Inventory of Federal Regulations Affecting Biofuels other than the Renewable Fuel Standard

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DISCLAIMER

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ABOUT BPC

Founded in 2007 by former Senate Majority Leaders Howard Baker, Tom Daschle, Bob Dole and George Mitchell, the Bipartisan Policy Center is a non-profit organization that drives principled solutions through rigorous analysis, reasoned negotiation and respectful dialogue. With projects in multiple issue areas, BPC combines politically balanced policymaking with strong, proactive advocacy and outreach.

Substantial changes in energy markets, persistent challenges in courts, and difficulties in the implementation of relevant enacting laws have kept the Renewable Fuel Standard (RFS) at the forefront of energy policy discussions. There are both strong advocates in support of holding firm on the existing requirements and calls for outright repeal. But there also exists an active middle ground focusing on reforming, not repealing, the RFS.

The Bipartisan Policy Center (BPC) is undertaking a yearlong effort aimed at fostering constructive dialogue and action on reforming the RFS. To do this, BPC is convening a diverse RFS advisory group to discuss opportunities for reform, hosting public workshops to solicit broad input, and ultimately publishing viable policy options based, in part, on the advisory group's deliberations.

As part of this effort, BPC has commissioned a series of background papers on various RFS topics. These papers are targeted at a broad audience that includes not only BPC's advisory group, but also policymakers, industry, and the public, with the intention of educating and informing the wider debate surrounding this issue. Given a topic as complex as the RFS, these papers cover multiple issues, providing a focused view from the perspectives of technology, infrastructure, policy, and law. The first three background papers listed will be released in early February. The remaining two, which are two separate law firms' perspectives on the same topic, will be released by the end of February.

1. **Technical Barriers to the Consumption of Higher Blends of Ethanol**
   The International Council on Clean Transportation
2. **Petroleum and Renewable Fuels Supply Chain**
   Stillwater Associates LLC
3. **Inventory of Federal Regulations Affecting Biofuels other than the Renewable Fuel Standard**
   Van Ness Feldman
4. **The Environmental Protection Agency's Authority to Amend the Renewable Fuel Standard**
   Sutherland Asbill & Brennan LLP
5. **The Environmental Protection Agency's Authority to Amend the Renewable Fuel Standard**
   Bracewell & Giuliani LLP

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To read other background papers in the series or for additional information about this effort, please visit http://bipartisanpolicy.org/projects/energy/renewable-fuel.

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The Renewable Fuel Standard (RFS) mandates that a minimum volume of renewable fuels be consumed in the U.S. transportation fuel supply each year, targeting 15 billion gallons per year of renewable fuel in 2015 and an additional 21 billion gallons per year of advanced renewable fuels in 2022. The Environmental Protection Agency (EPA) is responsible for establishing and implementing the regulations of the RFS, and EPA has some discretionary authority to adjust the mandated volumes.

Although the RFS has been the key driver in the production and use of biofuels in recent years, there are a number of other provisions in the Code of Federal Regulations (CFR) that directly or indirectly create incentives or barriers to the use of biofuels in the vehicle transportation sector. This inventory seeks to identify and categorize the most significant of these non-RFS regulations.

The inventory is divided into categories based on the segment of the biofuels production chain impacted by the regulations, be it fuel, motor vehicles, non-road vehicles, infrastructure, or stationary sources. Within each category, the inventory provides a brief description of the particular program and its potential impact on biofuels. The relevant government agency, regulatory citation, and statutory authority are also provided for each program.

Note that the inventory does *not* include regulations that generally affect fuel use or fuel production without any particular impact on biofuels. For example, rules regulating agricultural production are not included because such rules are not dependent on whether the crop is grown for food or for fuel. Rules regulating workplace safety of agricultural and biofuel production facilities are not included because these rules, too, do not have a distinct impact on biofuel production.

Additionally, this inventory does not include policies implemented by individual states, such as the low carbon fuel standard enacted as part of California's climate change legislation, AB 32.

Finally, although the federal government has a significant number of tax, grant, and loan programs for which biofuel producers and consumers are eligible, this inventory does not include federal funding policies for biofuel research, production, and consumption. Note that these policies have been thoroughly catalogued in the 2013 Congressional Research Service Report *Alternative Fuel and Advanced Vehicle Technology Incentives: A Summary of Federal Programs*.[1]

CATEGORY	PROGRAM	IMPACTS ON BIOFUELS
Fuel Regulations	Fuel Registration Requirements	Only certain fuels are designated for use in conventional vehicles. Designated fuels must register with EPA.
	Fuel Waiver Program	E10 and E15 have received waivers for use in conventional vehicles.
	Waiver Fuel Misfueling Mitigation Regulations	E15 fueling stations must have a plan to mitigate misfueling.
	Reid Vapor Pressure (RVP) Program	E10 receives special consideration to meet RVP, E15 does not.
	Reformulated Gasoline (RFG) Program	Biofuels useful for compliance with RFG program.
	Gasoline Sulfur Program	Biofuels useful for compliance with this program.
	E85 Blendstock Guidance	Current guidance makes full use of high-ethanol content fuel difficult.
	Proposed Tier 3 Regulation of E85	Proposed changes would impose some new obligations on E85.
	Winter Oxygenated Fuel Area Program	Biofuels useful for compliance with this program.
	Mobile Source Air Toxics Program	Biofuels useful for compliance with this program.
	SIPs to Comply with NAAQS	Biofuels could be used by States to comply with this program.
Motor Vehicle Regulations	Non-Greenhouse Gas (GHG) Vehicle Emission Standards	Current standards use test fuel with zero ethanol. Proposed standards would use E15.
	Greenhouse Gas (GHG) Emissions Standards	Tailpipe (not lifecycle) emissions are used to determine compliance. Flex-fuel vehicles must demonstrate actual E85 use.
	Corporate Average Fuel Economy (CAFE) Standards	Higher standards may encourage new technology that benefits biofuels.
	Vehicle MPG Labeling	Lower ethanol energy density may make flex-fuel vehicles appear less attractive. Tailpipe (not lifecycle) emissions data reported on labels.
	Federal Fleet Management	Federal agencies have mandates to buy alternative fuel vehicles, including those running on biofuels.
Regulation of Biofuel Use in Non-Road Vehicles	Bio-derived Jet Fuel Specification	FAA regulations only allow flights using fuels specified by ASTM. Certain biofuels have received ASTM specifications.
Infrastructure Regulations	Hazardous Materials Definition	Ethanol deemed a hazardous material when transported by pipeline, and therefore subject to certain safety requirements.
Stationary Source Production Regulation	NESHAP for Chemical Manufacturing Area Sources (CMAS)	Ethanol plants that emit over a certain quantity of certain hazardous pollutants are subject to permitting and regulation.
	Prevention of Significant Deterioration (PSD) Program	Ethanol plants that emit over a certain quantity of criteria pollutants in certain areas are subject to permitting and regulation.

