the Orbital Engine Company issued a report on the findings of vehicle testing it completed to assess the impact of E20 on the Australian passenger vehicle fleet. While the Australian vehicles in this study were not representative of U.S. vehicles of the same model years, they are similar to MY2000 and older U.S. motor vehicles with respect to technology and emission standards. The testing program covered vehicle performance and operability testing, vehicle durability testing, and component material compatibility testing, on nine different vehicle makes or models, five vehicles from MY2001 and four vehicles from MY1985 to MY1993. Testing results showed increases in exhaust gas temperature in five of the nine vehicles tested with three showing increases in catalyst temperature. Enleanment was found to occur in six of the nine vehicles tested, with three having closed loop control—the old vehicles without closed loop control all displayed enleanment. In general, the increase in exhaust gas temperature was found to follow those vehicles with enleanment. Furthermore, one vehicle in the study experienced catalyst degradation sufficient to make the tested vehicle no longer meet its applicable Australian emission standards.

EPA recently received a report by Ricardo [77] commissioned by the Renewable Fuels Association specifically discussing the potential impacts of E15 on MY1994–2000 light-duty motor vehicles. However, as discussed in the decision document, it sheds little new light on the potential emission impacts of E15 on MY2000 and older motor vehicles. While arguing that many MY1994–2000 motor vehicles may be designed to be compatible with E15, it did so only for "properly engineered" vehicles. Furthermore, it acknowledged potential emission increases in-use, but in the context of the waiver decision highlighted that they were likely within manufacturer compliance margins. Finally, it drew many of its conclusions only relative to E10, not to E0.

Hence, based on the limited data available and our engineering judgment, we conclude that MY2000 and older motor vehicles have the potential to experience conditions when operated on E15 which may ultimately lead to an increase in emissions.

2. Material Compatibility

Data and information exist in the literature regarding ethanol's impacts on motor vehicle material compatibility. Engine, fuel system, and emission control materials (metals, plastics, and elastomers) must maintain their integrity for motor vehicles to meet their exhaust and evaporative emissions standards. Material incompatibility can result from the chemical reaction or physical interaction between a fuel and material with which it comes into contact. This can lead to emissions compliance problems not only immediately upon using the new fuel or fuel additive, but especially over time. In most cases one would expect any materials incompatibility to show up in the emissions tests, but there may be impacts that do not show up due to the way the testing is performed or because the tests simply do not capture the effect. As a result, along with emissions testing, materials compatibility is a key factor in assessing the emissions durability of a fuel or fuel additive.

Based on our engineering assessment, it appears that manufacturers took varying steps at different points in time to transition the materials in their motor vehicle designs to be E10 compatible. Many in the mid-to-late 1980s took steps for E10 compatibility at least for the more immediate effects of ethanol (*e.g.,* the dissolving of certain elastomers). Large parts suppliers began testing materials on gasoline-ethanol blends in the mid-to-late 1980s and early 1990s, but practices varied with manufacturer. At the same time, certain areas have now had E10 for a number of years and therefore motor vehicles in these areas have experienced a much higher frequency of ethanol exposure. This has led many to argue that ethanol is compatible for all motor vehicles in the in-use fleet and therefore E15 should be too. However, since the effects would be long term, it is difficult to assess whether these motor vehicles experienced any higher rates of deterioration or component failure on E10. Furthermore, material compatibility with ethanol is time, condition (*e.g.,* temperature, pressure), and concentration dependent, such that problems may occur with E15 that did not show up with E10.

Moving from E10 to E15 reflects a 50% increase in the volume of ethanol present in gasoline. Therefore, since the impacts of ethanol on materials are a function of concentration, E15 has the potential to have more significant impacts than E10 if used in motor vehicles not equipped for it. For MY2000 and older motor vehicles, E15 use may result in degradation of metallic and non-metallic components in the fuel and evaporative emissions control systems that can lead to highly elevated hydrocarbon emissions from both vapor and liquid leaks. Potential problems such as fuel pump corrosion or fuel hose swelling would likely be worse with E15 than historically with E10, especially if motor vehicles will be operating exclusively on it. Since ethanol historically comprised a much smaller portion of the fuel supply (*see* section VI.A.), in-use experience with E10 was often discontinuous or temporary, while material effects are time and exposure dependent. Thus, problems may surface with E15 that have not surfaced historically in-use. Additionally, leak detection diagnostics did not appear until MY1996 and enhanced evaporative test procedures were not fully implemented until the late 1990s.

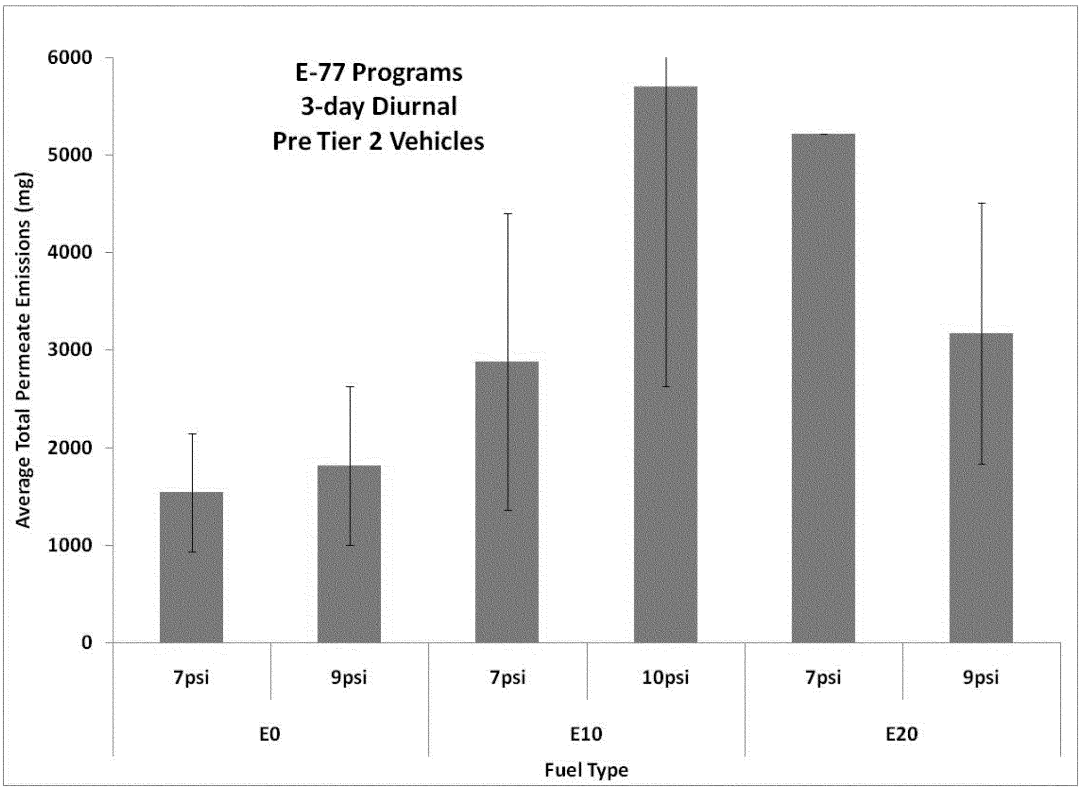
In addition to potential vapor or liquid leaks, ethanol is also known to facilitate permeation through the materials in the fuel system. Studies have shown this to be a significant source of increased emissions with gasoline-ethanol blends, especially on older motor vehicles. Following additional testing requirements as part of the Tier 2 motor vehicle emission standards beginning in 2004, materials in newer motor vehicles have been able to mitigate the permeation effects of ethanol in the fuel, as discussed in the waiver decision document. However, as shown in the Figure VI.C.2–1 below, permeation emissions from older model year vehicles may be very high with ethanol blends.[78]

[77] Ricardo Inc., *Technical Assessment of the Feasibility of introducing E15 Blended Fuel in U.S. Vehicle Fleet, 1994 to 2000 Model Years,* 10 September, 2010. EPA Docket # EPA–HQ–OAR–2010–0448.

[78] Diurnal testing refers to a process for measuring evaporative emissions where a vehicle is placed in a sealed enclosure and the temperature varied over multiple cycles to simulate ambient day and night conditions in summertime. *Enhanced Evaporative Emission Vehicles* (CRC Report: E–77–2), March 2010, and *Evaporative Emissions from In-Use Vehicles: Test Fleet Expansion* (CRC Report: E–77–2b), June 2010.

Figure VI.C.2-1

3-Day Diurnal Permeation Emissions by Ethanol Content and Pressure



As part of its waiver application, Growth Energy submitted a series of studies completed by the State of Minnesota and the Renewable Fuels Association (RFA) that investigated materials compatibility of motor vehicle engines and engine components using three test fuels: E0, E10, and E20 ("Minnesota Compatibility Study").[79] The Minnesota Compatibility Study looked at 19 metals ("Metals Study"),[80] eight elastomers (rubber materials) ("Elastomers Study"),[81] eight plastics ("Plastics Study"),[82] and 24 common fuel sending unit and fuel pump combinations ("Fuel Pumps Study" and "Fuel Pump Endurance Study"),[83, 84] currently used in automotive, marine, small engine, and fuel system dispensing equipment for physical or chemical effects due to ethanol.[85]

Results from the Minnesota study were mixed depending on if the comparison was being made between E20 and E10 or E20 and E0. Some materials were compatible with the ethanol blends while some displayed larger property changes with the ethanol blends. Because of the immense variety of materials available and the overlap in use of the different materials over time, the study could not test all materials in the fleet, nor did it directly assign the materials tested to a vehicle generation or model year. Instead, the study generalized that because ethanol was available in some parts of the U.S., these materials were likely E10 compatible. However, these materials were used prior to the widespread use of ethanol and therefore conceivably prior to many manufacturer's requirement for prolonged exposure to ethanol and specifically not for gasoline-ethanol blends above 10%. It is difficult to quantify the overall impact of changes in any material due to ethanol at E15 or E20 levels and what those changes would mean to the older motor vehicle fleet, only that some portion of the fleet may experience changes that could result in accelerated component failures beyond what would be expected on E0 or E10. In addition, it is important to note that the Minnesota Compatibility Study assessed component parts using laboratory bench tests rather than durability studies of whole motor vehicle fuel systems simulating "real world" motor vehicle use.

[79] "The Feasibility of 20 Percent Ethanol Blends by Volume as a Motor Fuel;" State of Minnesota and Renewable Fuels Association.

[80] "The Effects of E20 on Metals Used in Automotive Fuel System Components;" Bruce Jones, Gary Mead, Paul Steevens, and Mike Timanus; Minnesota Center for Automotive Research at Minnesota State University, Mankato; February 22, 2008.

[81] "The Effects of E20 on Elastomers Used in Automotive Fuel System Components;" Bruce Jones, Gary Mead, Paul Steevens, and Chris Connors; Minnesota Center for Automotive Research at Minnesota State University, Mankato; February 22, 2008.

[82] "The Effects of E20 on Plastic Automotive System Components;" Bruce Jones, Gary Mead, and Paul Steevens; Minnesota Center for Automotive Research at Minnesota State University, Mankato; February 21, 2008.

[83] "The Effects of E20 on Automotive Fuel Pumps and Sending Units;" Nathan Hanson, Thomas Devens, Colin Rohde, Adam Larson, Gary Mead, Paul Steevens, and Bruce Jones; Minnesota State University, Mankato; February 21, 2008.

[84] "An Examination of Fuel Pumps and Sending Units During a 4000 Hour Endurance Test in E20;" Gary Mead, Bruce Jones, Paul Steevens, Nathan Hanson, and Joe Harrenstein, Minnesota Center for Automotive Research at Minnesota State University, Mankota; March 25, 2009.

[85] Effects assessed in the studies include: Pitting, surface texture change, discoloration, or loss of mass for metals; appearance, volume, weight, tensile strength, elongation, and hardness for elastomers; mass loss or gain, volume loss or gain, tensile elongation, impact resistance, and tensile strength for plastics; and corrosion and longevity as measured by flow and pressure tests for pumps and sending units.

In addition to providing comments on the Minnesota Compatibility Study as discussed in the waiver decision document, the Alliance commented that engines need to be hardened for resistance to ethanol. Use of gasoline-ethanol blends in unhardened engines can result in bore, ring, piston and valve seat wear. Deterioration of these components can lead to compression and power loss, misfire and catalyst damage.

Based on our review of the literature and industry comments on the E15 waiver request, we believe that MY2000 and older light-duty motor vehicles have the potential for increased material degradation with E15 use. In addition, some MY2000 and older light-duty motor vehicles may have been designed for only limited exposure to E10 while the oldest vehicles on the road pre-date ethanol blends in the marketplace all together. This potential for material degradation may make the emissions control and fuel systems more susceptible to corrosion and chemical reactions from E15 when compared to the E0 certification fuels for these motor vehicles and may ultimately increase vehicle emissions, especially for MY2000 and older motor vehicles.

3. Motor Vehicle Population and Anticipated Emissions Impact

There is a long history of test programs that have been carried out on light-duty motor vehicles and trucks that have quantified the immediate emission impacts of blending ethanol up to 10 vol% into gasoline. These test programs, dating back to the earliest days of gasoline-ethanol blends, have found that the oxygen content of ethanol enleans the A/F ratio in motor vehicles during open-loop operation, causing a decrease in HC and CO emissions, but also results in a corresponding increase in NO_X emissions. These studies have been used to develop emission models, such as the EPA Predictive Models [86] incorporated into the Agency's MOVES model,[87] that have been thoroughly peer reviewed. The result is that for a typical E10 blend of gasoline, exhaust NMHC emissions have been found to decrease by about 5%, and NO_X emissions to increase by about 6%, relative to E0.[88] While the magnitude of impact may vary by a few percent depending on the motor vehicle technology and how other fuel properties change when ethanol is blended into gasoline, the relative magnitude and direction of the impacts remains consistent for typical fuels.[89] The limited available data on E15 suggests that this trend continues, and is slightly more pronounced due to the higher ethanol content. However, these emission impacts are not the focus of this proposal as their magnitude tends to be within vehicle compliance margins (the difference between a vehicle's actual emission certification level and the standard). Rather, for this proposal, we have focused on long-term durability issues associated with E15, as discussed in more detail below. The issue of immediate emission increases for E15 is more properly addressed as part of the anti-backsliding study and rulemaking under section 211(v) of the Act.

