State of California
Air Resources Board

UPDATED INFORMATIVE DIGEST

2011 AMENDMENTS TO THE PHASE 3 CALIFORNIA REFORMULATED GASOLINE REGULATIONS

Sections Affected:

Repeal of section 2258, and amendments to sections 2260, 2261, 2264, 2265 (and the incorporated "California Procedures for Evaluating Alternative Specifications for Phase 3 Reformulated Gasoline Using the California Predictive Model" as last amended August 7, 2008), 2265.1, 2266, 2266.5, and 2271, title 13, California Code of Regulations (CCR).

Background:

The Air Resources Board (ARB/Board administers the California reformulated gasoline (CaRFG) regulations, which have applied to all California gasoline since March 1996; the Phase 3 CaRFG standards have applied since December 31, 2003. The CaRFG regulations establish specifications for the following eight gasoline properties: sulfur, benzene, olefins, aromatic hydrocarbons, and oxygen content, 50 percent distillation temperature, 90 percent distillation temperature, and summertime Reid vapor pressure (RVP). The Phase 3 CaRFG regulations also prohibit the use of oxygenated compounds (oxygenates) other than ethanol in CaRFG, and regulate the composition of denatured ethanol that can be blended with California Reformulated Gasoline Blendstock for Oxygenate Blending (CARBOB) to produce CaRFG.

The CaRFG regulations allow refiners to use a "Predictive Model" to certify alternative formulations[1]. The Predictive Model is a set of mathematical equations that relate emission rates of exhaust and evaporative hydrocarbons and carbon monoxide (CO), oxides of nitrogen (NOx), and potency-weighted toxics for four toxic air contaminants (benzene, 1,3-butadiene, formaldehyde, and acetaldehyde) to the values of the eight regulated gasoline properties. An alternative gasoline formulation based on the Predictive Model is acceptable if emissions of reactivity-weighted hydrocarbons and CO (total ozone forming potential), NOx, and potency-weighted toxics resulting from this formulation are no greater than emissions from gasoline having the specifications set forth in the CaRFG standards. Currently, most of the gasoline sold in California complies with the CaRFG regulations through the use of the Predictive Model.

The latest version of the Predictive Model as amended by the 2007 CaRFG amendments went into effect on December 31, 2009. These amendments were necessary to preserve the air quality benefits of the Phase 2 CaRFG standards as they existed in 1999, pursuant to Health and Safety Code section 43013.1. ARB staff had

[1] See 13 CCR, Sec. 2265.

determined that the use of ethanol in Phase 3 CaRFG increases evaporative emissions, relative to Phase 2 CaRFG, through a process known as permeation. Permeation refers to the diffusive process whereby fuel molecules migrate through the materials of a vehicle's fuel system. Eventually, the fuel molecules are emitted into the air where they contribute to evaporative emissions from the vehicle. The 2007 amendments to the CaRFG regulations updated the Predictive Model to mitigate the excess emissions associated with permeation from on-road motor vehicles. The Predictive Model was also updated to reflect the current motor vehicle fleet and new data on how fuel properties affect motor vehicle emissions.

Since 1995, most of the State's gasoline has contained about two percent oxygen by weight. From 1995 to 2002, methyl tertiary-butyl ether (MTBE) was the oxygenated compound used in most California gasoline. Since December 31, 2003—the Phase 3 CaRFG compliance deadline—ethanol has been the only oxygenate allowed in California gasoline[2]. After the phase-out of MTBE, most California gasoline contained 5.7 percent by ethanol. Since January 2010, refiners have begun producing most California gasoline with ten percent ethanol. This recent increase in ethanol can be traced to the Federal Renewable Fuels Standard (RFS2) and the 2007 amendments to the CaRFG regulations that included amendments to the Predictive Model. RFS2 requires increasing amounts of biofuels, such as ethanol, to be used in transportation fuels.

