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RESOURCES AGENCY OF CALIFORNIA

State of California
AIR RESOURCES BOARD

Resolution 07-21

June 14, 2007

Agenda Item No.: 07-6-3

WHEREAS, sections 39600 and 39601 of the Health and Safety Code authorize the Air Resources Board (the Board or ARB) to adopt standards, rules and regulations and to do such acts as may be necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, section 43018(a) of the Health and Safety Code directs the Board to endeavor to achieve the maximum degree of emission reduction possible from vehicular and other mobile sources in order to accomplish the attainment of the state ambient air quality standards at the earliest practicable date;

WHEREAS, section 43018(c) of the Health and Safety Code provides that in carrying out section 43018, the Board shall adopt standards and regulations which will result in the most cost-effective combination of control measures on all classes of motor vehicles and motor vehicle fuel, including but not limited to specification of vehicular fuel composition;

WHEREAS, Health and Safety Code section 43013 authorizes the Board to adopt and implement motor vehicle fuel specifications for the control of air contaminants and sources of air pollution which the Board has found necessary, cost-effective, and technologically feasible to carry out the purposes of Division 26 of the Health and Safety Code;

WHEREAS, in 1991, the Board adopted the Phase 2 California Reformulated Gasoline standards (CaRFG2) which imposed minimum and maximum oxygen content requirements for California reformulated gasoline (CaRFG) in California;

WHEREAS, many gasoline producers used methyl tertiary-butyl ether (MTBE) to satisfy the oxygen content requirements of CaRFG2;

WHEREAS, pursuant to Executive Order D-5-99, issued by Governor Davis on March 26, 1999, MTBE was found, on balance, to pose a significant risk to the environment;

WHEREAS, Health and Safety Code section 43013.1 and Executive Order D-5-99 required ARB, in conjunction with the State Energy Resources Conservation and Development Commission, to remove MTBE from gasoline at the earliest possible date;

WHEREAS, in December 1999, the Board adopted the California Phase 3 reformulated gasoline (CaRFG3) specifications which required that starting December 31, 2002, no person shall sell, offer, or supply California gasoline which has been produced with the use of MTBE;

WHEREAS, sections 43013.1 of the Health and Safety Code directs the Board to ensure that regulations for CaRFG3 adopted pursuant to Executive Order D-5-99 maintain or improve upon emissions and air quality benefits achieved by CaRFG2 in California as of January 1, 1999, including emission reductions for all pollutants, including precursors, identified in the State Implementation Plan for ozone, and emission reductions in potency-weighted air toxics compounds;

WHEREAS, in December 1999, the Board also directed staff to return with additional information on the impacts of ethanol on evaporative emissions related to permeation effects on polymer and elastomeric hoses used in gasoline-powered sources;

WHEREAS, on July 25, 2002, the Board approved amendments to the CaRFG3 regulations to postpone by one year the removal of MTBE from California gasoline due to concerns over the supply and availability of gasoline to California consumers;

WHEREAS, the CaRFG3 regulations also currently include the following elements:

Standards for eight gasoline properties – summertime Reid Vapor Pressure (RVP), T50 (50 percent distillation temperature), T90 (90 percent distillation temperature), and aromatic hydrocarbon, benzene, sulfur, olefin, and oxygen contents;

Establishment of an absolute "cap" limit for each specification, applicable throughout the gasoline distribution system;

Establishment of additional, more stringent "refinery" limits applicable to gasoline when it is initially supplied from the production or import facility for all specifications but RVP, and provisions authorizing compliance through a form of averaging T50, T90, and sulfur, aromatic hydrocarbon, benzene and olefin contents;

An alternative compliance mechanism under which a producer or importer may use the CaRFG3 Predictive Model to identify alternative flat and averaging refinery limits, up to the cap limits, that will result in essentially no increase in emissions of exhaust hydrocarbons, or optionally the ozone forming potential, and oxides of nitrogen (NOx) and potency weighted toxics (benzene, 1,3-butadiene, acetaldehyde and formaldehyde);

A CaRFG3 Predictive Model Procedures document that sets forth mathematical equations, based on numerous vehicle emissions test programs, that predict the changes in exhaust hydrocarbons, NOx and potency weighted toxics resulting

from different gasoline formulations; in addition, the model includes an evaporative hydrocarbons element that allows an alternative RVP flat limit between 6.40 and 7.20 pounds per square inch (psi), when compared against the appropriate flat limit;