Fuel Regulations

The federal regulation of fuels is predominantly the responsibility of the Environmental Protection Agency (EPA). These rules proscribe the contents of fuels that can be sold for conventional fuel vehicles. To date, EPA has not regulated fuels used in alternative fuel vehicles, such as E85, compressed natural gas (CNG), and liquefied natural gas (LNG). Given the increased penetration of alternative fuel vehicles, however, EPA is beginning to propose new rules that would directly regulate the content of alternative fuels in addition to the mandates set by the RFS. In addition to EPA regulation, other agencies such as the Federal Trade Commission (FTC) have some authority to issue fuels regulations that affect the demand for biofuels.

E85 is a blend of gasoline and ethanol. E85 can contain between 51 percent and 83 percent ethanol, and must contain at least 2 percent denaturant.[2] The actual percent of ethanol in use in E85 will vary based on "seasonal climactic conditions and regional gasoline volatility specifications."[3] In recent rulemakings, EPA has begun referring to blends of gasoline and between 51 percent and 85 percent ethanol as "E51-85" or "flex-fuel" to reduce confusion as to the variability of ethanol.[4] In this inventory, we retain the E85 convention.

Fuel Registration Requirements

Program Description: Section 211(a) of the Clean Air Act gives EPA the responsibility of designating substances as vehicle fuels. The only fuels designated by EPA as fuels requiring registration are gasoline and diesel. Designated fuels that have not been approved by EPA cannot be sold for use in conventional vehicles.

Fuels outside of gasoline and diesel need not meet EPA's registration requirements and related regulations (see "Reid Vapor Pressure (RVP) Program," "Reformulated Gasoline (RFG) Program," "Gasoline Sulfur Program," "Winter Oxygenated Fuels Program," and "Mobile Source Air Toxics (MSAT) Program" below). However, in order to be used in conventional vehicles, such non-registered fuels require either: (1) a determination that the fuel is "substantially similar" to gasoline or diesel, or (2) an EPA waiver (see "Fuel Waiver Program" below). EPA has determined that for a fuel to be "substantially similar" to gasoline, it must be made up exclusively of carbon, hydrogen, oxygen, nitrogen, and/or sulfur; contain no more than 2.7 percent oxygen content by weight; and not have any metallic additives.[5] EPA has not explicitly defined "substantially similar" for diesel fuels.[6] Fuels used in alternative fuel vehicles (such as those that run on E85, CNG, and LNG), however, need not be registered with EPA under this program.

Impact on Biofuels: Certain blends of ethanol and gasoline are not considered to be "substantially similar" to gasoline. Only E10 and E15 have received waivers from this

requirement (see "Fuel Waiver Program" below). Isobutanol, a bio-based butanol, meets the "substantially similar" requirement at a mix of 12.5 percent isobutanol and 87.5 percent gasoline. E85 cannot be used for conventional vehicles, but it does not meet the definition of "gasoline" and therefore is not subject to EPA's fuel regulations when used in flex-fuel vehicles. While EPA has not issued a "substantially similar" specification for diesel fuel, biodiesel can be blended and sold at any amount up to 100 percent biodiesel ("B100").[7] Biodiesel producers may sell their particular blends in commerce after registration with EPA. EPA's practice has been to register any biodiesel that meets the appropriate American Society for Testing and Materials (ASTM) specification at the time registration is requested.[8]

Agency: EPA
Citation: 40 C.F.R. § 79
Statutory Authority: Clean Air Act § 211(a)

Fuel Waiver Program

Program Description: The Clean Air Act requires fuels used in conventional vehicles to be "substantially similar" to the fuels used for testing 1975 model year vehicles—gasoline and diesel—unless EPA explicitly grants a waiver. EPA has granted a number of waivers. For ethanol, EPA has granted waivers both to fuels that contain up to 10 percent ethanol (E10) and fuels that contain up to 15 percent ethanol (E15). EPA's waiver grant to E10 was done by default when EPA did not respond to a petition.[9] EPA's grant of a partial waiver to E15 for light-duty vehicles after model year 2001 was done by regulation in two parts in 2010 and 2011.[10] EPA has not granted waivers for blends of gasoline and ethanol with greater than 15 percent ethanol.

Impact on Biofuels: Fuel waivers do not require the blending of a specified amount of biofuels. Instead, they set an upper limit on the percent of biofuels that may be blended into gasoline. These upper limits, however, do impact the amount of biofuel that is demanded by the market and the extent that biofuel production (which is largely driven by the RFS) can be effectively utilized by conventional vehicles. Additionally, there is some concern that E15 and blends with higher concentrations of ethanol will cause damage to older engines and to small engines, such as those in motorcycles, off-road equipment, and boats. EPA has tried to mitigate these concerns by requiring Misfueling Mitigation Plans (see "Waiver Fuel Misfueling Mitigation Regulations" below).

Agency: EPA
Citation: Partial Grant and Partial Denial of Clean Air Act Waiver Application, 75 Fed. Reg. 68094 (Nov. 4, 2010); Partial Grant of Clean Air Act Waiver Application, 76 Fed. Reg. 4662 (Jan. 26, 2010)
Statutory Authority: Clean Air Act § 211(f)

Tier 2 Regulations

Until the issuance of the Tier 2 regulations in 2000, EPA had regulated fuel pollutant content and vehicle tailpipe emissions separately. The Tier 2 rule is a comprehensive regulatory program that includes rules for both the pollution content of gasoline-based fuels and emission standards for conventional pollutants from new motor vehicles. By regulating both fuels and vehicles simultaneously, EPA can capitalize on new vehicle technologies that take advantage of lower pollution fuels. While EPA issued a rule addressing both fuels and vehicles, in the interest of clarity, this inventory separates the fuel and vehicle portions of these rules into their respective categories.