Description of the Regulatory Action:

At its public hearing on October 21, 2011, the Board approved the repeal of title 13, California Code of Regulations, section 2258; and approved proposed amendments with modifications to sections 2260, 2261, 2264, 2265 (and the incorporated "California Procedures for Evaluating Alternative Specifications for Phase 3 Reformulated Gasoline Using the California Predictive Model" as last amended August 7, 2008), 2265.1, 2266, 2266.5, and 2271 of title 13, California Code of Regulations. These amendments relate primarily to the Phase 3 CaRFG regulations. Health and Safety Code section 43013.1 requires that the Phase 3 CaRFG regulations preserve the emissions and air quality benefits of the Phase 2 CaRFG program. The proposed amendments would help preserve the benefits of the Phase 2 CaRFG standards by correcting nine coefficient transcription errors in the *California Procedures for Evaluating Alternative Specifications for Phase 3 Reformulated Gasoline Using the California Predictive Model* (Procedures Guide). The procedures guide contains the equations and coefficients of the Predictive Model and is technically considered the Predictive Model. In addition, the amendments would: (1) repeal an outdated provision relating to the oxygen content of gasoline during the wintertime for gasoline sold or supplied between November 1, 1992, and February 29, 1996; (2) require that gasoline with a RVP value equal to or less than 7.20 pounds per square inch (psi) (or, correspondingly, an RVP value equal to or less than 5.99 psi for a final blend of CARBOB) to be certified as an RVP-controlled gasoline, in order to ensure that summertime gasoline produced early would meet all the requirements for summertime gasoline; (3) ensure that any producer or importer

[2] See 13 CCR section 2262.6.

intending to sell, offer, or supply a final blend of test-certified alternative gasoline formulation shall notify the Executive Officer sufficiently in advance to allow ARB inspectors an opportunity to sample and test the gasoline; (4) clarify that no person may combine any CARBOB that has been supplied from the facility at which it was produced or imported with anything other than what is specifically listed in the regulation; (5) amend the definition of racing vehicle to add clarity and more closely align with the U.S. Environmental Protection Agency's definition; and (6) make other miscellaneous changes to improve consistency, flexibility, and enforceability.

At the hearing, the staff presented, and the Board approved, additional modifications to the regulations proposed in the original Staff Report. Staff developed the modifications in response to comments received subsequent to the release of the Staff Report. After considering the staff's proposal, the Board adopted Resolution 11-36. The Board also directed staff to incorporate the approved modifications into the proposed regulatory text, with such other conforming modifications as may be appropriate, and to make the modified text available for a supplemental period of at least 15-days.

As a result of Board direction on October 21, 2011, the first Notice of Public Availability of Modified Text (1st 15-Day Change Notice) was issued on May 15, 2012. Based on comments received on the 1st 15-day proposed changes, additional modifications to the regulatory text were proposed in the Second Notice of Public Availability of Modified Text (2nd 15-Day Change Notice), which was issued on June 14, 2012. An additional document to the regulatory record was made available in the Third Notice of Public Availability of Additional Documents and Information (3rd 15-Day Notice), which was issued on July 17, 2012.

The following summarizes the substantive 1st 15-day modifications to the regulations and the rationale for making them:

Restrictions on blending CARBOB with other materials

1. Added provision to allow for a mixing of a CARBOB tender with a non-CARBOB tender at the interface in a pipeline to allow for fuel pipeline transportation. However, this mixture must be diverted and may not be offered, sold, or supplied as CARBOB or California gasoline.

   RATIONALE: The pipelines that transport CARBOB are typically not dedicated exclusively to CARBOB. Therefore, a tender of CARBOB may, in actual practice, be followed by a tender of a non-CARBOB material such as diesel fuel. However, the basic prohibition of section 2266.5(f)(1), as originally proposed, would prohibit the mixing that occurs at the interface of the CARBOB and non-CARBOB material. The additional amendments acknowledge this practice, but clarify that the resultant mixture may not be offered, sold, or supplied as CARBOB or California gasoline.

2. Added provision to allow for the changeover of a storage tank in a terminal or bulk plant from a non-CARBOB material to a CARBOB. If the resultant mixture meets the CARBOB limits, it may be treated as CARBOB. Records must be kept for two years in order for the facility to demonstrate compliance.

   RATIONALE: Storage tanks at terminals or bulk plants are typically not dedicated exclusively to CARBOB. Therefore, a tank that previously contained a non-CARBOB material such as diesel fuel may, in practice, be converted for storage of CARBOB. However, section 2266.5(f)(1), as it exists, would prohibit such conversion. The additional amendments acknowledge this practice, but clarify that the resultant mixture may be treated as CARBOB only if it meets the CARBOB limits.