Sufficient data do not exist to predict specific changes in emission rates for the various motor vehicle technologies due to long-term use of E15 blends. However, with respect to exhaust emissions, if a catalyst were to be damaged to the point of having no significant remaining functionality, we could expect NO_X emissions similar in magnitude to those in untreated engine-out exhaust (*i.e.,* before treatment by the catalyst). If, in this situation, the fuel control system continued to operate in closed-loop mode, NO_X emission levels in the range of 2–4 g/mi would be expected, or approximately ten times the typical emissions rate for a properly operating 1990s-era motor vehicle and about 60 times that of new cars today.[90] Similarly, loss of catalyst function could also cause significant HC emission increases, where levels on the order of 2 g/mi could be expected.[91] This would be equivalent to combined HC emissions of 40 new cars today. While this kind of complete failure would likely be limited in nature, misfueled motor vehicles may experience a reduction in catalyst efficiency earlier than intended, resulting in emissions levels increased above current levels and up to the uncontrolled engine-out levels presented above.

Another area of concern related to exhaust emissions is fuel pump malfunction occurring due to material incompatibility of higher ethanol content with parts such as plastic pump rotors, shaft seals or elastomeric tubing, and increased corrosion of metallic or electrical components. As described in Section VI.B, ethanol increases the electrical conductivity of fuel, increasing the likelihood that galvanic corrosion of metal parts would occur. Before outright failure, malfunctioning fuel pumps often provide inconsistent fuel pressure for some period of time, resulting in long crank (starting) times, misfires, and other erratic engine behavior. Should such conditions occur, they may cause increases in exhaust emissions and possible deterioration of exhaust catalysts.

In addition to the potential for exhaust emissions increases, evaporative emissions are also expected to increase, not only immediately due to increased permeation (as discussed above), but also due to long-term E15 use that may cause from increased corrosion of metallic fuel system components and accelerated deterioration of elastomeric hoses and seals. Corrosion may result in vapor or liquid leaks, depending on where in the fuel system the corrosion is located. Many types of elastomers used in o-rings and fuel lines swell or crack when exposed to ethanol, resulting in increased permeation of vapor or liquid leaks. Elastomeric seals on older motor vehicles may already be brittle and weakened from age. Exposure to E15 may produce accelerated failures of these elastomeric components.

Though it is difficult to quantify the impacts of these types of evaporative component failures, a recent evaporative emissions study produced some relevant data. During the program, a motor vehicle with a fuel system leak due to an o-ring failure produced between 23–26 times more gasoline vapor during a pair of diurnal tests than

[86] A detailed description of the development of the EPA Predictive Models is available in a Technical Support Document: "Analysis of California's Request for Waiver of the Reformulated Gasoline Oxygen Content Requirement for California Covered Areas", EPA420–R–01–016, June 2001.

[87] The Agency's MOVES model has undergone extensive peer review and testing, and incorporates the EPA Predictive Models.

[88] These effects are based the EPA Predictive Models and are generally consistent with conclusions of CRC E–74b report (*e.g.,* Figure ES–2). Fuels properties evaluated were based on market averages and were as follows: E0 had aromatics content of 29.5 vol%, a T50 of 215 °F, a T90 of 325 °F, and an RVP of 8.9 psi and E10 had aromatics content of 24.9 vol%, a T50 of 202 °F, T90 of 325 °F, and an RVP of 8.9 psi. Other parameters not mentioned here were assumed to be held constant between the blends.

[89] Results based on data mostly from vehicle models that predated the Tier 2 emission standards, so several recent test programs have been focused on Tier 2 vehicles that will soon make up the majority of the in-use fleet.

[90] *See* "Effects of Gasoline Composition on Vehicle Engine-Out and Tailpipe Hydrocarbon Emissions—The Auto/Oil Air Quality Improvement Research Program", SAE Paper No. 920329. *See also* "Engine-out and Tail-Pipe Emission Reduction Technologies of V–6 LEVs", SAE Paper No. 980674. A vehicle not operating in closed-loop mode may emit more or less NO_X depending on combustion behavior. During the 1990s, Federal emission standards for NO_X dropped from 1 g/mi to 0.4 g/mi.

[91] *See* "Effects of Gasoline Composition on Vehicle Engine-Out and Tailpipe Hydrocarbon Emissions—The Auto/Oil Air Quality Improvement Research Program", SAE Paper No. 920329. *See also* "Engine-out and Tail-Pipe Emission Reduction Technologies of V–6 LEVs", SAE Paper No. 980674.

a properly-functioning new motor vehicle meeting current standards.[92] The study also placed very small simulated leaks (essentially pin holes) in gas caps of three motor vehicles, representative of what could occur as a result of tiny corrosion sites in the vapor space of the fuel tank. Diurnal tests were performed to compare the emissions with and without the leaks. The MY1996 motor vehicle produced 54 times more evaporative emissions with the simulated leak, while the MY2001 and 2004 motor vehicles produced two and three times more vapors, respectively. The study authors point out that the two newer motor vehicles had tank vent systems designed to meet onboard refueling vapor recovery (ORVR) requirements, suggesting this may mitigate the effect of vapor space leaks.[93]

Thus, we may conclude that even small vapor space leaks occurring in older motor vehicles (before ORVR was required) have the potential to result in large increases in HC emissions.

For more discussion on potential evaporative issues, refer to the Waiver Decision document Section IV.A.3 that was also released today.

Table V1.C.3–1 below shows the projected population of motor vehicles—passenger cars and light-duty trucks in the fleet—by model year for 2011. According to this information, of the total estimated 225 million cars and trucks that operate on gasoline in the fleet today,[94] nearly 73 million or one-third are MY2000 and older light-duty motor vehicles, and it is these motor vehicles for which the effects of E15 are uncertain but indicate the potential for anywhere from small to significant emission increases from the deterioration of the emissions control system over time. As discussed above, if motor vehicles experience engine or emission component failure, the potential exists for very elevated exhaust and/or evaporative system emissions rates. If only a fraction of the fleet were to experience problems with E15, that would still be a large number of motor vehicles with a potentially significant impact on in-use emissions.

TABLE VI.C.3–1—PROJECTED POPULATION OF CARS AND LIGHT TRUCKS BY MODEL YEAR IN 2011

Model year	Cars	Light trucks	Cars and trucks combined	Cumulative total
2000 and earlier	41,548,800	32,162,084	73,710,884	73,710,884
2001–2006	46,567,413	38,594,752	85,162,165	158,873,049
2007–2011	39,068,213	26,755,598	65,823,812	224,696,860
Total	127,184,425	97,512,435	224,696,860	

Source: EPA's vehicle certification data and Mobile Vehicle Emissions Simulator (MOVES) model.

D. Heavy-Duty Gasoline Engines and Vehicles

Given its limited market, heavy-duty gasoline engines and vehicles have not been the focus of test programs and efforts to assess the potential impacts of E15 on such engines. From a historical perspective, the introduction of heavy-duty gasoline engine and vehicle technology has lagged behind the implementation of similar technology for light-duty motor vehicles. Similarly, emission standards for this sector have lagged behind those of light-duty motor vehicles, such that current heavy-duty gasoline engine standards remain comparable from a technology standpoint to older light-duty motor vehicle standards. Consequently, we believe the discussion in Section VI.C. for MY2000 and older motor vehicles should also be applicable to the majority of the in-use fleet of heavy-duty gasoline engines and vehicles. Therefore, we are proposing to prohibit the use of E15 in heavy-duty gasoline engines and vehicles. We seek comment on this assessment.

E. Motorcycles

Motorcycles come in many different sizes, styles and applications. The biggest distinction between motorcycle types are that some are designed for operation on-road and others are designed for operation off-road. The motorcycles designed for operation on-road are referred to as highway motorcycles. Highway motorcycles can range from small scooters equipped with a 50 cubic centimeter (cc) single cylinder two-stroke engine to a large touring motorcycle equipped with a multi-cylinder four-stroke engine with an engine displacement exceeding 2,000 cc. Motorcycles designed for off-road operation are referred to as off-highway motorcycles and can differ significantly from highway motorcycles in design and appearance.

Motorcycles have been around for well over 100 years. The fuel system used to manage the A/F ratio for motorcycles has been the carburetor. In fact, the carburetor has been the fuel control system of choice for highway and off-highway motorcycles until the last decade. Starting in the late 1990s, some of the more expensive high performance highway motorcycles began to use electronic fuel injection (EFI) to manage the A/F ratio. While EFI is becoming more common today in many highway motorcycles, there are still many models that use carburetors. Off-highway motorcycles have only begun to use EFI in a very few expensive competition models. The vast majority of off-highway motorcycles continue to use carburetors.

All internal combustion engines need a system to cool the engine from the excessive heat generated as part of the combustion process. Without a cooling system, the engine would quickly overheat and fail. Motorcycles use two types of engine cooling systems: liquid-cooled and air-cooled. Liquid-cooled systems are very similar to the systems used by automobiles. A radiator stores a liquid coolant that is distributed throughout the engine which cools the engine. The heated coolant is returned to the radiator where it is cooled by air from the moving motorcycle or from an external fan. An air-cooled system is similar to that used for most nonroad engines and is less sophisticated than a

[92] Diurnal testing refers to a process for measuring evaporative emissions where a vehicle is placed in a sealed enclosure and the temperature varied over multiple cycles to simulate ambient day and night conditions in summertime. *See* Coordinating Research Council Report No. E–77–2 for detailed results (available at *http://www.crcao.org*).

[93] Onboard refueling vapor recovery systems were phased into production in light-duty motor vehicles over MY1998–2000, and provide a relatively short, large-diameter pathway for vapors to reach the carbon canister where they are stored for combustion during engine operation. *See* Coordinating Research Council Report No. E–77–2 for detailed results (available at *http://www.crcao.org*).

[94] There are approximately 250 million cars and trucks in the fleet today when diesels are included.

liquid-cooled system. An air-cooled system uses a series of external "fins" located on the cylinders and cylinder heads that help direct heat away from the cylinder and cylinder head. Since the engine in a motorcycle is exposed to the atmosphere and not contained in an engine compartment like an automobile, the engine is exposed to passing air as the machine is operated on the road or trail. The passing air is channeled through the fins and helps cool the cylinder and cylinder head, which helps cool the combustion chamber, reducing the overall engine temperature. Air-cooling is not nearly as effective at controlling engine temperature as liquid cooling. One of the strategies to help with engine cooling for engines that rely on air-cooling is to operate the engine at an A/F ratio that is rich of stoichiometry. The additional fuel helps reduce combustion temperature, keeping overall engine temperature lower. For this reason, any increase in the A/F ratio beyond that designed for at the time of manufacturing, such as the enleanment resulting from ethanol, raises potential concerns.

In 1978, EPA issued HC and CO emission standards for highway motorcycles. There were no standards for NO_X emissions. To meet these standards, the vast majority of motorcycle models used the approach of adjusting the A/F ratio rather than using any unique emission control technologies, such as catalytic converters, EFI, and air injection. For performance and durability purposes, most motorcycles operated with an A/F ratio that was considerably rich of stoichiometry. The strategy used to control HC and CO emissions was to lean the A/F ratio from these rich values traditionally used for maximum performance. As with light-duty motor vehicles, this strategy resulted in lower HC and CO emissions, but caused an increase in NO_X emissions. Since there were no NO_X emission standards, the increased NO_X emissions were allowed. This strategy also resulted in complaints about vehicle performance and driveability. As a result, a common practice was for motorcycle owners to change the A/F ratio on their own to a richer setting that improved the performance concerns, but also possibly resulted in an exceedance of the emissions standards. These emission standards were unchanged until 2006 when more stringent standards for HC and new standards for NO_X were introduced for MY2008.

Off-highway motorcycles were unregulated until 2006. Beginning with MY2006, off-highway motorcycles were required to meet emission standards for HC, CO, and NOx emissions. In general, the overall majority of motorcycles designed from 1978 through 2006 either used an A/F ratio leaner than desired for maximum performance and durability to comply with highway motorcycle emission standards or ran rich, in the case of off-highway motorcycles, to help cool the engine and protect it from overheating and failure. The practice of motorcycle owners adjusting the A/F ratio to a richer setting to improve performance and driveability was even more prevalent in the off-highway motorcycle sector, especially for competition motorcycles where performance is an important attribute.

As E10 fuel has become more prevalent in the marketplace, many owners of off-highway and older highway motorcycles have chosen to either operate their motorcycles on E0 fuel whenever it is available or have modified their A/F ratio to a richer setting. In fact, the internet is full of blogs of motorcycle owners discussing concerns with operation on E10 fuel and ways to avoid these concerns, including how to change the A/F ratio setting. It is a violation of the CAA to modify a certified motorcycle from its certified configuration. Changing the A/F ratio from the certified setting would be considered tampering, yet it is clear it is practiced in-use.

For highway motorcycles designed to already operate leaner to comply with emission standards, the use of E15 fuel would result in a further leaning of the A/F ratio. These motorcycles were designed with an optimized A/F ratio setting taking into consideration the delicate balance of emissions, performance, and engine protection. Since most of these motorcycles use carburetors, the A/F ratio is not easily adjusted to adapt to the increased amount of oxygen in the A/F mixture. The additional enleanment of the A/F ratio could cause an increase in combustion temperature and ultimately engine temperature, potentially resulting in an exceedance of the emission standards and engine failure. For off-highway motorcycles that have typically been designed to operate rich of stoichiometry for engine protection, the enleanment of the A/F ratio could cause an increase in engine temperature beyond what the engine was designed to accommodate and ultimately result in engine failure. As a result of the increased enleanment resulting from E15 fuel, more motorcycle owners may be tempted to adjust the A/F setting of their motorcycles to protect vehicles from potential damage resulting in possible exceedances of the emissions standards.

