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State of California  
AIR RESOURCES BOARD

RESOURCES AGENCY OF CALIFORNIA

Resolution 98-79

December 11, 1998

Agenda Item No.: 98-9-2

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, sections 43018(a) and (b) of the Health and Safety Code direct 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, and to take whatever actions are necessary, cost-effective, and technologically feasible in order to achieve, by December 31, 2000, specified reductions in the emissions of reactive organic gases, oxides of nitrogen (NOx), particulates, carbon monoxide (CO), and toxic air contaminants from vehicular sources;

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, section 43013 of the Health and Safety Code 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 to be necessary, cost-effective, and technologically feasible to carry out the purposes of Division 26 of the Health and Safety Code;

WHEREAS, following a hearing in November 1991, the Board adopted regulations for California reformulated gasoline (CaRFG), applicable beginning March 1, 1996; these regulations include a comprehensive set of specifications affecting eight different gasoline properties — summertime Reid vapor pressure (RVP), T50, T90, and aromatic hydrocarbon, benzene, sulfur, olefin, and oxygen content — which result in significant reductions in emissions of ozone precursors and toxic air contaminants;

WHEREAS, the CaRFG regulations require that, for each of the eight regulated properties, producers and importers meet either “flat” or, if available, “averaging” limits when their gasoline is supplied from the production or import facility, and require that gasoline at any point in the distribution system not exceed “cap” limits for the properties which in most cases are less stringent than the flat or averaging limits;

WHEREAS, following a hearing in June 1994, the Board amended the CaRFG regulations to give gasoline producers and importers the option of using the "California Predictive Model" (the Predictive Model) to assign to batches of gasoline alternative CaRFG specifications for all of the regulated properties except RVP that could be met in lieu of the flat and averaging limits set forth in the regulations, as long as the alternative specifications are within the cap limits and are shown by the Predictive Model to achieve emissions reductions in hydrocarbons (HC), NOx and potency-weighted toxics equivalent to those resulting from the flat and averaging limits;

WHEREAS, the CaRFG regulations require that when gasoline is supplied from production or import facilities, it must contain between 1.8 percent by weight (wt.%) and 2.2 wt.% oxygen, except that a producer or importer using the Predictive Model may reduce or eliminate the oxygen subject to some wintertime exceptions, and may increase the oxygen up to the 2.7 wt.% cap year-round, as long as the gasoline is formulated so that the Predictive Model shows it will result in overall emission reductions equivalent to those resulting from the flat and averaging limits;

WHEREAS, the CaRFG regulations as originally adopted, including the minimum and maximum oxygen content requirements, were approved by the U.S. Environmental Protection Agency (U.S. EPA) on August 21, 1995, as a revision to California's State Implementation Plan (SIP);

WHEREAS, pursuant to Clean Air Act section 211(k), U.S. EPA has adopted federal reformulated gasoline regulations applicable to the 70 percent of California gasoline that is sold in the greater Los Angeles, San Diego, and Sacramento areas; these regulations require a year-round minimum oxygen content of 2.0 wt.% and do not provide any RVP exemption for gasoline containing ethanol;

WHEREAS, in the first part of this year the ARB staff worked intensively with the Western States Petroleum Association, environmental groups and others to identify possible changes and additions to the CaRFG regulations to provide refiners and marketers with more compliance flexibility while preserving the overall emissions reductions from the CaRFG program;

WHEREAS, as a result of these activities, the staff proposed, for consideration at an August 27, 1998 hearing, several amendments to the CaRFG regulations; these included amendments to sections 2262.5(b) and 2265(a)(2), title 13, California Code of Regulations, and to section I.A. of the "California Procedures for Evaluating Alternative Specifications for Phase 2 Reformulated Gasoline Using the California Predictive Model," that would increase the cap limit for oxygen under the CaRFG regulations from 2.7 wt.% to 3.5 wt.%, which is equivalent to 10 percent by volume (vol.%) ethanol;

WHEREAS, Health and Safety Code section 43830(g), enacted in 1991, conditionally exempts gasoline blends containing 10 percent by volume (vol.%) ethanol from the summertime RVP standard of 7.00 pounds per square inch (psi) in the CaRFG regulations; the statute makes the exemption inapplicable if the ARB determines, on the basis of independently verifiable automobile

exhaust and evaporative emission tests performed on a representative fleet of automobiles, that the blend would result in a net increase in the ozone-forming potential of the total emissions, excluding emissions of NO<sub>x</sub>, when compared to the total emissions, excluding emissions of NO<sub>x</sub>, from the same automobile fleet using gasoline that meets all applicable specifications for CaRFG;

