

Updated Informative Digest

Amendments to The California Reformulated Gasoline Regulations, Including Amendments Regarding the Downstream Blending of Oxygenates

Sections Affected: Adoption of sections 2263.7 and 2266.5, and amendments to sections 2260, 2262.5, 2264, 2265, and 2272 of Title 13, California Code of Regulations (CCR).

Background. The California Phase 2 reformulated gasoline (CaRFG) regulations were adopted by the Air Resources Board (ARB) following a hearing in November 1991. These regulations, which will become applicable in the spring of 1996, establish a comprehensive set of specifications for gasoline designed to achieve the maximum reductions in emissions of criteria pollutants and toxic air contaminants from gasoline-powered motor vehicles. The specifications cover sulfur, benzene, olefin, oxygen, and aromatic hydrocarbon contents, 50 percent (T50) and 90 percent (T90) distillation temperatures, and Reid vapor pressure (RVP).

The CaRFG standards include "cap" limits that apply to finished gasoline throughout the California gasoline distribution system. The standards also include generally more stringent limits that apply to gasoline when it is first supplied from a production facility (typically a refinery) or an import facility. The standards for gasoline being supplied from production or import facilities will apply starting March 1, 1996. The cap limits will apply starting April 15 to sales and supplies of gasoline throughout the gasoline distribution system except for gasoline being supplied from a bulk storage facility or being dispensed into a motor vehicle. Starting June 1, 1996 the cap standards will generally apply to all gasoline being sold or supplied in California.

Except in the case of RVP and oxygen content, the regulations provide two compliance options for meeting the limits applicable to gasoline being supplied from a production or import facility. One option is to elect to have the gasoline subject to a "flat limit," which must be met by every gallon of gasoline leaving the production or import facility. The other option is to elect an "averaging limit." The averaging limits established in the regulations for each of the six properties are more numerically stringent than the comparable flat limits. Under the averaging option, the producer may assign differing "designated alternative limits" (DALs) to different batches of gasoline being supplied from the production or import facility. Each batch of gasoline must meet the DAL for the batch. A producer or importer supplying a batch of gasoline with a DAL less stringent than the averaging limit must within 90 days before or after supply from the same facility sufficient quantities of gasoline subject to more stringent DALs to fully offset the exceedances of the averaging limit.

The CaRFG regulations also contain a mechanism under which a producer or importer may use the "California predictive model" to identify alternative flat and averaging limits applicable when gasoline is supplied from the production or import facility. The predictive model consists of a set of three mathematical equations which estimate the changes in exhaust emissions of hydrocarbons, oxides of nitrogen (NOx), and four toxic air contaminants that

result from different gasoline formulations. The equations are based on the results of a wide variety of test programs evaluating the effect of fuel properties on emissions. Producers and importers may use the predictive model to identify any combination of alternative flat and averaging limits as long as the emissions from the gasoline with the combination of limits are no greater than the emissions of gasoline meeting the comparable flat and average limits identified in the regulation.

The standards for oxygen content are administered differently from the rest of the standards. Oxygen is added to gasoline by blending in an "oxygenate," the most common of which are currently methyl tertiary butyl ether (MTBE) and ethanol. In most cases, CaRFG must have an oxygen content between 1.8 wt.% and 2.2 wt.%. Producers and importers may use the predictive model mechanism--or an analogous mechanism in which alternative gasoline formulations are certified based on a vehicle test program--to establish a maximum oxygen content limit as high as 2.7 wt.%. Since adding oxygen to gasoline reduces carbon monoxide (CO) emissions and ambient concentrations of CO are highest during the wintertime, the CaRFG regulations do not allow alternative formulations with oxygen contents below 1.8 wt.% during specified wintertime oxygenate control periods. In the rest of the year, gasoline formulations meeting the predictive model or vehicle testing criteria are allowed to have less or no oxygen.

The CaRFG regulations allow gasoline with less than the required minimum oxygen content to be shipped from a production or import facility, as long as the producer or importer takes appropriate measures to assure that the minimum levels of oxygen will be added before the gasoline is shipped from the final distribution facility. This element was included because it is generally not feasible to oxygenate gasoline with ethanol at "upstream" points in the gasoline distribution system. Under the CaRFG regulations, gasoline permitted to be supplied from the production or import facility without oxygen must at that point meet all of the other CaRFG specifications.

Finally, the CaRFG regulations provide small refiners a two-year extension of the compliance date for four of the eight CaRFG specifications (sulfur content, olefin content, T50 and T90), subject to a number of conditions. One of the conditions is that the extension can only apply to gasoline supplied from the small refiner's refinery in a calendar quarter in which two-thirds or more of the gasoline supplied from the refinery was refined at the small refinery from crude oil. The regulations also impose an annual limit on the amount of small refiner gasoline that qualifies for the partial two-year extension.