In either case, the use of E15 fuel could cause engine damage and emission increases for highway motorcycles built prior to 2008 and for all off-highway motorcycles, regardless of age. For highway motorcycles built after MY2008 there is the possibility that some models may be able to successfully accommodate the use E15 fuel. For MY2008 and beyond, there are a number of models that use EFI and catalytic converters. The systems are similar to automotive closed-loop catalyst systems. However, one of the advantages to modern Tier 2 light-duty emission control systems is that they use very sophisticated fuel trim learning systems that allow a very precise "learning and adapting" of changes to the A/F ratio mixture. While many of today's motorcycle models use closed-loop systems, they do not have the advanced fuel trim control of today's motor vehicles, meaning they would most likely not be able to accommodate the enleanment of the A/F ratio in the same manner as today's motor vehicles. Their closed-loop technology is more similar to that of MY2000 and older motor vehicles than to current motor vehicles.

In light of the above, while there is no actual E15 test data on motorcycles, EPA believes that any operation of highway or off-highway motorcycles on fuel containing E15 could result in engine damage and emission increases for highway and off-highway motorcycles. It also could have the unintentional result of encouraging motorcycle owners to violate the CAA by tampering with the vehicles A/F ratio setting to improve performance, driveability, and protect the engine from damage, while at the same time significantly increasing hydrocarbon and CO emissions. Therefore, we are proposing to prohibit the use of E15 in all motorcycles (highway and off-highway) but seek comment on our assessment.

F. Nonroad Engines, Vehicles, and Equipment (Nonroad Products)

1. Introduction

The nonroad product market is extremely diverse which makes it difficult to determine what the impacts of E15 use might be. However, similar to older motor vehicles, it appears that nonroad products may experience emissions increases related to enleanment and material compatibility issues if operated on E15. This is based in large part on the history of the design of nonroad products operating on E10 in relation to the age of those products in the field, and the implications of

extrapolating this in-use operating experience with E10 to E15.

The majority of nonroad products are still carbureted, or have very simplistic electronic fuel injection which cannot adjust the engine A/F ratio, and do not have any onboard diagnostics to monitor engine performance before components may fail. The experience of consumers with E10 in nonroad products in the 1980s pushed most manufacturers to take some steps to address enleanment and E10 material compatibility issues at that time, either with changes in engine design or warnings in consumer owner manuals (either to avoid ethanol blended fuels or blends higher than 10%). However, the design practices and recommendations varied across the industry due to the breadth of the nonroad market (as highlighted in Table VI.F.1–1) and the wide range of manufacturers, applications, and markets. The design practices also continued to evolve over time in part due to emission regulations.[95] While a review of current nonroad engine and equipment manufacturer Web sites indicates a general acceptance of E10 use with the new products being produced today, manufacturers continue to caution against any higher level ethanol use, and marine manufacturers still caution against E10 use.[96] In addition, nonroad product manufacturers are clearly still learning how to design for compatibility with E10 as evidenced by a recent large recall of snowblowers due to corroded carburetors.[97]

TABLE VI.F.1–1—2010 ESTIMATED POPULATION OF NONROAD ENGINES, EQUIPMENT AND VEHICLES

Nonroad category	Typical equipment/vehicles	Estimated 2010 in-use population (millions)
Small SI Engine	Handheld: Trimmers, chainsaws, blowers, hedge trimmers Nonhandheld: Lawnmowers, generators, riding tractors.	131.
Marine Outboard	Outboard engines to power fishing boats, pontoon boats	10.
Marine Sterndrive/Inboard	Speed boats, Ocean going fishing boats	2.
Marine Personal Watercraft	Jet skis, jet boats, *etc.*	1.3.
All Terrain Vehicles	Four wheelers	11.
Nonroad Motorcycles	Nonroad motorcycles	2.6.
Snowmobiles	Snowmobiles	2.4.
Large SI	Fork Lifts	0.24.
On-Highway Motorcycles	On-Highway Motorcycles	8 (2008 estimated population).

In addition, as shown in Table VI.F.1–2, consumers are still using a considerable amount of older nonroad products (*e.g.,* marine engines) that are not necessarily designed for E10 use. In recognition of this situation, States such as Minnesota, Missouri, Oregon, and Washington that have mandated the use of ethanol blends have also provided exceptions to the mandate for sale of ethanol free gasoline (E0) for a variety of nonroad products. In addition, Oregon has taken the additional step of publishing a list of retail stations distributing E0 to assist their nonroad consumers in locating it.[98]

TABLE VI.F.1–2—2010 ESTIMATED ACTIVE NONROAD PRODUCT POPULATION

Sales years	Nonroad SI, excluding marine SI (thousands)	Marine SI (thousands)
2007–2010	98,255	3,155
2003–2006	39,466	2,953
1999- 2002	7,245	2,484
1995–1998	1,253	1,828
1991–1994	475	1,215
1987–1990	208	656
1983–1986	72	348
1979–1982	28	177
1975–1978	18	100
1971–1974	11	50
1967–1970	6	23
1963–1966	3	10
Total	147,040	12,999

Source: UnEPA Nonroad8a model.

[95] The first exhaust emission regulations for nonroad products began with Small SI Engines in 1997 and the last onroad categories of Marine Inboard/Sterndrive and Snowmobiles will meet their first exhaust emission standards in 2010. The design changes to comply with the standards tended to enlean the A/F ratio of new engines compared to prior engines and limit the ability to manually adjust the A/F ratio, so while newer engines may use materials better suited for ethanol, they may also be more susceptible to enleanment concerns.

[96] *See* EPA–HQ–OAR–2010–0448, Submittal to Docket on Yamaha Web site information.

[97] *See* EPA–HQ–OAR–2010–0448, CPSC, Health Canada and Toro snowblower recall.

[98] *See* EPA–HQ–OAR–2010–0448, Oregon State Government Non-Ethanol Fuel Supplier Listing.

2. Enleanment

Given the relatively undeveloped technological design of the nonroad product fleet for purposes of emissions control, one of the main concerns with the use of E15 in nonroad products, as for older motor vehicles, is the increased temperatures caused by enleanment of the A/F ratio. With higher levels of ethanol, the stoichiometric (ideal) A/F ratio becomes lower (*i.e.,* more fuel is needed for the same amount of air) due to the increased oxygen in the fuel; hence, the nonroad products run leaner since they do not adjust to the fuel oxygen content. Engines designed to operate on non-ethanol fuels (0 wt% oxygen) are currently operating on E10, which typically contains about 3.5–3.7 wt% oxygen, and would operate on approximately 5.5 wt% oxygen when operating on E15. As evidenced by various studies,[99] enleanment has an immediate impact on emissions, causing HC and CO emissions to decrease and NO_X emissions to increase. However, since the HC and NO_X impacts are directionally opposite, these immediate impacts are of less concern than the impacts of long-term operation and durability. Leaner operation increases cylinder and exhaust temperatures that can lead to overheating of the engine. In some cases this can lead to expansion of the engine block and pistons and result in a seized engine. Increased combustion temperature can also result in expansion and contraction of the engine block and head metals which leads to loosening of the head bolts. With looser bolts, the gap between the engine block and the head will open and the head gasket can get damaged, which in turn damages other engine components (*e.g.,* intake and exhaust valves, manifolds, *etc.*) which can result in increased emissions and potential engine failure.

The likelihood that nonroad products may experience such issues with E15 is difficult to quantify. However, limited testing by DOE [100] showed some engine failures with E15, and this is not entirely unexpected since nonroad products are particularly prone to enleanment for several reasons. First, nonroad products remain primarily carbureted and/or have open loop fuel control.[101] This means they do not have the ability to self-adjust the A/F ratio in-use for the presence of ethanol in the fuel. The amount of enleanment an engine experiences in-use depends on several factors, including manufacturing variability, engine wear, and, importantly for E15, the A/F ratio setting of the engine in comparison to the setting needed for the fuel the engine is operating on. Engine manufacturers set the A/F ratio settings at the time of production based on a number of factors including the emission standards, expected deterioration of emissions over time and the emission certification fuels.[102] In-use engines are Federally certified on E0, while engines certified to California standards are certified on an MTBE blend (the equivalent oxygen content of about E6 or about 2.0 wt% oxygen).[103] Thus, when nonroad products switch to using E10 in the field, they operate leaner than they were set to operate and would operate leaner still on E15. Older nonroad products may have more headroom to tolerate enleanment from ethanol than newer engines. This is because manufacturers have tended to set the A/F ratio for their newer engines closer to stoichiometry (less rich) to meet newer, more stringent emission standards in recent years.[104] Second, the majority of nonroad products are air-cooled (rely on fins designed into the engine block to dissipate heat and some have a fan to aid in cooling) and fuel-cooled (rely on rich operation -excess fuel—to cool certain engine components like exhaust valves and manifolds). Thus, they are much less forgiving of temperature increases that might result from enleanment. Third, nonroad products frequently operate at wide open throttle for much of their duty cycle where exhaust temperatures are highest.

Additionally, as enleanment occurs, the potential for an engine to reach its lean limit is increased. A lean limit is found when the typical emissions trend for enleanment (decreased HC and CO emissions and increased NO_X emissions) reverses and results in increased HC and CO and decreased NO_X. The reversal of emissions at the lean limit is a signal the engine is starting to experience incomplete combustion and is beginning to experience misfires, hence the increases in HC. This often results in engine failure since the engine cannot operate for an extended period of time under this condition. Results from a DOE pilot study on small SI nonroad products confirmed the potential enleanment concerns.[105] Several engines failed prior to reaching their full useful life, and the emission results for one of these (a consumer market trimmer) indicated that it indeed may have exceeded its lean limit when operating on E15.

Finally, as highlighted above in VI.C., catalysts are an emission reduction technology that is sensitive to increases in exhaust temperature that would result from the use of E15. Although not yet commonly found on nonroad products, they began phasing-in on small SI handheld engines in 2002. High exhaust temperatures are already a concern with these catalysts due to the close location of the catalyst to the combustion chamber (catalysts are located within the muffler which is commonly attached to the engine block). The hotter combustion temperatures from engine enleanment result in hotter exhaust temperatures experienced by the catalyst and can increase the likelihood of catalyst washcoat sintering. If sintered, the catalyst becomes nearly useless. The likelihood that an engine/catalyst setup would reach this state is dependent on the engine/catalyst design and the production variability. Both of these vary from engine manufacturer to engine manufacturer and engine to engine.

These potential enleanment problems would also impact the emission performance of engines operated on E15 over their full useful life. Unfortunately, emissions data from nonroad products operated over their full useful life on E15 is very limited and currently is known only to exist for the small spark-ignition sector of nonroad engines. DOE performed a pilot and durability study on four small SI engine models operated

[99] "Effects of Intermediate Ethanol B lends on Legacy Vehicles and Small Non-Road Engines, Report 1", NREL/TP–540–43543 and ORNL/TM–2008/117, October 2008.

[100] "Effects of Intermediate Ethanol B lends on Legacy Vehicles and Small Non-Road Engines, Report 1", NREL/TP–540–43543 and ORNL/TM–2008/117, October 2008.

[101] Of the nearly 1200 gasoline-fueled nonroad engine families certified in 2010, only 36 are estimated to have closed loop electronic fuel injection, and most of those are large spark-ignited nonroad engines.

[102] Older nonroad products—those prior to emission standards—tended to have A/F ratio adjustment screws so knowledgeable consumers or maintenance facilities could adjust the A/F ratio of the engine if it operating poorly. Manufacturers tended to remove or limit the capability for such manual adjustments to meet emission standards.

[103] Standards for some nonroad categories which require evaporative emission certification on E10 and allow it as an option for exhaust are just beginning to phase in.

[104] Some engines have been under emission regulation for 13 years while others are just falling under emission regulation. In order to meet EPA emission standards, engines have either been enleaned and/or taken on engine designs of a more efficient engine such as a 4 stroke engine.

[105] "Effects of Intermediate Ethanol B lends on Legacy Vehicles and Small Non-Road Engines, Report 1", NREL/TP–540–43543 and ORNL/TM–2008/117, October 2008.

on E10 and E15.[106] The HC emissions from a commercial string trimmer engine were considerably higher after operation over the full useful life on E15 in comparison to E10 (191% vs. 101% increases in HC). Hydrocarbon emissions were similarly increased on a commercial generator with E15 vs. E10 when tested over their full useful life (47% increase for HC on E15 vs. 4.7% increase for E10) and for a consumer power washer (150% increase on E15 vs. a 44% increase for E10[107] The consumer blower engines tested did not make it to aging at full useful life on E15. The blower engines did have catalysts, however, the study was not able to analyze its effectiveness over time. If the catalyst on the blower was to fail and the engine continued to operate, then the engine could have emitted almost the same emissions as pre-regulation engines (*e.g.,* 100–120 g/kW-hr without a catalyst vs. 50 g/kW-hr with a catalyst). Thus, while it was only a small test sample, it is clearly suggestive that exhaust emissions may increase considerably with E15 over the full useful life of the engines. Furthermore, while the study was only conducted on the small SI segment of the nonroad market, the similarities between it and most other segments of the nonroad market would raise similar concerns.

3. Material Compatibility and Corrosion

Materials used in engine and fuel system components (*e.g.* metals, plastics, and rubbers) must be compatible with the full range of expected fuel compositions. Any deterioration of materials could result in loss of function of critical engine components, which can result in emissions increases from fuel leaks and equipment failure. Nonroad products do not have onboard diagnostics to detect these conditions and report it to the user prior to engine failure. Not much is known about the use of E15 in nonroad products in real world use. However, concern exists because, as discussed above in section VI.B., ethanol has different material compatibility characteristics than gasoline, and even products operating adequately on E10 today may have issues with E15. In addition, the vast range of nonroad product designs and technologies over the years indicates that material incompatibility may exist in portions of the in-use fleet when using E15.