3. Added provision to allow for the changeover of a storage tank in a terminal or bulk plant from a CARBOB to a non-CARBOB material. No person may offer, sell, or supply the resultant mixture as CARBOB.

   RATIONALE: As discussed above, industry practice may involve the conversion of a storage tank from storing CARBOB to a non-CARBOB material. This amendment acknowledges this practice but prohibits the resultant mixture from being offered, sold, or supplied as CARBOB, because it would be predominantly a non-CARBOB material.

4. Added provision to allow for the changing of a compartment in a cargo tank truck, marine vessel, rail car, or other vessel from a CARBOB to a non-CARBOB material, or vice versa. If converting from a non-CARBOB material to CARBOB and if the residue of non-CARBOB material does not exceed 0.25 percent of the compartment's safe fill volume, the resultant mixture may be treated as CARBOB. If converting from CARBOB to non-CARBOB, the resultant mixture may not be offered, sold, or supplied as CARBOB.

   RATIONALE: Compartments in cargo tank trucks, marine vessels, rail cars, and other vessels are typically not dedicated exclusively to CARBOB. Therefore, industry practice may involve the conversion of such compartments from the storage of CARBOB to a non-CARBOB material, or vice versa. The amendment acknowledges this practice but prohibits the offer, sale, or supply of the resultant mixture unless certain conditions are met in order to preserve the integrity of the CARBOB supply in California.

5. Added provision allowing protocols for the incidental mixing of non-CARBOB material with CARBOB during the normal and correct operation of a business.

   RATIONALE: The CaRFG regulations typically provide for protocols to accommodate unusual or unanticipated situations provided certain findings are made by the Executive Officer. After discussion with stakeholders, the above four situations were discovered. While it is possible other such situations may

exist, without a protocol, these situations would be prohibited by the CaRFG regulations. The additional amendments allow for protocols if certain conditions are met.

The following summarizes the substantive 2nd 15-day modifications to the regulations and the rationale for making them:

Restrictions on blending CARBOB with other materials added an exception to allow for mixing of CARBOB with vapor recovery condensate.

RATIONALE: Industry expressed a desire to blend vapor recovery condensate with CARBOB. The additional proposed modification will allow for the mixing of vapor recovery condensate with CARBOB in specified situations.

The 3rd 15-Day Notice placed an additional document into the regulatory record and provided the public with one document issued by the ARB in support of the proposed modifications from the 2nd 15-Day Change Notice. This document is a compilation of ARB's laboratory data for total oxygenates in CARBOB samples collected at downstream storage tanks located at bulk terminals for calendar year 2011. These data supported the amendment to allow for mixing of CARBOB with vapor recovery condensate, provided the resulting mixture of CARBOB has an oxygen content not exceeding 0.1 percent by weight.

Comparable Federal Regulations: The federal reformulated gasoline (RFG) regulations apply to about 80 percent of California's gasoline and are set forth in title 40 Code of Federal Regulations (CFR), part 80, section 40 et seq. The CaRFG regulations apply to all gasoline sold, supplied, or offered in California. All CaRFG meets or exceeds the requirements of the federal RFG regulations, resulting in significant additional emission reductions. Under 40 CFR § 80.81, gasoline meeting the Phase 3 CaRFG standards is exempt from several of the enforcement requirements of the federal RFG regulations.

Congress adopted a renewable fuels standard in 2005 (RFS) and strengthened it in December 2007 (RFS2) as part of the Energy Independence and Security Act. The RFS2 requires that 36 billion gallons of biofuels be sold annually by 2022, of which 21 billion gallons must be "advanced" biofuels and the other 15 billion gallons can be corn ethanol (See 40 CFR § 80.81100 et seq.). The federal RFS2 regulation compliments California's fuel programs, particularly the Low Carbon Fuel Standard (LCFS) (see 17 CCR § 95480 et seq.). But because neither the RFS2 nor LCFS dictate the actual specifications of California gasoline, neither of those regulations has a direct impact on the CaRFG regulations.