Following a December 14, 1995 hearing, the Board has now adopted a number of largely technical amendments to the CaRFG regulations. The amendments pertain to the downstream blending of oxygenates and various other topics.

Amendments Relating to Downstream Oxygenate Blending. The Board has adopted a set of amendments that will make it more practical to produce CaRFG with an oxygenate that is

blended into the rest of the gasoline at a point downstream from the production or import facility. The amendments generally follow the approach in the federal reformulated gasoline regulations adopted by the U.S. Environmental Protection Agency (U.S. EPA). The federal regulations require that when oxygenates are added downstream of the refinery or import facility, they are to be added only to a specially formulated reformulated gasoline blendstock intended for such downstream oxygenate blending. U.S. EPA calls the specially formulated product "Reformulated gasoline Blendstock for Oxygen Blending," or "RBOB". The Board's amendments refer to an analogous product called "California reformulated gasoline blendstock for oxygen blending," or "CARBOB."

For entities wishing to add oxygenate downstream from the production or import facility, the primary benefit of the CARBOB approach is that it will allow them to take advantage of the contribution oxygenates can make to meeting some of the CaRFG specifications for properties other than oxygen content. To the extent that an oxygenate has no or very low levels of sulfur, benzene, aromatic hydrocarbon and olefin, adding the oxygenate will reduce the concentration of these substances in the gasoline blend. At the same time, the CARBOB amendments have been designed to help assure that the necessary amounts of oxygenate will in fact be added, that addition of the oxygenate will not cause the resulting blend to fail to meet any of the applicable CaRFG limits, and that ARB enforcement personnel will be able to monitor compliance effectively.

Under the amendments, a producer or importer may designate final blends at the production or import facility as "CARBOB." The designation will have to identify each oxygenate type or types and amount or range of amounts that is to be added to the CARBOB downstream from the facility. These blends will generally be subject to all of the standards and compliance options applicable to final blends of reformulated gasoline being supplied from the production or import facility. However, in determining the properties of the CARBOB for purposes of compliance with the CaRFG standards, and in calculating the volume of the final blend for averaging purposes, the properties and volume will be analyzed after adding the minimum amount of the oxygenate designated by the producer or importer. The producer or importer is required to sample and analyze the CARBOB to determine its properties in accordance with this methodology. Additionally, the producer or importer is prohibited from supplying the CARBOB from the production facility or import facility where the sulfur, benzene, olefin or aromatic hydrocarbon content of the CARBOB, when multiplied by $(1 - \text{the designated minimum volume the oxygenate will represent after it is added to the CARBOB})$, results in a sulfur, benzene, olefin or aromatic hydrocarbon content value exceeding the applicable limit for that property.

The amendments require persons transferring CARBOB to provide a document identifying the oxygenate type or types and amount or range of amounts that must be added before the CARBOB is supplied from the final distribution facility. They require that any person blending oxygenate into CARBOB must apply for certification by the ARB. CARBOB may only be transferred to a certified oxygenate blender who will add the appropriate oxygenate, or

to an intermediate transferee who will take all reasonably necessary steps to assure that the CARBOB will be appropriately oxygenated. Persons are prohibited from blending CARBOB with any other CARBOB, gasoline, or blendstock except: (i) the appropriate type and amount of oxygenate, or (ii) other CARBOB for which the same type and amount or range of amounts of oxygenate has been designated; in addition, persons may enter into protocols with the ARB's Executive Officer that identify circumstances in which CARBOB may lawfully be combined with California gasoline or with different CARBOB during a changeover in service of a storage tank for a legitimate business reason.

Producers and importers of CARBOB are required to conduct a quality audit program similar to the program identified in the U.S.EPA regulations to make sure that the correct type and amount of oxygenate is being added downstream. In addition, an oxygenate blender is required to sample and test the gasoline resulting from the oxygenate blending, in a manner similar to that required in the federal program.

Other Amendments. The Board has also adopted the following additional amendments, designed to fine-tune the CaRFG program and to provide greater flexibility. Most of these amendments resulted from comments made by refiners.