Motor vehicle manufacturers, as discussed in section VI.G, were driven by both market forces and EPA emission standards to redesign motor vehicles and upgrade materials for continual use of E10. This is not the case for nonroad products. We are not aware of any standard design practices self imposed by industry in relation to the presence of ethanol in gasoline either in the early 1980s with gasohol in the Midwest or in the 2000s as gasoline-ethanol blends expanded nationwide. As a result, it appears that manufacturers used a variety of approaches at different points in time in response to market conditions. One reason for this is that the nonroad market serves a wide range of consumers—the low cost consumer quality and the higher cost professional quality—and the target market may govern how decisions are made. Another reason is the vast diversity of nonroad products as discussed above. The wide range of engines, applications, manufacturers, and markets leads to a wide range of equipment design practices. Finally, some manufacturers of nonroad vehicles and equipment may purchase another manufacturer's engine and modify it and/or its fuel system for a different application (*e.g.* purchasing a small SI engine and replacing the fuel tank with a different design so it fits in the equipment, or marinizing an automotive engine for use as a marine engine and recertifying). Since there have been no evaporative requirements for small SI engines until the Phase 3 standards (beginning in 2009), in prior years the hoses and tanks could be changed without concern. Consequently, even engine fuel systems designed for the presence of ethanol by the original engine manufacturer may be compromised by the vehicle/equipment manufacturer. Thus, it is very difficult to quantify the volume of nonroad products in today's fleet designed to operate on E10 let alone E15. As shown in Figure VI.A–1, since E10 now represents more than 80% of the gasoline market, it is clearly being used in nonroad products today. However, as shown in Figures VI.A–3 and VI.A–4 the expansion of E10 nationwide is still a relatively recent event and the effects we are focused on are effects from longer term use of the fuel.

Based on manufacturer Web sites and owner's manual recommendations, most new nonroad products produced today are designed to be compatible with E10. The main exceptions are marine applications (as well as aircraft, which are not nonroad for purposes of section 211(c), but in some cases use the same gasoline as nonroad products). The transition appears to have occurred at different points in time across the market. However, this is not to say that these engines have been designed to be compatible with E15. The effects of ethanol are time and concentration dependent such that the effects of E15 may be more severe than E10 on materials. Consequently, manufacturers, while approving the use of E10 today, now also warn against the use of any higher gasoline-ethanol blends.

Unlike motor vehicles, most nonroad products are used periodically and not for daily tasks. Many of these products are designed to be inexpensive consumer products that last a relatively short time or are used irregularly and for short periods of time. However a considerable fraction may remain in the in-use fleet for a long time (10–40+ years). Table VI.F.1–2 shows an estimated age distribution of nonroad products in 2010. Marine engines are separated in the table to illustrate the fact that these products in particular remain in the fleet for many years. Consequently, even if nonroad products today are designed by the manufacturer for the presence of 10% ethanol in the gasoline, a large number of pieces of equipment still exist in the field from model years when ethanol was not present in gasoline, or was just beginning to be introduced into the fuel stream. Based on subsequent experience, some of this equipment may operate fine on E10, while others may have complications due to the enleanment or material incompatibility effects of using ethanol.

There have been several attempts to study the material compatibility of E15 use in nonroad engines, vehicles and equipment. However, the broad range of equipment and designs over time make it extremely difficult to do any definitive study on the nonroad sector that would address the entire fleet. A literature and information search prepared by the University of Minnesota Center for Diesel Research outlines a number of the concerns with ethanol that could be experienced with E15.

—Corrosion of steel is accelerated by the presence of alcohols in the fuel, both because the ethanol itself is considered to be more corrosive but also because it is a solvent that removes oils and coatings from the surface that might protect against corrosion. In addition, ethanol attracts and mixes with water which is also corrosive and tends to create a slightly acidic solution, especially over time.

[106] "Effects of Intermediate Ethanol B lends on Legacy Vehicles and Small Non-Road Engines, Report 1", NREL/TP–540–43543 and ORNL/TM–2008/117, October 2008.

[107] The NO_X emission results on commercial engines change less over time on E15 compared to E10, however they start at a higher value at new engine condition on E15. (ref: "Effects of Intermediate Ethanol B lends on Legacy Vehicles and Small Non-Road Engines, Report 1", NREL/TP–540–43543 and ORNL/TM–2008/117, October 2008.)

—Elastomers exposed to higher gasoline-ethanol blends over time can increase in weight gain, swell, soften and increase in hardness when dried and as a result lose tensile strength, causing fuel pumps and fuel lines to fail. For fuel hoses, swelling and softening creates a risk of failure of the joints. The swelling and softening of O-rings, seals and gaskets causes a risk of damage or incorrect fit of the seal during assembly of joints leading to fuel leakage.
—Seals and gaskets on equipment that have not been previously exposed to higher alcohol fuels could deteriorate and break down creating leakage.
—Fiberglass-reinforced plastic fuel tanks, such as those on marine engines and motorcycles, may also experience problems depending on the type of resin and how much the ethanol will contribute to the corrosion of it.
—Materials such as lead/tin-coated steel used in fuel tanks and aluminum fuel system components require corrosion inhibitors due to the presence of the higher alcohol in E15.

In addition, four studies have been reported which tested the effect of a number of ethanol containing fuels (E10, E20) on materials compatibility of polymers, metal, and elastomers in motor vehicles and nonroad engines. While none of these studies reported on E15, a number of reports gave conditions seen on E10 and E20 and so results for E15 can be interpolated. The results of one technical assessment, published in 2002,[108] of E10 and E20 on two 2-stroke engines indicated materials compatibility concerns for E20 for both engine types, including effects on some polymeric materials that were deemed unacceptable and E20 tarnishing and corroding brass and aluminum parts. Similarly, three other studies conducted by the University of Minnesota published in 2008 on metal, plastic, and elastomer materials, respectively,[109, 110, 111] used in highway vehicles and nonroad products found a variety of impacts with E20 relative to E10 or E0, including clear incompatibility with some materials. The existence of such materials on equipment in the in-use fleet could lead to increased emissions, fuel leaks, and potentially engine failure from longer term use of E15. The degree to which such incompatible materials exist in the in-use fleet is unknown, but it is clear that they do exist based on in-use experience with E10.[112, 113]

We are not aware of any testing that has been done that might help quantify the potential impact on emissions from the types of engine problems that would result from material compatibility problems. However on July 14, 2010 the United States Consumer Protection Safety Commission (CPSC) and Health Canada (HC) announced a recall of Toro snowblowers stating that "Exposure to ethanol in gasoline can cause the carburetor needle to become corroded. A corroded needle can stick in the open position and allow fuel to leak from the carburetor."[114] Clearly fuel leaks would result in a considerable increase in evaporative emissions, and material issues with carburetors, fuel pumps, and other engine components could clearly lead to significant changes in exhaust emissions, if not engine survivability.

4. Phase Separation and Solvency/Detergency

Two additional concerns with E10 use in nonroad products are phase separation and solvency/detergency (*see* section VI.B.). However, if nonroad products have already been operating on E10, the degree to which these would be a concern with E15 is unknown. Phase separation occurs if a gasoline-ethanol blend is saturated with water. Phase separation is more likely in nonroad products due to the fact that these engines are typically used only seasonally or occasionally throughout the year and in the case of marine applications, the equipment is generally in a humid, water environment. In addition, specifically for small SI engines, some of the fuel systems are open to the atmosphere through a direct vent in the gas cap which exposes the fuel to air and humidity. If phase separation occurs, it has been reported by repair shops to be acidic and result in corroded carburetors and potential fuel line leaks. However, while phase separation has been and continues to be a significant concern with E10, as evidenced by ongoing guidance on manufacturer literature[115] and nonroad engine Web sites,[116] the additional ethanol in E15 would increase the water tolerance of the blend and thereby potentially reduce the frequency of phase separation occurring.

Similarly, in areas that have transitioned to E10, problems have historically also shown up in repair shops due to the solvency/detergency characteristics of ethanol. Ethanol has been known to dislodge sludge and varnish in the fuel system, causing it to clog fuel filters and carburetors. However, if in-use engines have already been operated on E10, the cleansing effect of the ethanol may have already occurred, and transitioning to E15 may not result in any additional problems.

G. Model Year 2007 and Newer Light-Duty Motor Vehicles

MY2007 and newer light-duty motor vehicles are covered by EPA's Tier 2 program which established dramatically more stringent NO_X standards. While the program allowed the standards to phase in from MY2004 through MY2009, manufacturer certification data show that gasoline-fueled motor vehicles actually reached full implementation with MY2007. MYs 2004–2006 included a mix of vehicles—some Tier 2 and some non-Tier 2. Tier 2 motor vehicles are more technologically advanced and robust than cars built years ago, are fully capable of running on E10, and must have their evaporative emission systems aged on E10 for durability purposes. Sophisticated computer systems and sensors constantly monitor the engine and the exhaust to be sure that everything (*i.e.,* the A/F ratio mixture) is kept at its optimum level. All auto manufacturers now warrant their new motor vehicles to operate on E10 or less. As found in the E15 waiver decision also published today, we believe on the basis of testing performed and our own engineering assessment, that these MY2007 and newer Tier 2 light-duty motor vehicles are durable and will maintain their emission performance when operated on E15.

To evaluate the impacts of E15 on Tier 2 motor vehicles, DOE performed a

[108] "A Technical Assessment of E10 and E20 Petrol Ethanol Blends Applied to Non-Automotive Engines. Failure Mode and Effects Analysis of Engine Function and Component Design for Mercury Marine 15hp Outboard and Stihl FS45 Line-Trimmer Engines," conducted by Orbital Engine Company, Report to Environment Australia, November 2002.

[109] "The Effects of E20 on Metals Used in Automotive Fuel System Components," by Bruce Jones, Gary Mead, Paul Steevens and Mike Timanus, Minnesota Center for Automotive Research at Minnesota State University, Mankato, February 22, 2008.

[110] "The Effects of E20 on Elastomers Used in Automotive Fuel System Components," by Bruce Jones, Gary Mead, Paul Steevens, and Mike Timanus, Minnesota Center for Automotive Research at Minnesota State University, Mankato, February 22, 2008.

[111] "The Effects of E20 on Plastic Automotive Fuel System Components," by Bruce Jones, Gary Mead, and Paul Steevens, Minnesota Center for Automotive Research at Minnesota State University, Mankato, February 21, 2008.

[112] *http://www.fuel-testers.com/marine_e10_bad_gas_reports.html.*

[113] *http://www.sail-world.com/USA/index.cfm?SEID=0&Nid=38442&SRCID=0&ntid=0&tickeruid=0&tickerCID=0.*

[114] *See* EPA–HQ–OAR–2010–0448, CPSC, Health Canada and Toro snowblower recall.

[115] *See* EPA–HQ–OAR–2010–0448, Collection of manufacturer literature from 1980 to present.

[116] *See* EPA–HQ–OAR–2010–0448, Submittal to Docket on Yamaha Web site information.

catalyst durability test program [117] on 19 Tier 2 motor vehicles from high sales volume models produced by the various light-duty vehicle manufacturers throughout 2009 and 2010. The specific purpose of the test program was to evaluate the long term effects of E0, E10, E15, and E20 on catalyst system durability. However, a number of the motor vehicles were also torn down and evaluated for any other impacts E15 may have had, including material compatibility in the fuel and evaporative emission control systems. As discussed in the waiver decision document, program results indicate that the changes manufacturers made (calibration, hardware, *etc.*) to their motor vehicles to comply with the Tier 2 standards have enabled the motor vehicles to operate satisfactorily on E15, including the ability of their catalysts to withstand the additional enleanment caused by E15.

The DOE test program was critical in supporting the waiver decision. However, it also serves to confirm our engineering assessment of the ability of light-duty motor vehicles to handle E15. The emission standards that EPA has implemented over time affecting motor vehicles have become more and more stringent (*i.e.,* Tier 0 to Tier 1 to LEV1 and NLEV to Tier 2 and LEV2). In addition, full useful life requirements have increased and new test cycles have been added. To comply with the stringent Tier 2 standards, manufacturers must minimize deterioration of their vehicle emission control systems over a vehicle's full useful life of 120,000 miles. By MY2004, new test procedures took effect to better represent actual consumer driving habits and conditions. These additional test cycles, coupled with the in-use testing required under the Compliance Assurance Program (CAP2000), pushed manufacturers to develop more robust emissions control systems (such as systems using wide range oxygen sensors) capable of withstanding the higher temperatures experienced during these more severe cycles without simply relying on enriching of the A/F ratio, causing emissions to rise. With each new program, manufacturers were required to improve the efficiency and durability of emission control hardware and the methods and control systems governing hardware performance causing newer motor vehicles to be able to accommodate gasoline-ethanol blends more so than older motor vehicles.

Perhaps the most critical changes made over time were the changes to the engine calibrations and catalyst systems to accommodate changes in the A/F ratio such as those that occur when switching to operation on gasoline-ethanol blends. Evolution in emission standards prompted corresponding evolution in motor vehicle emission control systems. In particular, catalyst deterioration must be minimized and catalyst temperatures controlled during all vehicle operation modes for the catalyst to work properly (*i.e.,* for it to maintain the necessary high efficiency demanded by the Tier 2 standards). Tier 2 motor vehicles, especially the MY2007 and newer motor vehicles, have improved hardware as well as more sophisticated emission control systems and strategies to help maintain catalyst effectiveness, and an extended motor vehicle operating range over which emissions performance must be maintained. MY2007 and newer motor vehicles have the ability to precisely adjust for changes in the A/F ratio and ultimately maintain peak catalyst efficiency under almost any condition, such as exposure to oxygenated fuels like those containing ethanol. To do so, some manufacturers incorporated learned or adaptive fuel trim into their motor vehicle designs to modulate the A/F ratio and alleviate catalyst temperature increases even under open loop conditions. Others, through careful hardware selection and certain calibration approaches, have motor vehicle designs with higher thermal margins to accommodate the effects of enleanment with gasoline-ethanol blends.

Prior to completion of the DOE catalyst durability test program some concern had been expressed that when operated on E15, vehicles, even Tier 2 motor vehicles that did not apply learned fuel trim, may experience catalyst degradation and higher emissions over time due to the higher exhaust temperatures it may cause. Several screening studies had measured exhaust and catalyst temperature and/or evaluated the ability of vehicles to apply learned fuel trim to adjust for the enleanment due to ethanol during open loop operation.[118, 119] They had found that those vehicles that did not apply learned fuel trim tended to experience higher catalyst and exhaust temperatures when operated on E15. However, as evidenced by the DOE catalyst durability test program, at least for Tier 2 motor vehicles this does not appear to be the case. Even those vehicles that do not apply learned fuel trim appear to have sufficient thermal margins. Therefore, not only do all manufacturers warrant their Tier 2 motor vehicles for operation on E10, but as discussed in the waiver decision document, we believe that they will also operate properly on gasoline-ethanol blends up to E15.