In the case of oxygen content, a requirement that CaRFG3 sold throughout the distribution system in Los Angeles, Orange, Riverside, San Bernardino, Ventura and Imperial Counties during specified winter months must contain at least 1.8 percent by weight (wt.%) oxygen, in order to reduce emissions of CO during the season of highest CO concentrations in areas where the CO ambient air quality standards have not yet been attained; during the rest of the year and in the remainder of the state, CaRFG3 being supplied from a production or import facility is subject to an oxygen content refinery limit of 1.8 to 2.2 wt.%, but the producer or importer may use the CaRFG3 Predictive Model to reduce oxygen content to as low as 0.0 wt.%, or raise it as high as 3.5 wt.%; and

A mechanism allowing a refiner to ship a non-oxygenated gasoline blend – called "California reformulated gasoline blendstock for oxygenate blending," or "CARBOB" – from the refinery without complying with the CaRFG3 standards if it is specially formulated to be combined with oxygenate "downstream" from the refinery and the resulting blend will meet all of the CaRFG3 standards; this allows entities adding oxygenate downstream from the refinery to take advantage of the contribution it can make to complying with the CaRFG3 standards, particularly by diluting the concentration of compounds like benzene;

WHEREAS, virtually all current California gasoline is subject to alternative refinery flat or averaging limits designated by the producer or importer using the CaRFG3 Predictive Model;

WHEREAS, ethanol is the only oxygenate approved for use in CaRFG3 and used in the vast majority of California gasoline;

WHEREAS, the use of ethanol in California gasoline has increased evaporative hydrocarbon emissions through a process known as permeation;

WHEREAS, in 2006, the U.S. Environmental Protection Agency, which administers the federal reformulated gasoline regulations, pursuant to the federal Energy Policy Act of 2005, removed the requirement that gasoline sold in the severe and extreme federal ozone non-attainment areas contain 2.0 wt.% or 2.1 wt.% on average oxygen, year-round;

WHEREAS, ARB staff has proposed 2007 amendments to the CaRFG3 regulations, which include the following elements:

Updating the CaRFG3 Predictive Model to mitigate the emissions associated with permeation from onroad motor vehicles associated with ethanol use in CaRFG3

and to incorporate new data that reflect the current motor vehicle fleet and account for changes in new vehicles' response to changes in fuel properties;

Adding an option to allow a producer, or an importer that produces gasoline, to use an alternative emissions reduction plan until December 31, 2011, unless the Executive Officer approves an extension in advance, to mitigate emissions associated with permeation. The alternative emissions reduction plan would create emission reductions from other sources to fully mitigate any emissions increase associated with permeation not otherwise mitigated by the producer's fuel formulation;

Decreasing the sulfur cap limit from the current specification of 30 parts per million by weight (ppmw) to 20 ppmw (21 ppmw for CARBOB) beginning December 31, 2009 to improve enforceability of the CaRFG3 program and to help protect the performance of sulfur-sensitive emission control components;

Allowing emissions averaging for low level sulfur-containing gasoline blends beginning December 31, 2009 to provide additional flexibility for producers and importers that produce gasoline and to avoid the need to ship out-of-state or reprocess gasoline with inadvertently higher levels of sulfur. For lower levels of sulfur, the compliance margin is smaller and unexpected deviations in the refinery process could easily cause a batch to become non-compliant;

Applying the 7.00 psi RVP limit to oxygenated gasoline to reflect that virtually all gasoline will be oxygenated and commingling emissions are not a problem for these fuels; and retaining the 6.90 RVP limit for non-oxygenated gasoline to ensure that no increase in hydrocarbon emissions from commingling with oxygenated gasoline will occur;

Allowing flexibility in setting the oxygen content in the Predictive Model to account for variability in test methods. Refiners are allowed to specify oxygen to be evaluated at the midpoint of the minimum and the maximum oxygen values entered into the Predictive Model if the range between the minimum and the maximum oxygen value is 0.4 percent or less. This proposed amendment will provide increased flexibility for refiners to blend ethanol at levels other than 5.7 percent, 7.7 percent, and 10 percent;

Increasing the maximum allowable amount of denaturant in ethanol from the current specification of 4.76 percent by volume to 5.00 percent by volume to be consistent with current standards of the American Society of Testing and Materials (ASTM), ASTM D4806-06c, and updating the appropriate references to the latest ASTM method. This proposed amendment will align California fuel regulations with federal fuel regulations, will create less confusion to suppliers, and will increase the supply of denatured ethanol available to be imported into California;

Updating the test method for oxygenate content of gasoline to ASTM D4815-4;

Starting December 31, 2009, requiring producers and importers to offset the increase in permeation emissions associated with the use of ethanol in California gasoline using either the revised Predictive Model or an alternative emissions reduction plan and requiring all CaRFG3 be fully compliant with the revised Predictive Model by January 1, 2012; and