Proposed Tier 3 Regulations

Following on the Tier 2 regulations, EPA is currently in the process of issuing Tier 3 regulations. Tier 3 would increase the stringency of both vehicle emission standards (tailpipe and evaporative) and gasoline content requirements (including adding requirements for E85). Tier 3 would also change the test fuel used to determine vehicle emissions to E15 and include a test fuel specification for E85. These rules are all more specifically addressed in their respective categories in this inventory. EPA is expected to finalize the rule by early 2014.

Waiver Fuel Misfueling Mitigation Regulations

Program Description: Because E15 is not authorized for use in all vehicles and engines, it is subject to additional regulations. EPA has issued a specific set of requirements for manufacturers of E15 to develop and submit to EPA misfueling mitigation plans. To date, manufacturers have based their plans largely on the EPA-approved Renewable Fuels Association Model E15 Misfueling Mitigation Plan.[11] The requirements for misfueling mitigation include labeling requirements for gasoline stations that dispense E15.[12] For gasoline stations that utilize pumps that allow a consumer to choose E10 or E15, additional misfueling mitigation measures were required.[13] For example, in an effort to mitigate the impacts E15 can have on small engines—such as those contained in motorcycles—fuel pumps capable of dispensing both E10 and higher ethanol blends are required to sell E10 only in quantities of more than 4 gallons, to ensure that residual ethanol in the pump does not make up a large proportion of fuel dispensed.[14]

Impact on Biofuels: Misfueling mitigation plans can increase the costs of providing E15 and may serve as a disincentive for some gas stations to do so. On the other hand, labeling requirements reduce the risk that E15 will be used in vehicles that cannot support it and so functions as the basis for the grant of the waiver to begin with.

Agency: EPA
Citation: 40 C.F.R. § 80 subpart N
Statutory Authority: Clean Air Act § 211(c)(1)

Reid Vapor Pressure (RVP) Program

Program Description: The Clean Air Act directs EPA to regulate the volatility of fuels used in conventional vehicles, which can result in evaporative emissions—predominantly volatile organic compounds (VOCs)—and ground-level ozone. RVP is a measure of fuel volatility, and EPA mandates that during the summer ozone season in certain parts of the country, fuel contain only between 7.8 and 9 pounds per square inch (psi) RVP. However, by regulation, fuels that contain between 9 percent and 10 percent ethanol are allowed a 1 psi "bump"—that is, they can contain between 8.8 and 10 psi RVP.

Impact on Biofuels: The RVP program, and the 1-psi bump in particular, have a number of impacts on biofuels. (1) This policy encourages the use of E10 ethanol (gasoline blended with 10 percent ethanol). E10 does not contain 1 psi more RVP than conventional gasoline and so refiners can leave RVP in the gasoline blendstock while still meeting the 7.8 to 9 psi requirement + 1 psi bump. (2) This policy is a barrier to the adoption of higher than 10 percent ethanol-blended fuel, such as E15. E15 is not eligible for the "bump" and so compliance with the RVP rules would require blenders to procure specially tailored low-RVP petroleum blendstock (similar to the blendstock they would be required to procure at lower blending levels).

Agency: EPA
Citation: 40 C.F.R. § 80.27
Statutory Authority: Clean Air Act § 211(h)

Reformulated Gasoline (RFG) Program

Program Description: Mandated by the 1990 Clean Air Act, the RFG program requires that certain geographic areas sell gasoline blends that are cleaner burning and thereby reduce ozone formation and toxic pollutants during certain months of the year. Approximately 30 percent of gasoline sold in the United States is RFG. Prior to 2006, RFG was required to contain 2 percent oxygen by weight. The 2 percent requirement was repealed by Congress in the Energy Policy Act of 2005 (EPAct 2005) based on the theory that the oxygen content of gasoline would stay around 2 percent due to increased ethanol usage from the Renewable Fuel Standard (RFS), which was established by the same legislation.[15]

The more general RFG requirement remains in effect and is essentially a requirement that fuel have RVP below 7.0 in certain areas and during certain months (for more details see entry on the RVP program above).

Impact on Biofuels: Prior to the 2005 repeal of the required 2 percent oxygen-by-weight requirement, ethanol was often blended with petroleum fuels to create a blend with sufficient oxygen—because ethanol is a high-oxygen fuel. The establishment of the RFS in 2005 and its expansion in 2007 meant that the oxygen requirement was no longer driving ethanol use. However, it is also possible that the RFG oxygen requirement provided a rationale for the continued use of MBTE—a high-oxygen fuel additive that is alleged to cause

underground water contamination—and that without the requirement, ethanol has been substituted for MBTE.[16] Although the RFG program post-2005 does not contain a specific oxygen requirement, the lower RVP profile of biofuel means it is still useful in RFG.

Agency: EPA
Citation: 40 C.F.R. § 80 subpart D; Removal of Reformulated Gasoline Oxygen Content Requirement, 71 Fed. Reg. 26691 (May 8, 2006) (Repealing the RFG oxygenate requirement)
Statutory Authority: Clean Air Act § 211(k)

Gasoline Sulfur Program

Program Description: As part of its Tier 2 regulations, EPA has limited the sulfur content of gasoline, enabling the use of advanced emission-reduction controls and directly reducing air pollution. The current standards reduce sulfur by up to 90 percent. EPA has proposed an update to these limits in the Tier 3 Program, which, if finalized, will require gasoline blends to contain no more than 10ppm sulfur by 2017.

Impact on Biofuels: Ethanol and other biofuels contain little or no sulfur. These standards, therefore, create a demand for low-sulfur fuels to be mixed with petroleum-based fuels in order to meet the low-sulfur standards. Increasing the stringency of the standard through the Tier 3 rule could increase the benefits of low-sulfur biofuels.