With respect to evaporative emissions control, evaporative systems have had leak detection diagnostic requirements since at least MY2000 as a result of the Agency's Onboard Diagnostic (OBD) program. In addition, CAP2000 which took effect with MY2001 motor vehicles placed more emphasis on the "in-use" performance of motor vehicle emission controls with motor vehicles operating nationwide on the different available fuels. This emphasis on real world motor vehicle testing prompted manufacturers to consider different available fuels, including gasoline-ethanol blends, when developing and testing their emission systems. However, even with the CAP2000 requirements, some materials issues continued to arise during in-use emissions testing. Consequently, as part of the new Tier 2 standards, EPA added the requirement that the evaporative control system and all related components (*i.e.* fuel tanks, fuel lines, *etc.*) demonstrate durability over their full useful life while operating on E10. Due to this new requirement, materials that would compromise evaporative emission compliance over the full useful life with exposure at E10 levels were eliminated as options for fuel system components. This requirement, coupled with much more stringent evaporative emission standards (over a 50% reduction for passenger cars and light trucks), was phased-in with the Tier 2 exhaust standards. Prior to Tier 2, materials are believed to have also been selected for ethanol compatibility but perhaps not for continuous exposure over the full useful life. Based on conversations with original equipment manufacturer parts suppliers, it is our understanding that in designing materials for continuous E10 exposure, they tested materials, components, and systems using ethanol levels in excess of 20% to ensure compatibility with E10. Consequently, Tier 2 motor vehicle designs should also be designed to be compatible with E15, and the results of the DOE catalyst durability test program served to confirm this belief.

[117] *Catalyst Durability Study,* Department of Energy/Coordinating Research Council Report: E–87–2, September 2010.

[118] *Mid-level Ethanol Blends Catalyst Durability Study Screening,* Coordinating Research Council Report:
E–87–1, June 2009.

[119] *Effects of Intermediate Ethanol Blends on Legacy Vehicles and Small Non-road Engines, Report 1—Updated,* National Renewable Energy Laboratory, February 2009.

H. Model Year 2001–2006 Motor Vehicles

For MY2001–2006 motor vehicles, both our engineering assessment and the available data make it less clear whether motor vehicles produced during those model years could have emission increases from long-term fueling with E15 like MY2000 and older motor vehicles or whether they would continue to function properly like MY2007 and newer motor vehicles. On the one hand, we believe that many of the same elements for ethanol compatibility of MY2007 and newer motor vehicles also apply to these motor vehicles (*e.g.,* designing to enhanced evaporative emission standards, SFTP, CAP2000). On the other hand, they were not all required to demonstrate evaporative emission system durability on E10 or to upgrade their catalyst and emission control systems to the extent needed to comply with the Tier 2 standards. The NLEV standards that began phasing in with MY2001 required improvements in closed loop A/F ratio control and catalyst efficiency, but the Tier 2 standards represented a considerable step change beyond NLEV. Furthermore, as discussed below, while there are some ongoing test programs evaluating the effects of E15, we do not yet have sufficient data that would serve to confirm or deny any engineering analysis of the situation, and in particular to address the potential concerns raised over those motor vehicles that do not apply learned fuel trim during open loop operation.

Two studies that might help inform the situation are currently still in process. The Rochester Institute of Technology is conducting a study of 10 motor vehicles spanning MY1998–2004 on E20 and is operating roughly 300 motor vehicles in-use on E20.[120] While the results of this study to date suggest vehicles may operate acceptably on E20—and by interpolation E15—mileage accumulation is limited, so its ability to assess emission impacts over the FUL of the vehicles is also limited. In addition, since there are no control vehicles operating on E0, comparisons of emission effects are restricted. The study is ongoing until November 2010. In addition, DOE is in the process of conducting catalyst durability testing on six motor vehicles certified to NLEV standards and two motor vehicles certified to Tier 1 standards which will also be completed by November. Since the motor vehicles are older, they are starting the test program with a significant number of miles already driven by consumers on E0. However, at least 50,000 miles are being accumulated on each motor vehicle, and identical motor vehicles of the same model are being tested on E0, E10, E15, and E20.

I. Emissions Impact Summary and Conclusions

As discussed above, the potential exists for E15 use to cause long-term or permanent increases in exhaust emissions from MY2000 and older light-duty motor vehicles, heavy-duty gasoline engines and vehicles, motorcycles, and nonroad products, as a result of accelerated deterioration of engine and emission control components. This deterioration can be a result of changes in engine operation, such as higher exhaust temperature, or damage to materials not compatible with E15. Similarly, evaporative emission increases may occur immediately due to increased permeation or over time due to repeated or on-going exposure of the fuel and evaporative emission control systems to E15. In some cases the potential emission impacts could be quite dramatic (*i.e.,* more than an order of magnitude) given the large differences between controlled and uncontrolled emissions on today's light-duty motor vehicles, heavy-duty gasoline engines and vehicles, motorcycles, and nonroad products. Consequently, the in-use emissions increases and air quality impact could be substantial for any of these products that experience very significant deterioration.

While it is not possible to quantify the frequency at which all of these products might experience problems with the use of E15, the degree of emissions increases associated with them, or the effectiveness of the proposed misfueling mitigation measures, we believe that the emission related problems would occur with enough frequency that the resulting emission benefits from the avoided misfueling would clearly outweigh the relatively low cost imposed by the proposed regulations. The emission benefits are the emissions increases from longer term use of E15 that would not occur because of this misfueling mitigation program. This is particularly the case considering the significant consumer savings for avoided repairs and replacement that, as discussed in section III.F., would by themselves be expected to exceed the costs of the misfueling mitigation measures.

For these reasons, the Agency proposes to prohibit the use of gasoline blended with greater than 10 vol% ethanol in (1) MY2000 and older motor vehicles, (2) heavy-duty gasoline engines and vehicles, (3) motorcycles, and (4) nonroad products. Today's prohibitions and other requirements are intended to reduce emissions due to the use of E15 in the group of vehicles or engines reasonably expected to have these adverse effects. The term misfueling describes use of E15 in the prohibited engines, vehicles and equipment listed above. We are inviting comment on whether this prohibition should also apply for MY2001–MY2006 motor vehicles.

VII. What is our legal authority for proposing these misfueling mitigation measures?

As explained above, we are proposing misfueling mitigation measures pursuant to our authority under CAA section 211(c)(1). This section gives EPA authority to "control or prohibit the manufacture, introduction into commerce, offering for sale, or sale" of any fuel or fuel additive (A) whose emission products, in the judgment of the Administrator, cause or contribute to air pollution "which may be reasonably anticipated to endanger public health or welfare" or (B) whose emission products "will impair to a significant degree the performance of any emission control device or system which is in general use, or which the Administrator finds has been developed to a point where in a reasonable time it would be in general use" were the fuel control or prohibition adopted. Under section 211(c)(1), EPA may adopt a fuel control if at least one of the two criteria above are met. We are proposing the misfueling mitigation measures based on both of these criteria. Under section 211(c)(1)(B), we believe that E15 would significantly impair the emission control systems used in MY2000 and older light-duty motor vehicles, heavy-duty gasoline engines and vehicles, highway and off-highway motorcycles, and all nonroad products. This leads us to conclude, under section 211(c)(1)(A), that the likely result would be increased HC, CO and NO_x emissions when these particular engines, vehicles and nonroad products use E15. The following sections summarize our analysis of each criterion.

A. Health and Welfare Concerns of Air Pollution Caused by E15

We believe that the emissions products of E15 contribute to air pollution that can reasonably be anticipated to endanger public health and welfare. As described in Section VI.B., the unique physical and chemical

[120] *The effect of E20 ethanol fuel on vehicle emissions,* B Hilton and B Duddy, Center for Integrated Manufacturing Studies, Rochester Institute of Technology, June 26, 2009.

properties of ethanol may negatively impact certain engines, vehicles and equipment when those products use gasoline-ethanol blends containing increased amounts of ethanol, particularly if those engines, vehicles and equipment are not designed for accommodating that increase. The result is likely an increase in HC, CO and NOx emissions from these engines, vehicles and equipment (*see* Sections VI.C.–F.). This potential increase in emissions of these particular pollutants contributes to air pollution levels that, for example, can violate the NAAQS for ozone or PM.

Section 211(c)(2)(A) requires that, prior to adopting fuel controls based on a finding that the fuel's emission products contribute to air pollution that can reasonably be anticipated to endanger public health or welfare, EPA consider "all relevant medical and scientific evidence available, including consideration of other technologically or economically feasible means of achieving emission standards under [section 202 of the Act]." EPA's analysis of the evidence relating to the emissions impact of emissions from E15 is described in Section VI above, while the evidence concerning the NAAQS is discussed in the NAAQS rulemakings themselves.

EPA has also satisfied the statutory requirement to consider "other technologically or economically feasible means of achieving emission standards under section [202 of the Act]." This provision has been interpreted as requiring consideration of establishing emissions standards under section 202 prior to establishing controls or prohibitions on fuels or fuel additives under section 211(c)(1)(A). *See Ethyl Corp.* v. *EPA,* 541 F.2d 1, 31–32 (DC Cir. 1976). In *Ethyl,* the Court stated that section 211(c)(2)(A) calls for good faith consideration of the evidence and options, not for mandatory deference to regulation under section 202 compared to fuel controls. *Id.* at 32, n.66. For MY2000 and older motor vehicles, proposing emissions standards under section 202 is not an option since emissions standards promulgated under section 202 only apply to *new* motor vehicles. This is also true for the other categories (heavy-duty gasoline engines and vehicles, highway and off-highway motorcycles, and all nonroad products) to the extent these products are already in the marketplace. Thus, for all of these products, the proposed measures under section 211(c)(1) are appropriate for addressing misfueling. Additionally, EPA has previously promulgated the most technologically and economically feasible HC, CO and NO_X emissions standards for all of these engines, vehicles and equipment, so new emissions standards under section 202 for any of these products would not achieve any additional protection beyond those obtained through the misfueling mitigation measures being proposed today under section 211(c)(1).

It is therefore appropriate for EPA to exercise its authority under section 211(c)(1)(A) and propose these misfueling mitigation measures that will likely reduce or eliminate the emissions products from E15 that contribute to the air pollution that endangers our public health or welfare.

B. Impact of E15 Emission Products on Emission Control Systems

EPA believes that E15 can significantly impair the emissions control technology in MY2000 and older light-duty motor vehicles, heavy-duty gasoline engines and vehicles, highway and off-highway motorcycles, and all nonroad products. As discussed in Section VI above, ethanol enleans the A/F ratio; this may lead to emissions products that can cause increased exhaust gas temperatures and, over time, incremental deterioration of emission control hardware and performance. Enleanment can also lead to catalyst failure. Additionally, ethanol can cause material compatibility issues which may lead to other component failure. Ultimately, all of these impacts would likely significantly impair the emissions control systems or devices and lead to exhaust and/or evaporative emission increases.

Section 211(c)(2)(B) requires that, prior to adopting a fuel control based on a significant impairment to emission control systems, EPA consider available scientific and economic data, including a cost benefit analysis comparing emission control devices or systems which are or will be in general use that require the proposed fuel control with such devices or systems which are or will be in general use that do not require the proposed fuel control. This provision is not applicable to the proposed misfueling mitigation measures since a particular emission control device or system is not required for use with the measures being proposed today. Instead, the misfueling mitigation measures are being proposed to protect *existing* controls on existing engines, vehicles and equipment already in the marketplace from the detrimental impacts they may incur when using E15.

Thus, EPA may exercise its authority under section 211(c)(1)(B) and propose these misfueling mitigation measures since use of E15 would significantly impair the emission control devices or systems in MY2000 and older light-duty motor vehicles, heavy-duty gasoline engines and vehicles, highway and off-highway motorcycles, and all nonroad products.

C. Effect of Misfueling Mitigation Measures on the Use of Other Fuels or Fuel Additives

Section 211(c)(2)(C) requires that, prior to prohibiting a fuel or fuel additive, EPA establish that such prohibition will not cause the use of another fuel or fuel additive "which will produce emissions which endanger the public health or welfare to the same or greater degree" as the prohibited fuel or fuel additive. Even assuming that this proposal amounts to a prohibition, as compared to a control, EPA does not believe that the proposed misfueling mitigation measures will result in the use of any other fuel or fuel additive that will produce emissions that will endanger public health or welfare to the same or greater degree as the emissions produced by E15. In fact, the measures being proposed today should lessen the overall public health or welfare impacts from the emissions from these products. To the extent that EPA is proposing a prohibition of using E15 in certain engines, vehicles and equipment, such a prohibition should serve to prevent or reduce misfueling in those products and avoid the increased detrimental effects this provision seeks to protect against. These products would instead use other gasoline or gasoline-ethanol blends currently available in the marketplace and be able to meet their current emissions standards. Thus, EPA may propose these misfueling mitigation measures under 211(c)(1) without causing other public health or welfare effects from the use of another fuel or fuel additive.

VIII. Public Participation

We request comment on all aspects of this proposal. This section describes how you can participate in this process.

A. How do I submit comments?

We are opening a formal comment period by publishing this document. We will accept comments during the period indicated under **DATES** in the first part of this proposal. If you have an interest in the proposed program described in this document, we encourage you to comment on any aspect of this rulemaking. We also request comment on specific topics identified throughout this proposal.

Your comments will be most useful if you include appropriate and detailed supporting rationale, data, and analysis. Commenters are especially encouraged

to provide specific suggestions for any changes to any aspect of the regulations that they believe need to be modified or improved. You should send all comments, except those containing proprietary information, to our Air Docket (*see* **ADDRESSES** in the first part of this proposal) 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 subject line on the first page of your comment. Please ensure that your comments are submitted 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 Confidential Business Information (CBI) or information that is otherwise protected by statute, please follow the instructions in Section XI.B.