Other miscellaneous changes that would provide clarifications, corrections, or improvements in consistency, compliance flexibility, or enforcement ability;

WHEREAS, the expeditious introduction of blends of ethanol up to 10 percent by volume may lead to higher volumes of gasoline available in California, may increase the use of renewable fuels, and may reduce the emissions of carbon dioxide;

WHEREAS, there is current California legislative activity that may provide some or all of the funding for the mitigation of any emissions increases associated with introduction of blends of ethanol up to 10 percent by volume and for the alternative emissions reduction plan option;

WHEREAS, the California Environmental Quality Act and Board regulations require that an action not be adopted as proposed where it will have significant adverse environmental impacts if feasible alternatives or mitigation measures are available which would substantially reduce or avoid such impacts;

WHEREAS, the Board has considered the impact of the proposed amendments on the economy of the State;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with the provisions of chapter 3.5 (commencing with section 11340), part 1, division 3, title 2 of the Government Code;

WHEREAS, the Board finds that:

The proposed updates to the CaRFG3 Predictive Model are necessary and appropriate to more accurately reflect changes in the current motor vehicle fleet, account for changes in new vehicles' response to changes in fuel properties, and mitigate increases in evaporative emissions from onroad motor vehicles caused by the effects of ethanol on permeation;

The proposed addition of an alternative emissions reduction plan is appropriate to allow producers and importers that produce gasoline the option of creating emission reductions from other sources to fully mitigate any emissions increase associated with permeation not otherwise mitigated through the producer's or importer's fuel formulation;

The proposed amendments to lower the sulfur cap from 30 ppmw to 20 ppmw (21 ppmw for CARBOB) beginning December 31, 2009 are necessary and appropriate to improve enforceability of the CaRFG3 program and to help protect the performance of sulfur-sensitive emissions control components;

The proposed amendments to allow emissions averaging for low level sulfur-containing gasoline blends beginning December 31, 2009 are necessary and appropriate because, for lower levels of sulfur, the compliance margin is smaller and unexpected deviations in the refinery process could easily cause a batch to become non-compliant. The emissions averaging provisions will avoid the need to ship out-of-state or reprocess gasoline with inadvertently higher levels of sulfur while reducing supplies of available product or incurring significant expense;

The proposed amendments to apply the 7.00 psi RVP limit to oxygenated gasoline is appropriate because virtually all gasoline sold in California will be oxygenated. Retaining the 6.90 RVP limit for non-oxygenated gasoline is necessary to ensure that no increase in hydrocarbon emissions from commingling with oxygenated gasoline will occur;

The proposed amendment to evaluate the candidate fuel specification for oxygen at the midpoint of the minimum and the maximum oxygen values entered into the Predictive Model if the range between the minimum and the maximum oxygen value is 0.4 percent or less is appropriate to provide increased flexibility for refiners to blend ethanol at levels other than 5.7 percent, 7.7 percent, and 10 percent;

The proposed amendments to change the maximum denaturant content specification from the current 4.76 percent by volume to 5.00 percent by volume are necessary to be consistent with the recent change in ASTM D4806-06c, and to align California fuel regulations with federal fuel regulations, create less confusion to suppliers, and increase the supply of denatured ethanol available to be imported into California;

The proposed amendment to update the test method for determining the oxygenate content of gasoline to ASTM D4815-04 is appropriate to align the CaRFG3 regulations with the current and accepted ASTM method;

The proposed amendments to require producers and importers to use the revised Predictive Model starting December 31, 2009, allow the use of an alternative emissions reduction plan between December 31, 2009 and December 31, 2011, and require emissions associated with ethanol in gasoline be fully offset through the use of the Predictive Model starting January 1, 2012 are necessary and appropriate to mitigate the emissions associated with permeation from onroad motor vehicles while providing a reasonable period of time for refineries to be upgraded; and

The proposed amendments also include additional minor changes to provide clarifications, corrections, or improvements to the regulatory language that will improve compliance flexibility or enforcement ability;

WHEREAS, the Board further finds that:

The proposed amendments do not substantially change or establish specifications for motor vehicle fuel, will not require a gasoline ingredient to be added or removed beyond what is allowed by the existing regulations or is currently already used to produce gasoline for sale in California. As a result, the proposed amendments to the CaRFG3 regulations are not subject to the requirement for a multimedia evaluation pursuant to Health and Safety Code section 43830.8;