Agency: EPA
Citation: 40 C.F.R. § 80 subpart H (Tier 2); Tier 3 Motor Vehicle Emission and Fuel Standards, 78 Fed. Reg. 29816 (May 21, 2013) (to be codified at 40 C.F.R. § 80 subpart O)
Statutory Authority: Clean Air Act § 211

E85 Blendstock Guidance

Program Description: As outlined above, E85 is not currently regulated under EPA's fuels program. However, this fuel is subject to specification by ASTM, which requires a *minimum* level of volatility that varies by season and geography.[17] Conversely, in order to ensure E85 quality and reduce sulfur content, EPA has issued guidance stating that any blendstock used to make E85 must be in compliance with applicable RFG regulations, including those setting a maximum volatility for the blendstock.[18]

Impact on Biofuels: Manufacturing high-ethanol content E85 (i.e., blends with 83 percent ethanol) at the minimum volatility of the ASTM specification is often not possible using the low-volatility blendstock required by EPA guidance. Manufacturers can only comply with both requirements by reducing the ethanol content of E85 closer to the 51 percent minimum level, which increases the volatility of the blend while leaving the volatility of the non-ethanol blendstock unchanged.[19] EPA is proposing to address this problem by directly regulating E85 in its proposed Tier 3 regulations (see "Proposed Tier 3 Regulation of E85" below). In doing this, EPA believes it can remove the requirement that only RFG be used as

an E85 blendstock, opening the door for the use of butane and natural gasoline liquids as blendstocks. This would allow sale of E85 with higher ethanol content while still meeting ASTM specifications.

Agency: EPA
Citation: Tier 3 Motor Vehicle Emission and Fuel Standards, 78 Fed. Reg. 29816, 29937 (May 21, 2013)
Statutory Authority: Clean Air Act § 211

Proposed Tier 3 Regulation of E85

Program Description: As a solution to the conflict between current E85 blend guidance and ASTM specifications discussed in "E85 Blendstock Guidance" above, and to regulate air quality as more E85 is brought to market, EPA has proposed in its Tier 3 rule to require that E85 meet the same sulfur, benzene, RVP, detergency, and fuel composition requirements of other regulated fuels. EPA has proposed and taken comment on a number of potential regulatory options. One such option would define manufacturers of E85 as "refiners," thereby providing more flexibility in how these requirements are met but with a higher administrative burden to demonstrate compliance. Another would allow manufacturers to reduce administrative and compliance burdens by using only blendstocks that meet certain fuel content specifications, while not considering them refiners.[20]

Impact on Biofuels: EPA regulation of E85 may increase production costs. On the other hand, EPA has asserted that the current "lack of clarity regarding the standards that apply to fuels used in FFVs could act to impede the further expansion of ethanol blended fuels."[21] As a means of removing the barrier created by the conflict between current blendstock guidance and ASTM specifications, these proposed rules could encourage the use of higher ethanol content E85.

Agency: EPA
Citation: Tier 3 Motor Vehicle Emission and Fuel Standards, 78 Fed. Reg. 29816, 29936-38 (May 21, 2013)
Statutory Authority: Clean Air Act § 211

Winter Oxygenated Fuel Area Program

Program Description: Adding oxygen to gasoline reduces the amount of carbon monoxide (CO) emitted at combustion, which can otherwise increase in colder weather.[22] Based on this understanding, beginning in the late 1980s, some states started requiring increased oxygen content of fuels sold in winter months.[23] Subsequently, the 1990 Clean Air Act Amendments included a provision requiring increased oxygen content of fuels sold in winter months in CO nonattainment areas.[24] More specifically, areas not in attainment of the National Ambient Air Quality Standard (NAAQS) for CO must ensure that gasoline sold in the winter months contain 2.7 percent oxygen by weight.[25] In addition, some states have

increased the required oxygen content to 3.5 percent. Almost all areas of the country are now in attainment of the NAAQS for CO.

Impact on Biofuels: Ethanol is the most common oxygenate for compliance with this program.[26] Ethanol is blended with gasoline so the blend contains the desired oxygen content. Therefore, in "nonattainment areas" for the CO NAAQS, fuel suppliers have an incentive to purchase fuels with higher ethanol blends. States are also using ethanol as an oxygenate in their "maintenance programs" for CO once they have reached attainment.

Agency: EPA
Citation: 40 C.F.R. § 80.35
Statutory Authority: Clean Air Act § 211(m)

Mobile Source Air Toxics (MSAT) Program

Program Description: The MSAT rules reduce hazardous air pollution—such as benzene, 3-butadiene, formaldehyde, acetaldehyde, acrolein, and naphthalene—from cars and trucks. The rules accomplish this both by regulating the benzene content of gasoline-based fuels and by regulating the air toxics emissions from new passenger vehicles. Specifically, in its 2007 rule, EPA required gasoline-based fuels to have less than 0.62 percent benzene by volume, on average, across a refinery by 2011. EPA is directed to "from time to time revise" these regulations; however, no revisions are currently announced.

Impact on Biofuels: Benzene is a high-octane substance. Therefore the reduction of benzene in fuels has likely marginally decreased the octane of the fuel. In order to compensate for this decrease, refiners are likely to blend in additional ethanol, which is very high octane.[27]

Agency: EPA
Citation: 40 C.F.R. § 80 subpart L
Statutory Authority: Clean Air Act § 202(l)

State Implementation Plans to Comply with NAAQS

Program Description: EPA sets NAAQS for criteria air pollutants such as nitrous oxides (NO_x), sulfur dioxide (SO_2), CO, and particulate matter (PM). States then develop implementation plans (SIPs) in order to reduce ambient concentrations of these air pollutants to the level set by the NAAQS. States have wide discretion as to what measures they will use to reduce these concentrations, including the promulgation of regulations for existing (rather than new) vehicles.

Impact on Biofuels: Although the Clean Air Act generally preempts states from implementing additional fuels regulations,[28] states can include such regulations in their SIPs,[29] including support for renewable fuels such as ethanol and biodiesel, the use of which reduces emissions of air pollutants, including PM, CO, hydrocarbons, and air toxics. Note

that biodiesel can increase emissions of NO_x and so these policies may not be attractive to all states.

Agency: EPA
Citation: Various
Statutory Authority: Clean Air Act § 108-110

Fuel Rating, Certification, and Labeling

Program Description: Starting in 1979, under the Petroleum Marketing Practices Act, the FTC regulates the rating, certification, and labeling of certain fuels. The FTC included biofuels in 1993.[30] In the Energy Independence and Security Act of 2007 (EISA), Congress directed the FTC to further develop labeling regulations for biomass-based diesel and biodiesel. All fuels must be rated, certified, and labeled at the appropriate octane level. Note that states, not the federal government, set regulations specifying the minimum octane *for sale*. In addition, biofuels (including E10, E15, E85, and biodiesel) must be labeled as such. The FTC has decided not to move forward with a somewhat controversial ethanol labeling proposal.[31]

Impact on Biofuels: The octane rating requirements can encourage the use of higher ethanol blend fuels because ethanol is a very high-octane fuel additive. In order to provide fuels that meet vehicle octane requirements set by states or deemed optimal by vehicle manufacturers, refiners blend in ethanol. FTC's proposals related to direct labeling of the fuel economy of ethanol may, if put into effect, discourage ethanol usage by highlighting that, due to lower energy density of ethanol compared with gasoline, ethanol generally has lower MPG than gasoline.