B. How should I submit CBI to the agency?

Do not submit information that you consider to be CBI electronically through the electronic public docket, *http://www.regulations.gov,* 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 ID EPA–HQ–OAR–2010–0448. 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 comments that include any information claimed as CBI, a copy of the comments that does not contain the information claimed as CBI must be submitted for inclusion in the 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 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 in Chicago, IL on November 16, 2010 at the location shown below. The hearing will start at 10 a.m. local time and continue until everyone has had a chance to speak.

Millennium Knickerbocker Hotel Chicago, 163 East Walton Place, @ North Michigan Avenue, Chicago, IL 60600, Phone# 312–751–8100.

If you would like to present testimony at the public hearing, we ask that you notify the contact person listed under **FOR FURTHER INFORMATION CONTACT** in the first part of this proposal at least 8 days before the hearing. You should estimate the time you will 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 notifications we receive. This schedule will be available on the morning of the 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 will not 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.

D. Comment Period

The comment period for this rule will end on January 3, 2011.

E. What should I consider as I prepare my comments for EPA?

You may find the following suggestions helpful for preparing your comments:

- Explain your views as clearly as possible.
- Describe any assumptions that you used.
- Provide any technical information and/or data you used that support your views.
- If you estimate potential burden or costs, explain how you arrived at your estimate.
- Provide specific examples to illustrate your concerns.
- Offer alternatives.
- Make sure to submit your comments by the comment period deadline identified.
- To ensure proper receipt by EPA, identify the appropriate docket identification number in the subject line on the first page of your response. It would also be helpful if you provided the name, date, and **Federal Register** citation related to your comments.

XI. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order (EO) 12866 (58 FR 51735, October 4, 1993), this action is a "significant regulatory action." This action may raise novel legal or policy issues. Accordingly, EPA submitted this action to the Office of Management and Budget (OMB) for review under EO 12866 and any changes made in response to OMB recommendations have been documented in the docket for this action.

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) document prepared by EPA has been assigned EPA ICR number 2408.01.

This proposed rule imposes some new information collection burdens regarding product transfer documentation. Product transfer documents, or PTDs, are commonly used in the fuels distribution system and are their use is a customary business practice. This proposed rule is expected to add a one-time burden to program and implement new product codes and statements, as well as a continuing, small burden associated with affixing (using) products codes and statements. This proposed regulation contains provisions requiring standard product labels, which will not impose any information collection burden on regulated parties. We have also estimated the burden associated with parties who elect to use proposed "Survey Option 1."

For the proposed information collection, we estimate that there will be 9,608 annual respondents; 2,009,226 annual responses; and 71,809 annual hours. We estimate that annual cost of this information collection to respondents will be $5,098,427. The average burden is 0.04 hours per response. Burden is defined at 5 CFR 1320.3(b).

We estimate that the cost of adding the proposed survey of compliance

(which requires sampling and testing) with the proposed labeling requirements to the existing RFG survey at $50,000 per year. The cost to implement all of the proposed survey provisions for conventional gasoline is estimated at $2 million per year. Thus, the total cost of the proposed survey requirements is estimated to be $2.05 million per year

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, EPA has established a public docket for this rule, which includes this ICR, under Docket ID number EPA–HQ–OAR–2010–0448. Submit any comments related to the ICR 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 November 4, 2010 a comment to OMB is best assured of having its full effect if OMB receives it by December 6, 2010. 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 today's rule on small entities, small entity is defined as: (1) A small business as defined by the Small Business Administration's (SBA) regulations 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. The small entities directly regulated by this proposed rule are petroleum refiners and importers, ethanol producers, ethanol blenders, gasoline terminals, gasoline stations with convenience stores, and other gasoline stations. While there are small entities in each of these market sectors as discussed in Section III.F., the cost impact on any particular entity is expected to be a tiny fraction of annual revenues.

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

This rule does not contain a Federal mandate that may result in expenditures of $100 million or more for State, local, and Tribal governments, in the aggregate, or the private sector in any one year. The total annual cost is expected to be $6 million. Thus, this rule is not subject to the requirements of sections 202 or 205 of UMRA.

This rule is also not subject to the requirements of section 203 of UMRA because it contains no regulatory requirements that might significantly or uniquely affect small governments. This action primarily affects the private sector, specifically petroleum refiners and importers, ethanol producers, ethanol blenders, gasoline terminals, gasoline stations with convenience stores, and other gasoline stations.

E. Executive Order 13132 (Federalism)

EPA believes that this action does not have federalism implications. This rule 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. Any preemption of State or local controls under section 211(c)(4)(A), based on issuance of this rule under section 211(c)(1), would only apply to State or local controls adopted for purposes of motor vehicle emissions control.

EPA consulted with State and local officials early in the process of developing the proposed action to permit them to have meaningful and timely input into its development. EPA met with members of the National Association of Clean Air Agencies (NACAA) to discuss the nature of today's proposed rule. Additionally, we provided State and local governments an opportunity to provide comment on the implementation of misfueling mitigation measures for a partial E15 waiver in both the RFS2 NPRM (*see* 74 FR 25016) and the E15 waiver request notice (*see* 74 FR 18228). We received comments from only one State on this issue in the RFS2 NPRM, and it supported efforts for properly labeling fuel pumps containing gasoline-ethanol blends. Thus, Executive Order 13132 does not apply to this action. In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicits comment on this proposed action from State and local officials.

F. Executive Order 13175

This action does not have Tribal implications, as specified in Executive Order 13175 (65 FR 67249, November 9, 2000). This rule will be implemented at the Federal level and impose compliance costs only on petroleum refiners and importers, gasoline stations with convenience stores, and other gasoline stations. Thus, Executive Order 13175 does not apply to this action.

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

EPA interprets EO 13045 (62 FR 19885, April 23, 1997) as applying only to those regulatory actions that concern health or safety risks, such that the analysis required under section 5–501 of the EO has the potential to influence the regulation. This action is not subject to EO 13045 because it does not establish an environmental standard intended to mitigate health or safety risks.

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

This action is not a "significant energy action" as defined in Executive Order 13211 (66 FR 28355 (May 22, 2001)), because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. This proposed rule would require a label to be placed on E15 fuel dispensers, for those stations that elect to sell E15. The cost of the labels would average $6.45 per year per gasoline station. This is a tiny fraction of the station's annual profit, and is not expected to significantly affect energy distribution.

I. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 ("NTTAA"), Public Law 104–113, 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do 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.

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order (EO) 12898 (59 FR 7629 (Feb. 16, 1994)) establishes Federal executive policy on environmental justice. Its main provision directs Federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

EPA has determined that this proposed rule will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it increases the level of environmental protection for all affected populations without having any disproportionately high and adverse human health or environmental effects on any population, including any minority or low-income population. This action would affect all gasoline stations that choose to sell E15 and therefore will not affect any particular area disproportionately.

List of Subjects in 40 CFR Part 80

Environmental protection, Air pollution control, Fuel additives, Diesel, Gasoline, Imports, Incorporation by reference, Labeling, Motor vehicle pollution, Penalties, Reporting and recordkeeping requirements.

Dated: October 13, 2010.

Lisa P. Jackson,

Administrator.

For the reasons set forth in the preamble, 40 CFR part 80 is proposed to be amended as follows:

PART 80–REGULATION OF FUEL AND FUEL ADDITIVES

1. The authority citation for part 80 continues to read as follows:

Authority: 42 U.S.C. 7414, 7542, 7545, and 7601(a).

2. Section 80.45 is amended by adding a new paragraph (c)(1)(iii)(C) to read as follows:

§ 80.45 Complex emissions model.

* * * * *

(c) * * *

(1) * * *

(iii) * * *

(C) During Phase II, fuels with an ethanol concentration greater than 10 volume percent and not more than 15 volume percent shall be evaluated with the OXY fuel parameter set equal to 4.0 percent by weight when calculating VOCE using the equations described in paragraphs (c)(1)(i) and (c)(1)(ii) of this section.

* * * * *

3. A new subpart N is added to read as follows:

Subpart N—Additional Requirements for Gasoline-Ethanol Blends

Sec.
80.1500 Definitions.
80.1501 What are the labeling requirements that apply to retailers and wholesale purchaser-consumers of gasoline-ethanol blends that contain greater than 10 volume percent ethanol and not more than 15 volume percent ethanol?
80.1502 What are the survey requirements for gasoline-ethanol blends?
80.1503 What are the product transfer document requirements for gasoline-ethanol blends, base gasolines, and conventional blendstocks for oxygenate blending subject to this subpart?
80.1504 What acts are prohibited under this subpart?
80.1505 Who is liable for violations of this subpart?
80.1506 What penalties apply under this subpart?
80.1507 What are the defenses for acts prohibited under this subpart?
80.1508 What evidence may be used to determine compliance with the requirements of this subpart and liability for violations of this subpart?

Subpart N—Additional Provisions for Gasoline-Ethanol Blends

§ 80.1500 Definitions.

All of the definitions in § 80.2 apply to this subpart. As used in this subpart:

(a) *Blendstock for oxygenate blending* means gasoline blendstock which could become gasoline solely upon the addition of an oxygenate.

(b) *Conventional blendstock for oxygenate blending* means gasoline blendstock which could become conventional gasoline solely upon the addition of an oxygenate.

(c) *Carrier* has the same meaning as defined in § 80.2(t).

(d) *Conventional gasoline* has the same meaning as defined in § 80.2(ff)

(e) *E0* means a gasoline that contains no ethanol.

(f) *E10* means a gasoline-ethanol blend that contains between 9 and 10 volume percent ethanol.

(g) *E15* means a gasoline-ethanol blend that contains greater than 10 volume percent ethanol and not more than 15 volume percent ethanol.

(h) *EX* means a gasoline-ethanol blend that contains less than 9 volume percent ethanol where X equals the maximum volume percent ethanol in the gasoline-ethanol blend.

(i) *EXX* means a gasoline-ethanol blend above E15 where XX equals the maximum volume percent ethanol in the gasoline-ethanol blend.

(j) *Ethanol blender* has the same meaning as defined in § 80.2(v).

(k) *Ethanol importer* means a person who brings ethanol into the United States (including from the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Northern Mariana Islands) for use in motor vehicles and nonroad engines.

(l) *Ethanol producer* means any person who owns, leases, operates, controls, or supervises a facility that produces ethanol for use in motor vehicles and nonroad engines.

(m) *Flex-fuel vehicle* has the same meaning as flexible-fuel vehicle as defined in § 86.1803–01.

(n) *Fuel dispenser* means the apparatus used to dispense fuel into the fuel tank that is used to power a motor vehicle or a nonroad engine, and that is attached to a motor vehicle or nonroad engine.

(o) *Gasoline* has the same meaning as defined in § 80.2(c).

(p) *Gasoline importer* means an importer as defined in § 80.2(r) that imports gasoline or gasoline blending stocks that could become gasoline solely upon the addition of oxygenates.

(q) *Gasoline refiner* means a refiner as defined as in § 80.2(i) that produces gasoline or gasoline blending stocks that could become gasoline solely upon the addition of oxygenates.

(r) *Oxygenate blender* has the same meaning as defined in § 80.2(mm).

(s) *Oxygenate blending facility* has the same meaning as defined in § 80.2(ll).

(t) *Regulatory control periods* has the same meaning as defined in § 80.27(a)(1). Regulatory control periods is defined in § 80.27(a)(1) to mean June 1 to September 15 for retail outlets and wholesale purchaser-consumers and May 1 to September 15 for all other facilities.

(u) *Retail outlet* has the same meaning as defined § 80.2(j).

(v) *Retailer* has the same meaning as defined in § 80.2(k).

(w) *Survey series* means the four quarterly surveys that comprise a survey program.

(x) *Sampling strata* means the three types of areas sampled during a survey which include the following:

(1) Densely populated areas;

(2) Transportation corridors; and

(3) Rural areas.

(y) *Wholesale purchaser-consumer* has the same meaning as defined in § 80.2(o).

§ 80.1501 What are the labeling requirements that apply to retailers and wholesale purchaser-consumers of gasoline-ethanol blends that contain greater than 10 volume percent ethanol and not more than 15 volume percent ethanol?

(a) Any retailer or wholesale purchaser-consumer who sells, dispenses, or offers for sale or dispensing, gasoline-ethanol blends that contain greater than 10 volume percent ethanol and not more than 15 volume percent ethanol shall affix the following conspicuous and legible label to the fuel dispenser:

CAUTION!
This fuel contains 15% ethanol maximum
Use only in:
2007 and newer gasoline cars
2007 and newer light-duty trucks
Flex-fuel vehicles
This fuel might damage other vehicles and engines. Federal law ***prohibits*** its use in all other vehicles and engines

(b) Labels shall meet the following requirements for appearance and placement:

(1) *Dimensions.* The label shall measure 3 and 5/8 inches wide by 3 and 1/8 inches high.

(2) *Placement.* The label shall be placed on the upper two-thirds of each fuel dispenser in a location that is clearly visible to the consumer.

(3) *Text.* The text shall be centered and the appropriate font and background shall be used as described in paragraphs (b)(3)(i) through (iii) and (b)(4)(i) through (iv).

(i) The word "CAUTION!" shall be in 24-point, dark red, bold, Arial font.

(ii) The ethanol content "This fuel contains 15% ethanol maximum" shall be in 14 point, white, Arial font.

(iii) All other text on the label shall appear in 14-point, black, Arial font, except that the word "prohibits" shall appear in 14-point, black, bold, italic, Arial font.

(4) *Color.* (i) The background for the area which includes the word "CAUTION!", and the ethanol content "This fuel contains 15% ethanol maximum" shall be 1-inch wide and neon-orange in color, except that a rectangular white background large enough to encompass the word "CAUTION!" shall be superimposed on this neon-orange background.

(ii) The background for all other text on the label shall be white.

(iii) The label shall have a 1/16-inch neon-orange three-sided border to the left, right, and bottom of the area which includes the text described in paragraph (b)(3)(iii) of this section. This border shall be attached to the neon-orange background area described in paragraph (b)(4)(i) of this section.

(iv) The label shall have a 1/16-inch white border, located to the outside of the neon-orange border described in paragraph (b)(4)(iii) of this section and neon-orange background area described in paragraph (b)(4)(i) of this section.

§ 80.1502 What are the survey requirements related to gasoline-ethanol blends?