- The averaging provisions have been revised to allow a refiner supplying a high-DAL batch of gasoline between March 1 and May 30, 1996 to offset it with low-DAL batches supplied through August 28, 1996. This will assure that refiners will have a 180-day offset period for batches shipped during the start-up of the program.
- A refiner supplying gasoline as an alternative formulation under the predictive model provisions will be allowed to change the PM flat limits for one or more properties to PM averaging limits if there are no changes to the PM alternative specifications for the remaining properties and the new PM alternative formulation meets the predictive model criteria. Such a refiner will also be allowed to switch one PM averaging limit to a PM flat limit, if there are no outstanding debits for that averaging limit, there are no changes to the specifications for any other properties, and the revised PM alternative formulation meets the predictive model criteria. Similar switches are already allowed for refiners supplying gasoline subject to a combination of the regular flat and averaging limits identified in the regulations.
- The definition of "production facility" has been amended. The preexisting definition allowed the Executive Officer to stipulate, at the request of a refiner, that the refiner's production facility includes a physically separate bulk storage facility that is owned and operated by the producer and is not used to store or distribute gasoline that is not supplied from the production facility. The amendment makes the provision apply to a separate bulk storage facility that is

leased instead of owned by the producer, and to one that is operated at the direction of the producer instead of directly by the producer's own employees.

- The Board amended the provision limiting the two-year extension for small refiners to gasoline supplied from the small refiner's refinery in a calendar quarter in which two-thirds or more of the gasoline supplied from the refinery was refined at the refinery from crude oil, so that: (i) March 1996 is counted with the second quarter of 1996; (ii) the two-thirds determination does not count the volume of oxygenates in the small refiner's gasoline; and (iii) the two-thirds determination does not count gasoline supplied from the small refiner's refinery but not produced by the small refiner.
- The Board added language allowing a small refiner to enter into a protocol with the Executive Officer under which batches of gasoline reported by the small refiner as not exempt from any of the CaRFG specifications will not count against the annual volume of the small refiner's gasoline that is exempt from the four CaRFG specifications until March 1998.
- The designated wintertime period in which CaRFG sold or supplied in San Luis Obispo County must have a minimum oxygen content of 1.8 wt. % has been revised to make it consistent with the period applicable under the current wintertime oxygenates regulation.
- A technical amendment will assure that producers and importers who have to meet the CaRFG RVP standard for gasoline supplied from their production and import facilities in March 1996 will also have to meet that standard for gasoline supplied from their production and import facilities during April 1996 before the cap limits become applicable on April 15.
- The Board added a provision that expressly prohibits persons from combining California gasoline that has been supplied from a production or import facility with any nonoxygenate blendstock, other than vapor recovery condensate, unless the person can affirmatively demonstrate that (i) the blendstock meets all of the California gasoline standards without regard to the properties of the gasoline to which the blendstock is added, and (ii) the person meets with regard to the blendstock all requirements applicable to producers of California gasoline. However, protocols are authorized to allow transmix to be blended into CaRFG under certain circumstances, and there is an exception for adding nonoxygenate blendstock to California gasoline that exceeds one or more of the cap limits, where the person adding the blendstock obtains the prior approval of the Executive Officer based on a demonstration that the blending is a reasonable means of bringing the gasoline into compliance with the cap limits.

- An amendment makes clear that protocols may be used to specify how the offsetting requirements for DALs are applied to individual refiners as well as how the notification requirements are applied.

Comparable Federal Regulations. The 1990 amendments to the federal Clean Air Act (FCAA) require U.S. EPA to adopt regulations regarding reformulated gasoline. (FCAA §211(k).) U.S. EPA has adopted these regulations as 40 C.F.R. §§80.40 to 80.82. In California, they have applied in Los Angeles, Orange, Ventura and San Diego counties, and in parts of Riverside and San Bernardino counties, since January 1, 1995.

The FCAA provides that the federal regulations must require no NOx increase, a minimum 2.0 percent by weight oxygen content (with certain exceptions), a maximum 1.0 percent by volume benzene content, and limits on heavy metals. The federal regulations must also specify performance standards for hydrocarbons in the high ozone period and toxic compounds year-round in two phases--the first starting in 1995 and the second starting in 2000. The U.S. EPA regulations identify "per-gallon" and optional averaged standards that may be met under a "simple model" through 1997. The regulations also identify a "complex model" which is optional until January 1, 1998, and is mandatory thereafter.

While the federal substantive requirements will apply in the covered areas of southern California, the ARB has worked with U.S. EPA and gasoline producers to avoid unnecessary duplication of the enforcement requirements. In 40 C.F.R. §80.81, U.S. EPA has exempted California producers from many of the federal enforcement requirements from March 1, 1996 to January 1, 2000, as long as certain criteria are met. As noted above, the new "CARBOB" provisions are generally patterned after the federal "RBOB" provisions, many of which are contained in 40 C.F.R. §80.69. Producers of CaRFG and CARBOB will be exempt from the 40 C.F.R. §80.69 requirements. 40 CFR §80.78(a)(5) prohibits persons from combining federal RFG with any nonoxygenated blendstock unless the person meets all requirements applicable to refiners and the blendstock being added meets all federal RFG standards without regard to the RFG to which the blendstock is added. This requirement is not eliminated by the California exemption.