Agency: FTC
Citation: 16 C.F.R. § 306
Statutory Authority: 15 U.S.C. § 2821 et seq

Motor Vehicle Regulations

The regulation of motor vehicles has less of a direct impact on biofuels than regulation of fuels themselves. However, vehicle regulations can indirectly affect biofuel demand by encouraging the deployment of vehicles capable of utilizing biofuels and by giving biofuels a leg up when regulations take advantage of beneficial biofuel emission profiles. Finally, vehicle labeling that highlights the fuel economy and environmental strengths and weaknesses of biofuels can impact consumer preferences.

Non-Greenhouse Gas (GHG) Vehicle Emission Standards

Program Description: EPA sets tailpipe and evaporative NO_x, VOCs, and $PM_{2.5}$ emissions standards for motor vehicles as part of its Tier 2 regulations. EPA has proposed the Tier 3 regulations as an update to this program. If finalized, the Tier 3 regulations would further limit tailpipe and evaporative emissions from vehicles beginning in 2017. EPA uses an emissions test fuel to determine expected emissions from vehicles given certain emissions-control technologies. The test fuel was last updated before widespread adoption of E10, let alone E15. In its Tier 3 standards, EPA is proposing to update the test fuel to an E15 fuel, among other changes. The Tier 3 proposal also contains a proposed alternative high-octane certification fuel, such as E30, for vehicles designed to optimize high-octane fuel. Higher-octane fuels can utilize direct injection engines to reduce emissions. Finally, EPA is proposing to require flex-fuel vehicles, which until now only had to meet emissions tests using conventional gasoline, to meet emission standards both when using the newly required E15-based test fuel for conventional vehicles and when using E85.[32]

Impact on Biofuels: These changes will better reflect the emissions profile of higher-ethanol fuel blends and will encourage the adoption of those fuels. In particular, the high-octane fuels can be used to help vehicle manufacturers meet future more stringent fuel economy and GHG emission standards. However, additional regulation of E85 could increase costs.

Agency: EPA
Citation: 40 C.F.R. part 85 (Tier 2); Tier 3 Motor Vehicle Emission and Fuel Standards, 78 Fed. Reg. 29816 (May 21, 2013) (to be codified at 40 C.F.R. part 1065 subpart H)
Statutory Authority: Clean Air Act § 202

Greenhouse Gas (GHG) Emissions Standards

Program Description: As part of a joint rulemaking with the U.S. Department of Transportation, EPA set GHG emission standards for new model vehicles in 2009. EPA requires manufacturers to demonstrate biofuel use before providing credit for reduced GHG emissions to flex-fuel vehicles. While EPA assumes 50 percent use of non-gasoline for plug-in electric hybrids and CNG vehicles, it does not make particular assumptions for flex-fuel vehicles capable of using greater than 15 percent blend biofuels. Instead, manufacturers must provide EPA with evidence of the proportion of non-biofuel use for their particular fleet of flex-fuel vehicles.[33] However, EPA has proposed draft guidance providing a standardized "weight" for the amount of E85 used in flex-fuel vehicles when determining GHG emissions beginning for model year 2016.[34] The draft guidance assumes E85 is used 20 percent of the time. Biofuels advocates have argued that this number is too low and should be in the range of 40 percent to 60 percent.[35] This guidance has not yet been finalized. Notwithstanding the draft guidance, the full life-cycle GHG emissions emitted by vehicles that use biofuels (including the carbon sequestered by biofuel feedstock, energy used in production, and land-use changes due to increased demand for feedstock) are not considered in EPA standards. Only the tailpipe emissions of E85 (slightly lower than conventional gasoline) are considered for the E85 portion of the weighted average.

Impact on Biofuels: The rule for calculating vehicle emissions that assumes flex-fuel vehicles only will utilize conventional gasoline limits the incentive for sale of those vehicles as a means of compliance with the GHG emission standards. The fact that full life-cycle emissions are not considered when calculating vehicle GHG emissions has uncertain impact on biofuel usage as the relative life-cycle emissions between biofuels and gasoline are disputed and depends on the type of feedstock used to produce the biofuel. The rule also may have second-order impacts on biofuel. As GHG emission standards increase beyond their current levels, vehicle manufacturers will have to implement new techniques. One such technique is direct fuel injection. This technology, however, requires higher fuel octane levels to work properly. Ethanol has higher octane than gasoline and is often used as a fuel additive to increase the octane of the blended fuel. Accordingly, the move to direct injection promoted by increasing fuel economy standards might increase demand for ethanol as a fuel additive to boost the octane of the fuel blend.

Agency: EPA
Citation: 40 C.F.R. Part 85
Statutory Authority: Clean Air Act § 202

Corporate Average Fuel Economy (CAFE) Standards

Program Description: Vehicle manufacturers are required to sell vehicles that, averaged across each fleet (domestic passenger car, imported passenger car, and light-duty truck), meet certain fuel economy levels. CAFE standards were first implemented in 1975 in response to the 1970s oil embargos. As the law was phased in, fuel economy increased

steadily through the early 1980s. Standards leveled off from the mid-1980s until a 2006 revision in EISA. This revised program increased standards, particularly for light-trucks and SUVs, and instituted new flexibility mechanisms such as trading across vehicle categories. Beginning in 2009, the Obama administration increased the stringency of standards for light-duty vehicles and, for the first time, set standards for medium- and heavy-duty trucks. The fuel economy of flex-fuel vehicles (vehicles capable of running on conventional gasoline, up to 85 percent ethanol, or any blend of the two) through model year 2019 is statutorily required to be calculated assuming 50 percent use of gasoline and 50 percent use of E85.[36] In addition, in an effort to further encourage the deployment of flex-fuel vehicles, EISA requires that each flex-fuel vehicle sold receives 1.2 credits for each mile per gallon rather than 1 credit through 2014. Manufacturers have optimized the number of vehicles sold in each fleet to maximize the impact of this credit, but have not pushed flex-fuel vehicles significantly beyond that encouraged by the credit. The law phases this bonus crediting down so that flex-fuel vehicles only receive 1 credit per MPG after model year 2019.[37]