No responsible party identified in paragraphs (a) and (b) of this section shall introduce E15 into commerce until the survey program requirements in either paragraph (a) or paragraph (b) in this section are satisfied.

(a) *Survey option 1.* In order to satisfy the survey program requirements, any gasoline refiner, gasoline importer, ethanol blender, ethanol producer, or ethanol importer shall properly conduct a program of compliance surveys in accordance with a survey program plan which has been approved by EPA in all areas which may be supplied with their gasoline, blendstock for oxygenate blending, ethanol, or gasoline-ethanol blend if these may be used to manufacture E15 or as E15. Such approval shall be based upon the survey program plan meeting the following criteria:

(1) The survey program shall consist of at least four quarterly surveys which shall occur during the following time periods:

(i) One survey during the period January 1 through March 31;

(ii) One survey during the period April 1 through June 30;

(iii) One survey during the period July 1 through September 30; and

(iv) One survey during the period October 1 through December 31.

(2) The survey program plan shall meet the general requirements of paragraph (b)(4) of this section.

(b) *Survey option 2.*

(1) To comply with the requirements under this paragraph (b), ethanol blenders, ethanol producers, ethanol importers, gasoline refiners, and gasoline importers must participate in the funding of a consortium which arranges to have an independent survey association conduct a statistically valid program of compliance surveys pursuant to a survey program plan which has been approved by EPA, in accordance with the requirements of paragraphs (b)(2) through (b)(4) and (b)(6) of this section.

(2) *General requirements.* The consortium survey program under this paragraph (b) must be:

(i) Planned and conducted by a survey association that is independent of the ethanol blenders, ethanol producers, ethanol importers, gasoline refiners, and/or gasoline importers that arrange to have the survey conducted. In order to be considered independent:

(A) Representatives of the survey association shall not be an employee of any ethanol blender, ethanol producer, ethanol importer, gasoline refiner, or gasoline importer;

(B) The survey association shall be free from any obligation to or interest in any ethanol blender, ethanol producer, ethanol importer, gasoline refiner, or gasoline importer; and

(C) The ethanol blenders, ethanol producers, ethanol importers, gasoline refiners, and/or gasoline importers that arrange to have the survey conducted shall be free from any obligation to or interest in the survey association.

(ii) Conducted at retail outlets that sell gasoline; and

(iii) Represent all gasoline dispensed nationwide.

(3) *Independent Survey Association Requirements.* The consortium described in paragraph (b)(1) of this section shall require the independent survey association conducting the surveys to:

(i) Submit to EPA for approval each calendar year a proposed survey program plan in accordance with the requirements of paragraph (b)(4) of this section.

(ii) Obtain samples of gasoline offered for sale at gasoline retail outlets in accordance with the survey program plan approved under this paragraph (b), or immediately notify EPA of any refusal of retail outlets to allow samples to be taken.

(iii) Test, or arrange to be tested, the samples required under paragraph (b)(3)(ii) of this section for oxygenate content as follows:

(A) Samples collected at retail outlets shall be shipped the same day the samples are collected via overnight service to the laboratory and analyzed for oxygenate content within 24 hours after receipt of the sample in the laboratory.

(B) Any laboratory to be used by the independent survey association for oxygenate testing shall be approved by EPA and its test method for determining oxygenate content shall be a method permitted under § 80.46(g).

(iv) In the case of any test that yields a result that does not match the label affixed to the product (*e.g.,* a sample greater than 15 volume percent ethanol dispensed from a fuel dispenser labeled as "E15" or a sample containing greater than 10 volume percent ethanol and not more than 15 volume percent ethanol dispensed from a fuel dispenser not labeled as "E15"), the independent survey association shall, within 24 hours after the laboratory receives the sample, send notification of the test result as follows:

(A) In the case of a sample collected at a retail outlet at which the brand name of a gasoline refiner or gasoline importer is displayed, to the gasoline refiner or gasoline importer, and EPA. This initial notification to a gasoline refiner or gasoline importer shall include specific information concerning the name and address of the retail outlet, contact information, the brand, and the ethanol content of the sample.

(B) In the case of a sample collected at other retail outlets, to the retailer and EPA.

(C) The independent survey association shall provide notice to the identified contact person or persons for each party in writing (which includes e-mail or facsimile) and, if requested by the identified contact person, by telephone.

(v) Confirm that each fuel dispenser sampled is labeled as required in § 80.1501 by confirming that:

(A) The label meets the appearance and content requirements of § 80.1501.

(B) The label is located on the fuel dispenser according to the requirements in § 80.1501.

(vi) In the case of a fuel dispenser that is improperly labeled, the survey association shall provide notice as provided in paragraphs (b)(2)(iv)(A) through (C) of this section.

(vii) Provide to EPA quarterly and annual summary survey reports which include the information specified in paragraph (b)(5) of this section.

(viii) Maintain all records relating to the surveys conducted under this paragraph (b) for a period of at least five (5) years.

(ix) Permit any representative of EPA to monitor at any time the conducting of the surveys, including sample collection, transportation, storage, and analysis.

(4) *Survey Plan Design Requirements.* The proposed survey program plan required under paragraph (b)(3)(i) of this section shall, at a minimum, include the following:

(i) *Number of Surveys.* The survey program plan shall include four quarterly surveys each calendar year. The four quarterly surveys collectively are called the survey series as defined in § 80.1500.

(ii) *Sampling Areas.* The survey program plan shall include sampling in all sampling strata, as defined in § 80.1500, during each survey. These sampling strata shall be further divided into discrete sampling areas or clusters. Each survey shall include sampling in at least 40 sampling areas in each stratum which are randomly selected.

(iii) *No advance notice of surveys.* The survey plan shall include procedures to keep the identification of the sampling areas that are included in any survey plan confidential from any regulated party prior to the beginning of a survey in an area. However, this information should not be kept confidential from EPA.

(iv) *Retail outlet selection.*

(A) The retail outlets to be sampled in a sampling area shall be selected from among all retail outlets in the sampling area that sell gasoline, with the probability of selection proportionate to the volume of gasoline sold at the retail outlets; the sample should also include retail outlets with different brand names as well as those retail outlets that are unbranded.

(B) In the case of any retail outlet from which a sample of gasoline was collected during a survey and determined to have an ethanol content that does not match the fuel dispenser label (*e.g.* a sample greater than 15 volume percent ethanol dispensed from a fuel dispenser labeled as "E15" or a sample with greater than 10 volume percent ethanol and not more than 15 volume percent ethanol dispensed from a fuel dispenser not labeled as "E15"), that retail outlet shall be included in the subsequent survey.

(C) One sample of each product dispensed as gasoline shall be collected at each retail outlet, and separate samples shall be taken that represent the gasoline contained in each gasoline storage tank unless collection of separate samples is not practicable.

(v) *Number of samples.*

(A) The minimum number of samples to be included in the survey plan for each calendar year shall be calculated as follows:

$$n = \left\{ \left[\left(Z_\alpha + Z_\beta \right) \right]^2 \Big/ \left(4 * \left[arc\sin\left(\sqrt{\phi_1}\right) - arc\sin\left(\sqrt{\phi_0}\right) \right]^2 \right) \right\} * St_n * F_a * F_b * Su_n$$

Where:

n = minimum number of samples in a year-long survey series. However, in no case shall n be smaller than 7,500.

Z_α = upper percentile point from the normal distribution to achieve a one-tailed 95% confidence level (5% α-level). Thus, Z_α equals 1.645.

Z_β = upper percentile point to achieve 95% power. Thus, Z_β equals 1.645.

φ_1 = the maximum proportion of non-compliant stations for a region to be deemed compliant. In this test, the parameter needs to be 5% or greater, *i.e.,* 5% or more of the stations, within a stratum such that the region is considered non-compliant. For this survey, φ_1 will be 5%.

φ_0 = the underlying proportion of non-compliant stations in a sample. For the first survey plan, φ_0 will be 2.3%. For subsequent survey plans φ_0, will be the average of the proportion of stations found to be non-compliant over the previous four surveys.

St_n = number of sampling strata. For purposes of this survey program, St_n equals 3.

F_a = adjustment factor for the number of extra samples required to compensate for collected samples that cannot be included in the survey, based on the number of additional samples required during the previous four surveys. However, in no case shall the value of F_a be smaller than 1.1.

F_b = adjustment factor for the number of samples required to resample each retail outlet with test results exceeding the labeled amount (*e.g.* a sample greater than 15 volume percent ethanol dispensed from a fuel dispenser labeled

as "E15" or a sample with greater than 10 volume percent ethanol and not more than 15 volume percent ethanol dispensed from a fuel dispenser not labeled as "E15"), based on the rate of resampling required during the previous four surveys. However, in no case shall the value of F_b be smaller than 1.1.

Su_n = number of surveys per year. For purposes of this survey program, Su_n equals 4.

(B) The number of samples determined pursuant to paragraph (b)(4)(v)(A) of this section, after being incremented as necessary to allocate whole numbers of samples to each cluster, shall be distributed approximately equally for the quarterly surveys conducted during the calendar year.

(5) *Summary survey reports.* The quarterly and annual summary survey reports required under paragraph (b)(3)(vii) of this section shall include the following information:

(i) An identification of the parties that are participating in the survey.

(ii) The identification of each sampling area included in a survey and the dates that the samples were collected in that area.

(iii) For each retail outlet sampled:

(A) The identification of the retail outlet;

(B) The gasoline refiner or gasoline importer brand name displayed, if any;

(C) The fuel dispenser labeling (*e.g.,* "E15");

(D) The sample test result for oxygenate content; and

(E) The test method used to determine oxygenate content under § 80.46(g).

(iv) Ethanol level summary statistics by brand and unbranded for each sampling area, strata, and survey series. These summary statistics shall:

(A) Include the number of samples, the average, median and range of ethanol content, expressed in volume percent.

(B) [Reserved]

(v) The quarterly reports required under this paragraph (b)(5) are due 60 days following the end of the quarter. The annual reports required under this paragraph (b)(5) are due 60 days following the end of the calendar year.

(vi) The reports required under this paragraph (b)(5) shall be submitted to EPA in an electronic spreadsheet.

(6) *Procedures for obtaining approval of survey plan.* The first year in which a survey program is conducted may consist of only a portion of a calendar year ending on December 31 (*i.e.* in the initial year, a survey program may begin on a date after January 1, but would still end on December 31). Subsequent survey programs shall be conducted on a calendar year basis. The procedure for obtaining EPA approval of a survey program plan under this paragraph (b), and for revocation of such approval, is as follows:

(i) For the first year in which a survey will be conducted, a survey program plan that complies with the requirements of this paragraph (b) must be submitted to EPA no later than 60 days prior to the date on which the survey program is to begin.

(ii) For subsequent years in which a survey will be conducted, a survey program plan that complies with the requirements of this paragraph (b) must be submitted to EPA no later than November 1 of the year preceding the calendar year in which the survey will be conducted.

(iii) The survey program plan must be signed by a responsible officer of the consortium which arranges to have an independent surveyor conduct the survey program.

(iv) The survey program plan must be sent to the following address: Director, Compliance and Innovative Strategies Division, U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Mail Code 6506J, Washington, DC 20460.

(v) EPA will send a letter to the party submitting the survey program plan that indicates whether EPA approves or disapproves the survey plan.

(vi) EPA may revoke its approval of a survey plan if EPA determines that the requirements in this section have not been complied with, or that the provisions of the survey plan approved by EPA pursuant to paragraph (b)(6)(v) of this section have not been diligently implemented.

(vii) The approving official for a survey plan under this section is the Director of the Compliance and Innovative Strategies Division, Office of Transportation and Air Quality.

(viii) Any notifications or reports required to be submitted to EPA under this paragraph (b) must be directed to the official designated in paragraph (b)(6)(iv) of this section.

(7) *Independent surveyor contract.*

(i) For the first year in which a survey program will be conducted, no later than 30 days preceding the start of the survey, the contract with the independent surveyor shall be in effect, and an amount of money necessary to carry out the entire survey plan shall be paid to the independent surveyor or placed into an escrow account with instructions to the escrow agent to pay the money to the independent surveyor during the course of the conduct of the survey plan.

(ii) For subsequent years in which a survey program will be conducted, no later than December 1 of the year preceding the year in which the survey will be conducted, the contract with the independent surveyor shall be in effect, and an amount of money necessary to carry out the entire survey plan shall be paid to the independent surveyor or placed into an escrow account with instructions to the escrow agent to pay the money to the independent surveyor during the course of the conduct of the survey plan.

(iii) For the first year in which a survey program will be conducted, no later than 15 days preceding the start of the survey EPA must receive a copy of the contract with the independent surveyor and proof that the money necessary to carry out the survey plan has either been paid to the independent surveyor or placed into an escrow account; if the money has been placed into an escrow account, a copy of the escrow agreement must to be sent to the official designated in paragraph (b)(6)(iv) of this section.

(iv) For subsequent years in which a survey program will be conducted, no later than December 15 of the year preceding the year in which the survey will be conducted, EPA must receive a copy of the contract with the independent surveyor and proof that the money necessary to carry out the survey plan has either been paid to the independent surveyor or placed into an escrow account; if placed into an escrow account, a copy of the escrow agreement must be sent to the official designated in paragraph (b)(6)(iv) of this section.

(8) *Failure to fulfill requirements.* A failure to fulfill or cause to be fulfilled any of the requirements of this paragraph (b) is a prohibited act under Clean Air Act section 211(c) and § 80.1504.

§ 80.1503 What are the product transfer document requirements for gasoline-ethanol blends, base gasolines, and conventional blendstocks for oxygenate blending subject to this subpart?