Available data are not sufficient to reasonably quantify the effect that ethanol in gasoline has on permeation emissions or the effect of fuel property changes on the exhaust emissions from off-road sources; an emissions test program was initiated to provide enough information to reasonably quantify the impacts of ethanol on the emissions from off-road sources;

CaRFG3 amendments would ultimately result in a small net decrease in CO_2 equivalent greenhouse gas emissions from California gasoline production and use;

Construction of refinery equipment needed for compliance with regulations approved herein could result in temporary emissions from heavy-duty equipment and disruption of the soil, including the generation of dust;

The regulations approved herein are expected to result in increased shipments of ethanol, with concomitant impacts on waterborne, truck, and rail traffic;

There are no feasible mitigation measures or alternatives available to the Board which would further substantially reduce the above potential adverse impacts of the proposed regulations while at the same time providing the substantial overall public health benefit from the emissions reductions noted herein and the removal of MTBE from California gasoline; and

None of the above potential adverse environmental benefits are associated with the actual use of the gasoline expected to be produced in compliance with the CaRFG3 regulations approved herein;

WHEREAS, pursuant to the requirements of the California Environmental Quality Act, and the Board's regulations, the Board further finds that:

The proposed amendments will not significantly affect the formulation of California gasoline, and accordingly will not have significant adverse air quality or other environmental impacts;

The prohibitions of MTBE use and other oxygenates other than ethanol remain unchanged, so there will be no significant negative impacts on water quality;

WHEREAS, the Board further finds that:

The proposed regulatory action will not affect the creation or elimination of jobs within the State of California, the creation of new businesses or elimination of existing businesses within the State of California, or the expansion of businesses currently doing business within the State of California;

The proposed regulatory action will not significantly affect small businesses because the affected refineries are not small businesses;

The proposed reporting requirements which apply to businesses are necessary for the health, safety, and welfare of the people of the State of California;

The proposed regulatory action will not create significant costs or savings to any state agency or in federal funding to the state, costs or mandate to any local agency or school district whether or not reimbursable by the state pursuant to Part 7 (commencing with section 17500), Division 4, Title 2 of the Government Code, or other nondiscretionary cost or savings to state or local agencies;

No reasonable alternative considered by the Board or that has otherwise been identified and brought to the attention of the Board would be more effective in carrying out the purpose for which the action is proposed or would be as effective and less burdensome to affected private persons than the proposed action;

The amendments adopted herein are necessary to provide clarity, enhance flexibility, and ensure the practical and effective implementation of the CaRFG3 regulations;

WHEREAS, the Board further finds that:

The proposed amendments to the CaRFG3 regulations will increase gasoline production costs by between 0.6 to 2.1 cents per gallon of gasoline, including about $400 to $1 billion of capital improvement costs at refineries, capital expenditures at pipeline terminals and ethanol off-loading sites for the handling, storage, and blending of increased amount of ethanol, and annual operating and maintenance costs of $80 million;

Most of the amendments approved herein and associated costs are designed to mitigate the increase in evaporative hydrocarbon emissions associated with the

phase-out of MTBE from CaRFG to protect ground and drinking water; California Health and Safety Code section 43013.1 requires the ARB ensure that regulations for CaRFG3 adopted pursuant to Executive Order D-5-99 preserve the emissions benefit of the CaRFG2 program, therefore the cost associated with mitigating the increase in emissions associated with the phase-out of MTBE and preservation of the emissions benefits are necessary to ensure compliance with the directive of Executive Order D-5-99;

Since the approved amendments are designed to preserve the emissions benefit of the CaRFG2 program, there is no cost-effectiveness value that can be assigned to the amendments *per se*; however, since the amendments provide additional flexibility to refiners and importers, they are expected to make the overall CaRFG3 regulations more cost-effective while preserving the emissions benefit of the CaRFG2 program;

NOW, THEREFORE, BE IT RESOLVED that the Board hereby approves the adoption of amendments to sections 2261, 2262, 2262.3, 2262.4, 2262.5, 2262.9, 2263, 2263.7, 2264.2, 2265 (and the incorporated "California Procedures for Evaluating Alternative Specifications for Phase 3 Reformulated Gasoline Using the California Predictive Model"), 2266, 2266.5, 2270, 2271, and 2273, and the adoption of sections 2260(a)(0.5), (0.7), (7.5), (8.5), (10.5), (10.7), (19.7), (23.5), and (23.7), 2262.3(d), 2264.2(a)(3), (b)(5), and (d), 2265(c)(4), 2265.1, 2265.5, and 2266(b)(3), (4), and (5) of title 13, California Code of Regulations, as set forth in Attachment A hereto, with the modifications to those sections as set forth in Attachment B hereto.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to adopt the proposed amendments as set forth in Attachment A hereto, including incorporated documents, as approved herein, with modifications as set forth in Attachment B after making the modified regulatory language, with such other conforming modifications as may be appropriate, and any additional supporting documents and information available for public comment for a period of at least 15 days as required by Government Code section 11346.8, provided that the Executive Officer shall consider all written comments regarding the modifications and additional supporting documents and information as may be submitted during this period, shall make modifications as may be appropriate in light of the comments received, and shall present the regulations to the Board for further consideration if she determines that this is warranted.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to provide the Board an update on potential increases in hydrocarbon emissions from materials permeability associated with the use of ethanol in gasoline from off-road sources by December 2008, including any appropriate amendments necessary to mitigate the emissions impacts of permeation on off-road sources.