Impact on Biofuels: In general, CAFE standards increase fuel economy and decrease fuel use, potentially including biofuel use. However, certain policies have been in place to encourage certain vehicles capable of running on biofuels. The flex-fuel vehicle credit received by manufacturers encourages the sale of flex-fuel vehicles capable of using fuels with greater than 15 percent ethanol. However, it is not clear that it increases the *use* of biofuels, as many consumers who purchase flex-fuel vehicles use conventional E10 gasoline. Fuel economy standards are tied with EPA's GHG emission standards. Therefore, this policy has similar impacts to the EPA GHG policy discussed above. Additionally, increasing fuel economy standards have reduced the quantity of fuel consumed. Combined with the quantity-based requirements of the RFS, lower demand (driven partially by increasing fuel economy) may create a problem if the mandated quantity of biofuels increases the blend percentage beyond the current standard of 10 percent (also known as the "blend wall"). Although this could lead to greater adoption of E15, EPA has recently proposed a reduction in the mandated RFS volumes of total renewable fuels and advanced biofuels, in order to avoid the perceived "blend wall" problem.[38]

Agency: DOT NHTSA
Citation: 40 C.F.R. Parts 523, 531, 533, 536, 537
Statutory Authority: 49 U.S.C. §§ 32902, 32904-6

Vehicle MPG Labeling

Program Description: In 2011, EPA and the National Highway Traffic Safety Administration (NHTSA) revised the required label for new motor vehicles.[39] Labels will apply to model year 2013 and later vehicles, including passenger cars, light-duty trucks, and SUVs. Ethanol flexible fuel vehicles have special labeling requirements. These labels must identify the types of fuels that a vehicle may operate with and must list the vehicle's fuel economy when operated with gasoline. Manufacturers also have the option of including E85 range information. The label also includes expected tailpipe GHG emissions.

Impact on Biofuels: Because ethanol is less energy dense than gasoline, labels that list E85 range for flex-fuel vehicles may discourage use of high-ethanol blends by showing lower fuel economy. In addition, the labels do not account for any life-cycle GHG benefits when using biofuels compared with petroleum-based fuel.

Agency: DOT NHTSA / EPA Joint Rule
Citation: 40 C.F.R. Part 85; 49 C.F.R. Part 575
Statutory Authority: 49 U.S.C. § 32908

Federal Fleet Management

Program Description: Federal agencies face a complex web of requirements for the purchase and use of alternative fuel vehicles and fuels. The most recent requirement, from Executive Order 13514, requires agencies to establish GHG reduction targets and to achieve those targets through any of a range of measures, including through managing federal vehicle fleets. Agencies are also required to reduce petroleum consumption by 2 percent annually through 2020. Agencies can comply by using low GHG-emitting vehicles. The U.S. General Services Administration's guidance on E.O. 13514 contains helpful information on various fleet management requirements.[40]

Impact on Biofuels: The purchase of flex-fuel and other alternative fuel vehicles by federal fleets can, in theory, increase the use of biofuels. However, some agencies that have purchased flex-fuel vehicles have not actually utilized biofuels in those vehicles.[41]

Agency: All
Citation: E.O. 13514, 13423; EISA 2007 §§ 141, 142, 246; EPAct 2005 § 701
Statutory Authority: Various

Regulation of Biofuel Use in Non-Road Vehicles

Biofuel use need not be limited to passenger and other motor vehicles. Initiatives are underway to increase biofuel use in ships, railroads, and airplanes. However, while some funding and initial research have been made for rail[42] and sea[43] use of biofuels—particularly by the U.S. Department of Defense—by far the largest emphasis has been on biofuel use in air transportation.

Bio-Derived Jet Fuel Specification

Program Description: Federal Aviation Administration (FAA) regulations limit the use of fuels for air transportation to those that have received specification by ASTM. In July 2011, ASTM approved an air transport biofuel specification called ASTM D7566 that allows up to 50 percent blend of biofuels.[44] In 2011, ASTM approved the use of hydroprocessed esters and fatty acids (HEFA), which are chemicals identical to hydrocarbons found in jet fuel, but are derived from vegetable-oil-containing feedstocks (such as algae, camelina, or jatropha), or from animal fats (called "tallow"). ASTM has had a specification for biomass fuels produced through Fischer-Tropsch (a chemical process for converting certain solids or gasses to liquid hydrocarbons) since 2009.

Impact on Biofuels: Without this approval, biofuels would not be approved for use in commercial flights. Since the approval in 2011, a number of commercial flights have used biofuels, including a new weekly KLM flight from New York to Amsterdam.[45] Additional types of biofuels must receive approval before their use becomes available.

Agency: FAA
Citation: 14 C.F.R. § 91.9 (requiring only the use of fuels certified); 14 C.F.R. parts 33, 23, 25, 27, 29 (specifying that ASTM International aviation fuel specifications are certified for various types of engines and planes)
Statutory Authority: 49 U.S.C. § 44704

Infrastructure Regulations

The Pipeline and Hazardous Materials Safety Administration (PHMSA) regulates the transportation of certain biofuels as hazardous materials. Flammable, toxic, corrosive, and environmentally harmful biofuels were explicitly included in the definition of hazardous materials, thereby subjecting these biofuels to general PHMSA hazardous materials pipeline safety regulations.[46] Although PHMSA has not made any formal rulemakings as to which biofuels are considered "flammable, toxic, corrosive, and environmentally harmful," a prior

proposed rule suggests that ethanol would likely fit within this category.[47] PHMSA has not made a determination regarding the regulation of other biofuels, such as biodiesel.

The inclusion of ethanol as a hazardous material paves the way for transportation by pipeline, but will also subject pipeline operators that want to transport ethanol to the regulations required for any hazardous material, including the development of integrity management plans[48] and spill and emergency response plans.[49] In addition, PHMSA may request that pipelines obtain special permits for shipping ethanol, which can add time and increase the stringency of safety requirements.[50]

Stationary Source Production Regulation

The Clean Air Act establishes significant regulation of stationary sources of air pollution. While facilities that produce biofuels are subject to these regulations, most such regulation does not impact biofuel production uniquely and so is not addressed in this inventory. However, there are a small number of regulations specific to biofuel production.