(a) *Product transfer documentation for conventional blendstock for oxygenate blending, or base gasoline transferred upstream of an ethanol blending facility.*

(1) In addition to any other product transfer document requirements under 40 CFR part 80, on each occasion when any person transfers custody or title to any conventional blendstock for oxygenate blending which could become conventional gasoline solely upon the addition of ethanol, or base gasoline upstream of an oxygenate blending facility, as defined in § 80.2(ll),

the transferor shall provide to the transferee product transfer documents which include the following information:

(i) The name and address of the transferor;

(ii) The name and address of the transferee;

(iii) The volume of conventional blendstock for oxygenate blending or gasoline being transferred;

(iv) The location of the conventional blendstock for oxygenate blending or gasoline at the time of the transfer;

(v) The date of the transfer;

(vi) For gasoline during the regulatory control periods defined in § 80.27(a)(1):

(A) The maximum Reid Vapor Pressure (RVP), as determined by a method permitted under § 80.46(c), stated in the following format: "The RVP of this base gasoline does not exceed [fill in appropriate value]"; and

(B) For base gasoline designed for the special provisions for gasoline-ethanol blends in § 80.27(d)(2), information about the suitable ethanol content stated in the following format: "Designed for the special RVP provisions for ethanol blends that contain between 9 and 10 volume % ethanol."

(C) For base gasoline not described in paragraph (a)(vi)(B) of this section, information regarding the suitable ethanol content, stated in the following format: "Suitable for blending with ethanol at a concentration of no more than 15 volume percent ethanol."

(2) The requirements in paragraph (a)(1) do not apply to reformulated gasoline blendstock for oxygenate blending, as defined in § 80.2(kk), which are subject to the product transfer document requirements of § 80.69 and § 80.77.

(b) *Product transfer documentation for gasoline transferred downstream of an oxygenate blending facility.*

(1) In addition to any other product transfer document requirements under 40 CFR part 80, on each occasion when any person transfers custody or title to any gasoline-ethanol blend downstream of an oxygenate blending facility, as defined in § 80.2(ll), except for transfers to the ultimate consumer, the transferor shall provide to the transferee product transfer documents which include the following information:

(i) The name and address of the transferor;

(ii) The name and address of the transferee;

(iii) The volume of gasoline being transferred;

(iv) The location of the gasoline at the time of the transfer;

(v) The date of the transfer; and

(vi) One of the statements detailed in paragraph (b)(1)(vi)(A) though (E) which accurately describes the gasoline-ethanol blend. The information regarding the ethanol content of the fuel is required year-round. The information regarding the RVP of the fuel is only required for gasoline during the regulatory control periods defined in § 80.27(a)(1).

(A) For gasoline containing no ethanol (E0), the following statement: "E0: Contains no ethanol. The RVP does not exceed [fill in appropriate value] psi."

(B) For gasoline containing less than 9 volume percent ethanol, the following statement: "EX—Contains up to X% ethanol. The RVP does not exceed [fill in appropriate value] psi." The term X refers to the maximum volume percent ethanol present in the gasoline.

(C) For gasoline containing between 9 and 10 volume percent ethanol (E10), the following statement: "E10: Contains between 9 and 10 volume percent ethanol. The RVP does not exceed [fill in appropriate value] psi."

(D) For gasoline containing greater than 10 volume percent and not more than 15 volume percent ethanol (E15), the following statement: "E15: Contains up to 15 volume percent ethanol. The RVP does not exceed [fill in appropriate value] psi;" or

(E) For all other gasoline that contains ethanol, the following statement: "EXX—Contains no more than XX% ethanol," where XX equals the volume % ethanol.

(2) Except for transfers to truck carriers, retailers, or wholesale purchaser-consumers, product codes may be used to convey the information required under paragraph (b)(1) of this section if such codes are clearly understood by each transferee.

(c) The records required by this section must be kept by the transferor and transferee for five (5) years from the date they were created or received by each party in the distribution system.

(d) On request by EPA, the records required by this section must be made available to the Administrator or the Administrator's authorized representative. For records that are electronically generated or maintained, the equipment or software necessary to read the records shall be made available, or, if requested by EPA, electronic records shall be converted to paper documents.

§ 80.1504 What acts are prohibited under this subpart?

No person shall—

(a)(1) Sell, introduce, or cause or allow the sale or introduction of gasoline containing greater than 10 volume % ethanol (*i.e.,* greater than E10) into any model year 2000 or older light duty gasoline motor vehicle, any heavy-duty gasoline motor vehicle or engine, any highway or off-highway motorcycle, or any gasoline-powered nonroad engines, vehicles or equipment;

(2) Notwithstanding § 80.1504(a)(1), no person shall be prohibited from selling, introducing, or causing or allowing the sale or introduction of gasoline containing greater than 10 volume % ethanol into any flex-fuel vehicle.

(b) Sell, offer for sale, dispense, or otherwise make available at a retail or wholesale purchaser-consumer facility a gasoline-ethanol blend that is not correctly labeled as to its ethanol content in accordance with § 80.1501;

(c) Fail to fulfill, or cause a failure of the fulfillment of, any survey required under § 80.1502;

(d) Fail to generate, use, transfer and maintain product transfer documents that accurately reflect the type of product, ethanol content, maximum Reid Vapor pressure (RVP), and other information required under § 80.1503;

(e) Improperly blend, or cause the improper blending of, ethanol into conventional blendstock for oxygenate blending, base gasoline or gasoline already containing ethanol, in a manner inconsistent with the information on the product transfer document under § 80.1503(a)(1)(vi) or § 80.1503(b)(1)(vi);

(f) For gasoline during the regulatory control periods defined in § 80.27(a)(1), combine any base gasoline or conventional blendstock for oxygenate blending intended for blending with E10 that took advantage of the 1 psi waiver applicable for 9–10 volume percent gasoline-ethanol blends with any gasoline or conventional blendstock for oxygenate blending intended for blending with E15, unless the resultant combination is designated, in its entirety, as an E10 blendstock for oxygenate blending.

(g) For gasoline during the regulatory control periods defined in § 80.27(a)(1), combine any gasoline-ethanol blend containing E10 that took advantage of the 1 psi waiver applicable to 9–10 volume percent gasoline-ethanol blends, with any gasoline containing E0 or any gasoline blend containing E15.

(h) Fail to meet any other requirement of this subpart.

(i) Cause another person to commit an act in violation of paragraphs (a) through (h) of this section.

§ 80.1505 Who is liable for violations of this subpart?

(a) *Persons liable.* Any person who violates § 80.1504(a) through (i) is liable for the violation. In addition, when the gasoline contained in any storage tank at

any facility owned, leased, operated, controlled or supervised by any gasoline refiner, gasoline importer, oxygenate blender, carrier, distributor, reseller, retailer, or wholesale purchaser-consumer is found in violation of the prohibitions described in § 80.1504(a), and (c) through (i), the following persons shall be deemed in violation:

(1) Each gasoline refiner, gasoline importer, oxygenate blender, carrier, distributor, reseller, retailer, or wholesale purchaser-consumer who owns, leases, operates, controls or supervises the facility where the violation is found.

(2) Each gasoline refiner or gasoline importer whose corporate, trade, or brand name, or whose marketing subsidiary's corporate, trade, or brand name, appears at the facility where the violation is found.

(3) Each gasoline refiner, gasoline importer, oxygenate blender, distributor, and reseller who manufactured, imported, sold, offered for sale, dispensed, supplied, offered for supply, stored, transported, or caused the transportation of any gasoline which is in the storage tank containing gasoline found to be in violation.

(4) Each carrier who dispensed, supplied, stored, or transported any gasoline which is in the storage tank containing gasoline found to be in violation, provided that EPA demonstrates, by reasonably specific showings using direct or circumstantial evidence, that the carrier caused the violation.

(b) For label violations under § 80.1504(b), only the wholesale purchaser-consumer or retailer and the branded gasoline refiner or branded gasoline importer, if any, shall be liable.

(c) Each partner to a joint venture, or each owner of a facility owned by two or more owners, is jointly and severally liable for any violation of this subpart that occurs at the joint venture facility or a facility that is owned by the joint owners, or a facility that is committed by the joint venture operation or any of the joint owners of the facility.

(d) Any parent corporation is liable for any violations of this subpart that are committed by any of its solely-owned subsidiaries.

§ 80.1506 What penalties apply under this subpart?

(a) Any person under § 80.1505 who is liable for a violation under § 80.1504 is subject to an administrative or civil penalty, as specified in sections 205 and 211(d) of the Clean Air Act, for every day of each such violation and the amount of economic benefit or savings resulting from the violation.

(b)(1) Any violation of any requirement that pertains to the ethanol content of gasoline shall constitute a separate day of violation for each and every day such gasoline giving rise to such violations remains any place in the gasoline distribution system, beginning on the day that the gasoline that violates such requirement is produced or imported and distributed and/or offered for sale, and ending on the last day that any such gasoline is offered for sale or is dispensed to any ultimate consumer for use in any motor vehicle, unless the violation is corrected by altering the properties and characteristics of the gasoline giving rise to the violations and any mixture of gasolines that contains any of the gasoline giving rise to the violations such that the gasoline or mixture of gasolines has the properties and characteristics that would have existed if the gasoline giving rise to the violations had been produced or imported in compliance with all requirements that pertain to the ethanol content of gasoline.

(2) For the purposes of this paragraph (b), the length of time the gasoline in question remained in the gasoline distribution system shall be deemed to be twenty-five days; unless the respective party or EPA demonstrates by reasonably specific showings, using direct or circumstantial evidence, that the gasoline giving rise to the violations remained any place in the gasoline distribution system for fewer than or more than twenty-five days.

(c) Any violation of any affirmative requirement or prohibition not included in paragraph (b) of this section shall constitute a separate day of violation for each and every day such affirmative requirement is not properly accomplished, and/or for each and every day the prohibited activity continues. For those violations that may be ongoing each and every day the prohibited activity continues shall constitute a separate day of violation.

§ 80.1507 What are the defenses for acts prohibited under this subpart?

(a) *Defenses for prohibited activities.*

(1) In any case in which a gasoline refiner, gasoline importer, oxygenate blender, carrier, distributor, reseller, retailer, or wholesale purchaser-consumer would be in violation under § 80.1504(a), and (c) through (i) it shall be deemed not in violation if it can demonstrate:

(i) That the violation was not committed or caused by the regulated party or its employee or agent;

(ii) That product transfer documents account for all of the gasoline in the storage tank found in violation and indicate that the gasoline met relevant requirements; and

(iii)(A) That it has conducted a quality assurance program, including a sampling and testing program, as described in paragraph (b) of this section;

(B) A carrier may rely on the sampling and testing program carried out by another party, including the party that owns the gasoline in question, provided that the sampling and testing program is carried out properly.

(2)(i) Where a violation is found at a facility which is operating under the corporate, trade or brand name of a refiner, that refiner must show, in addition to the defense elements required by paragraph (a)(1) of this section, that the violation was caused by:

(A) An act in violation of law (other than the Act or this part), or an act of sabotage or vandalism;

(B) The action of any reseller, distributor, oxygenate blender, carrier, or a retailer or wholesale purchaser-consumer supplied by any of these persons, in violation of a contractual undertaking imposed by the gasoline refiner designed to prevent such action, and despite periodic sampling and testing by the gasoline refiner to ensure compliance with such contractual obligation; or

(C) The action of any carrier or other distributor not subject to a contract with the gasoline refiner but engaged by the gasoline refiner for transportation of gasoline, despite specification or inspection of procedures and equipment by the gasoline refiner which are reasonably calculated to prevent such action.

(ii) In this paragraph (a), to show that the violation "was caused" by any of the specified actions the party must demonstrate by reasonably specific showings using direct or circumstantial evidence, that the violation was caused or must have been caused by another.

(3) For label violations under § 80.1504(b), the branded gasoline refiner or branded gasoline importer shall not be deemed liable if the requirements of paragraph (b)(4) of this section are met.

(b) *Quality assurance program.* In order to demonstrate an acceptable quality assurance program for gasoline at all points in the gasoline distribution network, other than at retail outlets and wholesale purchaser-consumer facilities, a party must present evidence of the following in addition to other regular appropriate quality assurance procedures and practices.

(1) A periodic sampling and testing program to determine if the gasoline

contains applicable maximum and/or minimum volume percent of ethanol.

(2) That on each occasion when gasoline is found in noncompliance with one of the requirements referred to in paragraph (b)(1) of this section:

(i) The party immediately ceases selling, offering for sale, dispensing, supplying, offering for supply, storing, transporting, or causing the transportation of the violating product; and

(ii) The party promptly remedies the violation (such as by removing the violating product or adding more complying product until the applicable requirements are achieved).

(3) An oversight program conducted by a carrier under paragraph (b)(1) of this section need not include periodic sampling and testing of gasoline in a tank truck operated by a common carrier, but in lieu of such tank truck sampling and testing the common carrier shall demonstrate evidence of an oversight program for monitoring compliance with the requirements of § 80.1504 relating to the transport or storage of gasoline by tank truck, such as appropriate guidance to drivers on compliance with applicable requirements and the periodic review of records normally received in the ordinary course of business concerning gasoline quality and delivery.

(4) The periodic sampling and testing program specified in paragraph (b)(1) of this section shall be deemed to have been in effect during the relevant time period for any party, including branded gasoline refiners and branded gasoline importers, if:

(i) An EPA approved survey program under § 80.1502 was in effect and was executed fully and properly;

(ii) Any retailer at which a violation was discovered allowed survey inspectors to take samples and inspect labels; and

(iii) For truck loading terminals and truck distributors that perform oxygenate blending, additional quality assurance procedures and practices were in place, such as regular checks to reconcile volumes of ethanol in inventory and regular checks of equipment for proper ethanol blend rates.

§ 80.1508 What evidence may be used to determine compliance with the requirements of this subpart and liability for violations of this subpart?

(a) Compliance with the requirements of this subpart pertaining to the ethanol content of gasoline shall be determined based on the ethanol level of the gasoline, measured using the methodologies specified in § 80.46(g). Any evidence or information, including the exclusive use of such evidence or information, may be used to establish the ethanol content of gasoline if the evidence or information is relevant to whether the ethanol content of gasoline would have been in compliance with the requirements of this subpart if the appropriate sampling and testing methodology had been correctly performed. Such evidence may be obtained from any source or location and may include, but is not limited to, test results using methods other than those specified in § 80.46(g), business records, and commercial documents.

(b) Determinations of compliance with the requirements of this subpart other than those pertaining to the ethanol content of gasoline, and determinations of liability for any violation of this subpart, may be based on information obtained from any source or location. Such information may include, but is not limited to, business records and commercial documents.

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