BE IT FURTHER RESOLVED that the Board directs the staff to work with the air pollution control and air quality management districts and the affected companies on

meeting requirements of the California Environmental Quality Act and obtaining district permits.

BE IT FURTHER RESOLVED that the Board directs the staff to return to Board by December 2008 with a status report on the implementation of the regulations.

BE IT FURTHER RESOLVED, that the Board directs the Executive Officer to release the modified regulatory language for the 15-day public comment period only after considering any new legislation signed by the Governor in the 2007 Legislative regular session that explicitly provides for alternative funding to mitigate any emissions increases associated with the introduction of higher blends of ethanol up to 10 percent by volume, the alternative emissions reduction plan option, or both, and to take any and all actions necessary to ensure the purposes and intent of this resolution and any new legislation are achieved, including incorporating modifications into the CaRFG3 regulations as appropriate to implement the new legislation.

BE IT FURTHER RESOLVED, that the Board directs the Executive Officer to submit the ultimately adopted amendments to the U.S. EPA as a revision to the California SIP.

I hereby certify that the above is a true and correct copy of Resolution 07-21, as adopted by the Air Resources Board.

Lori Andreoni

Lori Andreoni, Clerk of the Board

Resolution 07-21

June 14, 2007

Identification of Attachments to the Resolution

Attachment A: The Proposed Regulation Order attached as Appendix A to the Staff Report: Initial Statement of Reasons, release date April 27, 2002.

Attachment B: Staff's Suggested Modifications to the Original Proposal for which the staff has not yet developed specific regulatory language (distributed at the Board Hearing on June 14, 2007.)

ATTACHMENT B

PUBLIC HEARING TO CONSIDER 2007 AMENDMENTS TO THE PHASE 3 CALIFORNIA REFORMULATED GASOLINE REGULATIONS

Staff's Suggested Modifications to the Original Proposal

Shown below are the staff's suggested conceptual modifications to the originally proposed amendments set forth in Appendix A to the Staff Report: Initial Statement of Reasons released April 27, 2007. Staff has not yet developed specific regulatory language to incorporate these conceptual modifications. All proposed modifications will be made available to the public for a fifteen-day comment period prior to final adoption.

Third Party Alternative Emissions Reduction Plan

1. Add provision to define which third parties who are not producers or importers that produce gasoline may enter into an alternative emissions reduction plan and how they may enter into an alternative emissions reduction plan.
2. Add other provisions, as needed, to effectuate the purpose of allowing certain third parties who are not producers or importers that produce gasoline to participate in an alternative emissions reduction plan by obtaining emission reduction offsets on behalf of producers or importers that produce gasoline and to improve consistency, flexibility, and enforceability.

Sulfur Cap

1. Amend provisions to change the date for lowering the sulfur content cap from 30 parts per million weight to 20 parts per million weight (21 ppm for CARBOB) from December 31, 2009 to December 31, 2011.

Early Ethanol Blending

1. Add provisions that allow for early access to the proposed amendments for parties wishing to increase ethanol blending up to 10 percent volume with appropriate mitigation of any increase in emissions caused by the increase in ethanol content.

California Predictive Model Procedures Guide

1. Modify the proposed "California Procedures for Evaluating Alternative Specifications for Phase 3 Reformulated Gasoline Using the California Predictive Model" to be consistent with the modifications to the originally

proposed amendments, to correct errors, increase consistency, and provide clarifications.

Potential Legislative Requirement

1. Add provisions, as appropriate, to implement any new legislation signed by the Governor in the 2007 Legislative regular session that explicitly provides for alternative funds to mitigate any emissions increases associated with the introduction of higher blends of ethanol up to 10 percent by volume, the alternative emissions reduction plan option, or both, including provisions to enable refiners and importers to take advantage of the amended CaRFG3 rules to introduce higher ethanol blends as early as feasible.