National Emission Standards for Hazardous Air Pollutants (NESHAP) for Chemical Manufacturing Area Sources (CMAS)

Program Description: This Clean Air Act rule limits the amount of hazardous air pollutants that can be emitted by a stationary source. After a 2009 revision, the biofuels industry sought clarification from EPA as to whether ethanol producers were subject to the CMAS rule and was told by EPA and state agencies that, given the particulars of the rule, they were not.[51] However, EPA revised the rule in 2013 in such a way that ethanol plants are now subject to the rule.[52]

Impact on Biofuels: This rule requires ethanol facilities to meet certain emission limits for hazardous air pollutants and will result in the installation of on-site emission control equipment. In addition, plants will be required to obtain a Title V permit, which imposes additional reporting obligations. This is likely to raise the cost of production.

Agency: EPA
Citation: 40 C.F.R. § 63 subpart VVVVVV
Statutory Authority: Clean Air Act § 112

Prevention of Significant Deterioration Program

Program Description: This Clean Air Act program requires that "major sources" of regulated air pollutants in areas of the country that have ambient air pollution under the level set by NAAQS ("attainment areas") obtain a pre-construction permit and utilize the best available control technology (BACT) for the regulated pollutants emitted. The definition of major source is a source that emits 250 tons per year (tpy) of a regulated pollutant or emits only 100 tpy if the source category is on a particular EPA-defined list (note, EPA has set much higher thresholds for the emission of GHGs in its Tailoring Rule[53]). In 2007, EPA modified the definition of the listed source category "chemical process plants," which had previously included biofuel production facilities, to explicitly exclude "all facilities that

produce ethanol through a natural fermentation process that involves the use of such things as corn, sugar beets, sugar cane or cellulosic biomass as a feedstock."[54] EPA also excluded any fugitive emissions from these plants.[55]

Impact on Biofuels: By excluding ethanol from this definition, production facilities that emit more than 100 tpy but less than 250 tpy of regulated pollutants are not required to obtain PSD permits. To the extent other non-ethanol biofuels producers are considered "chemical process plants," however, they would not benefit from this exclusion.

Agency: EPA
Citation: 40 C.F.R. part 52 subpart A
Statutory Authority: Clean Air Act § 169

Endnotes

[1] Congressional Research Service, Alternative Fuel and Advanced Vehicle Technology Incentives: A Summary of Federal Programs, January 2013, https://www.fas.org/sgp/crs/misc/R42566.pdf.

[2] See: DOE, *Handbook for Handling, Storing, and Dispensing E85 and Other Ethanol Blends 3* (Sept. 2013), at http://www.afdc.energy.gov/uploads/publication/ethanol_handbook.pdf.

[3] See: J. Herzog, *Possible Approach to Fuel Quality Standards for Fuel Used in Flexible-Fuel Automotive Spark-Ignition Vehicles (FFVs), 2* (January 2012) in Docket EPA-HQ-OAR-2011-0135-0529, at http://www.regulations.gov/contentStreamer?objectId=090000648128138e&disposition=attachment&contentType=pdf.

[4] See, e.g.: Tier 3 Motor Vehicle Emission and Fuel Standards, 78 Fed. Reg. 29816, 29991-12 (May 21, 2013).

[5] EPA, Regulation of Fuels and Fuel Additives; Definition of Substantially Similar, (Jan. 24, 1991), at http://www.epa.gov/otaq/regs/fuels/additive/jan91.pdf/.

[6] Jim Caldwell, Office of Transportation and Air Quality, *Registration of New Biofuels and the Clean Air Act,* 5 (2012), at http://www.sae.org/events/gim/presentations/2012/jim_cadwell.pdf.

[7] EPA, *Guidance for Biodiesel Producers and Biodiesel Blenders/Users,* EPA420-B-07-019, at 1 (Nov. 2007), at http://www.epa.gov/otaq/renewablefuels/420b07019.pdf.

[8] Id. at 6.

[9] The provision allowing a waiver to be granted by operation of law when EPA did not respond within 180 days was removed from the Clean Air Act by the Energy EISA 2007.

[10] Partial Grant and Partial Denial of Clean Air Act Waiver Application, 75 Fed. Reg. 68094 (Nov. 4, 2010); Partial Grant of Clean Air Act Waiver Application, 76 Fed. Reg. 4662 (Jan. 26, 2010).

[11] Renewable Fuels Association, Model E15 Misfueling Mitigation Plan (March 2, 2012), at http://www.epa.gov/otaq/regs/fuels/additive/e15/documents/rfa-model-e15-misfueling-mitigation-plan.pdf. A list of approved E15 misfueling mitigation plans is available at http://www.epa.gov/otaq/regs/fuels/additive/e15/documents/e15-mmp-approved-companies-list.pdf.

[12] 76 Fed. Reg. 44406 (July 25, 2011).

[13] See: EPA, Sample Letter Approving Use of Model Misfueling Mitigation Plan at 2 (2012), at http://www.epa.gov/otaq/regs/fuels/additive/e15/documents/e15-mmp-approval-letter-sample.pdf.

[14] Id.

[15] EPA, Removal of Reformulated Gasoline Oxygen Content Requirement, EPA420-F-06-035 (May 2006), at http://www.epa.gov/otaq/regs/fuels/rfg/420f06035.pdf.

[16] See: 71 Fed. Reg. 26691, 26692 (May 8, 2006).

[17] What was previously deemed "E85" by ASTM has been renamed "ethanol fuel blends for flexible-fuel automotive spark-ignition engines" and specified in ASTM D5798–11. More detail on the ASTM D5798-11 specification and its volatility requirements is available in DOE, *Handbook for Handling, Storing, and Dispensing E85 and Other Ethanol-Gasoline Blends* (Sept. 2013), at http://www.afdc.energy.gov/uploads/publication/ethanol_handbook.pdf.

[18] See: J. Herzog, *Possible Approach to Fuel Quality Standards for Fuel Used in Flexible-Fuel Automotive Spark-Ignition Vehicles (FFVs), 2* (January 2012) in Docket EPA-HQ-OAR-2011-0135-0529, at http://www.regulations.gov/contentStreamer?objectId=090000648128138e&disposition=attachment&contentType=pdf.

[19] Id. at 2-3.

[20] Id. at 4.

[21] See: Tier 3 Motor Vehicle Emission and Fuel Standards, 78 Fed. Reg. 29816, 29937 (May 21, 2013).

[22] White House Office of Science and Technology Policy, *Interagency Assessment of Oxygenated Fuels*, at 1-7 to 1-8 (1997), at http://www.clu-in.org/download/contaminantfocus/mtbe/ostpfin.pdf.

[23] Id. at 1-7.

[24] Id. at iii.

[25] U.S. Environmental Protection Agency, State Winter Oxygenated Fuel Program, "Winter Oxygenates," at http://www.epa.gov/otaq/fuels/gasolinefuels/winterprograms/.

[26] EPA, State Winter Oxygenated Fuel Program Requirements for Attainment or Maintenance of CO NAAQS, EPA420-B-08-006 (Jan. 2008), at http://epa.gov/otaq/regs/fuels/420b08006.pdf.

[27] Control of Hazardous Air Pollutants from Mobile Sources, 72 Fed. Reg. 8428, 8482 (Feb. 2007), at http://www.gpo.gov/fdsys/pkg/FR-2007-02-26/pdf/E7-2667.pdf.

[28] See: Clean Air Act § 211(c)(4).

[29] See: EPA, *Guidance on the Use of Opt-in to RFG and Low RVP Requirements in Ozone SIPs*, (Aug. 1997), at http://www.epa.gov/otaq/fuels/gasolinefuels/documents/rvpguide.pdf.

[30] 58 Fed. Reg. 41356 (Aug. 3, 1993).

[31] See: Automotive Fuel Ratings Certification and Posting*,* 76 Fed. Reg. 19684 (Apr. 8, 2011).

[32] EPA has specified that the specific E85 test fuel used to test flex-fuel vehicles must contain between 80 percent and 83 percent ethanol. Tier 3 Motor Vehicle Emission and Fuel Standards, 78 Fed. Reg. 29816, 29912 (May 21, 2013).

[33] Manufacturers must present data and analysis to EPA sufficient to demonstrate, "based on sound statistical methodology and … account[ing] for analytical uncertainty," the proportion of E85 used in a vehicle type or feet: 40 C.F.R. § 600.510-12(k)(2). EPA provides as examples of acceptable analytical tools: "data gathered from on-board sensors and computers, from dual fuel vehicles in fleets that are centrally fueled, or from other sources." Id.

[34] EPA, *Draft Guidance for E85 Flexible Fuel Vehicle Weighting Factor for Model Years 2016–2019 Vehicles Under the Light-Duty Greenhouse Gas Emissions Program*, 78 Fed. Reg. 17660 (Mar. 2013), at http://www.gpo.gov/fdsys/pkg/FR-2013-03-22/pdf/2013-06657.pdf.

[35] See: Comments of Bob Dinneen, President & Chief Executive Officer (CEO), Renewable Fuels Association (RFA), at http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0120-0018.

[36] 49 U.S.C. § 32905.

[37] 49 U.S.C. § 32906.

[38] EPA, 2014 Standards for the Renewable Fuel Standard Program, 78 Fed. Reg. 71732 (Nov. 29, 2013).

[39] Revisions and Additions to Motor Vehicle Fuel Economy Label, 76 Fed. Reg. 39478 (July 6, 2011).

[40] Guidance for Federal Agencies on E.O. 13514 Section 12 , 4, at http://www.gsa.gov/graphics/fas/ExecutiveOrder13514.pdf.

[41] Emily Yehle, *Audit faults vehicle sustainability efforts*, E&E News PM, Oct. 29 2013, at http://www.eenews.net/eenewspm/stories/1059989620.

[42] See: UIC, Railways and Biofuel (July 2007), at http://www.uic.org/IMG/pdf/Railways_and_Biofuels_Final_Report.pdf; Bryan Sims, "Amtrak presents details on yearlong Heartland Flyer B20 trial," *Biodiesel Magazine* (Nov. 7, 2011), at http://www.biodieselmagazine.com/articles/8156/amtrak-presents-details-on-year-long-heartland-flyer-b20-trial.

[43] See: Great Green Fleet, Department of Defense, at http://greenfleet.dodlive.mil/energy/great-green-fleet/; Ecofys, *Potential for Biofuels for Shipping* (Jan. 2012), at http://www.ecofys.com/files/files/ecofys_2012_potential_of_biofuels_in_shipping_02.pdf.

[44] ASTM, ASTM Aviation Fuel Standard Now Specifies Bioderived Components, July 1, 2011, at http://www.astmnewsroom.org/default.aspx?pageid=2524.

[45] KLM, Weekly flight using sustainable biofuel, March 8, 2013, at https://www.klmtakescare.com/en/content/weekly-flight-using-sustainable-biofuel.

[46] Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 § 14, Pub. L. 112-90 (amending 49 U.S.C. § 60101(a)(4)(B) to include biofuels as hazardous liquids).

[47] Pipeline Safety: Miscellaneous Changes to Pipeline Safety Regulations, proposal, 76 Fed. Reg. 73570, 73571 (Nov. 29, 2011).

[48] 49 C.F.R. § 195.452.

[49] 49 C.F.R. parts 194, 195. See also: PHMSA, Safety Alert: Responding to Incidents Involving Ethanol and Gasoline Fuel Mixtures (April, 2006), at http://www.dnr.mo.gov/env/esp/docs/E-85_042606.pdf.

[50] 49 C.F.R § 190.341.

[51] See: Piyush Srivastav, EPA Air Regs: Changes Pose Severe Impacts for Ethanol Producers, *Ethanol Today* (May-June 2012), at http://www.bluetoad.com//display_article.php?id=1077477&id_issue=113360.

[52] National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources, 77 Fed. Reg. 75740 (Dec. 21, 2012).

[53] See: Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 Fed. Reg. 31514 (June 3, 2010).

[54] Treatment of Certain Ethanol Production Facilities Under the ''Major Emitting Facility'' Definition, 72 Fed. Reg. 24060 24061 (May 1, 2007) (codified in various sections of 40 C.F.R. parts 51, 52, 70, 71).

[55] *Id.* at 24068.