WHEREAS, when 10 vol.% ethanol is added to gasoline meeting the RVP standard of 7.00 psi, the RVP of the gasoline increases by approximately 1 psi and mass HC evaporative emissions will increase significantly; the ozone-forming potential of the emissions other than NO<sub>x</sub> from RVP-exempt gasoline will accordingly increase unless the contribution to ozone formation from the mass HC evaporative emissions increase is fully offset by any decreases in exhaust HC emissions, any decreases in reactivity of the exhaust and evaporative HC emissions, and decreases in exhaust CO emissions, to the extent CO contributes to ozone formation;

WHEREAS, at the August 27, 1998 hearing, the Board adopted all of the proposed amendments except for the increase in the oxygen cap limit from 2.7 to 3.5 wt.%; the Board continued consideration of increasing the oxygen cap limit to December 10, 1998, so that the continued hearing could be conducted during the two-day Board meeting at which the Board was also scheduled to consider making the RVP exemption determination under Health and Safety Code section 43830(g);

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:

Amending the CaRFG regulations to increase the CaRFG oxygen cap from 2.7 to 3.5 wt.% as proposed by staff will provide refiners additional flexibility in complying with the CaRFG requirements;

The CaRFG regulations as amended herein remain technologically feasible;

The amendments adopted herein will not affect the creation or elimination of jobs within the State of California, the creation of new businesses or the elimination of existing businesses within California, the expansion of businesses currently doing business within California, or the ability of California businesses to compete with businesses in other states;

The amendments adopted herein will not have any adverse impact on the economy of the state;

While the CaRFG regulations as amended herein are different from the reformulated gasoline regulations contained in the Federal Code of Regulations, the regulations approved herein are authorized by state law;

WHEREAS, the Board further finds that:

Since the CaRFG regulations as amended herein will allow a refiner to supply a batch of gasoline with an oxygen content between 2.7 and 3.5 wt.% only if the Predictive Model shows that the gasoline will result in reductions in exhaust emissions of HC, NO<sub>x</sub> and potency-weighted toxics equivalent to those resulting from the CaRFG flat and averaging limits, the amendments will not result in an increase in exhaust emissions of those pollutants;

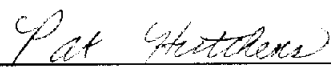
By adopting Resolution 98-78 earlier today, the Board has made the determination necessary to eliminate the RVP exemption in Health and Safety Code section 43830(g), and CaRFG containing 10 percent ethanol as allowed by the amendments adopted herein will accordingly not be exempt from the RVP standard in the CaRFG regulations; and

The amendments adopted herein are not expected to result in a significant adverse impact on the environment.

NOW, THEREFORE, BE IT RESOLVED that the Board hereby amends sections 2262.5(b) and 2265(a)(2), title 13, California Code of Regulations as set forth in Attachment A hereto, and amends section I.A. of the "California Procedures for Evaluating Alternative Specifications for Phase 2 Reformulated Gasoline Using the California Predictive Model" as set forth in Attachment B hereto.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to submit the amendments adopted herein to the U.S. EPA as a revision to the California SIP, and to take whatever actions are necessary to assure prompt approval of the SIP revision by U.S. EPA.

I hereby certify that the above is a true and correct copy of Resolution 98-79, as adopted by the Air Resources Board.

  
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Pat Hutchens, Clerk of the Board

Attachment A

**Proposed Regulation Order**

**Amendments to the California Reformulated Gasoline Regulations**

**Note:** The preexisting regulation text is set forth below in normal type. The proposed amendments are shown in underline to indicate additions and ~~strikeout~~ to show deletions. The characters “\* \* \* \*” indicate that no amendments to the omitted intervening text are being proposed.

Amend title 13, California Code of Regulations (CCR), sections 2262.5(b) and 2265(a) to read as follows:

**Section 2262.5. Standards for Oxygen Content.**

\* \* \* \*

(b) ***Maximum oxygen content standard for all California gasoline.*** No person shall sell, offer for sale, supply, or transport California gasoline which has an oxygen content exceeding ~~2.7~~ 3.5 percent by weight.

\* \* \* \*

NOTE: Authority cited: sections 39600, 39601, 43013, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal.3d 411, 121 Cal.Rptr. 249 (1975). Reference: sections 39000, 39001, 39002, 39003, 39010, 39500, 39515, 39516, 41511, 43000, 43016, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal.3d 411, 121 Cal.Rptr. 249 (1975).

**Section 2265. Gasoline Subject to PM Alternative Specifications Based on the California Predictive Model.**

(a) ***Election to sell or supply a final blend as a PM alternative gasoline formulation.***

- (1) In order to sell or supply from its production facility or import facility a final blend of California gasoline as a PM alternative gasoline formulation subject to PM alternative specifications, a producer or importer shall satisfy the requirements of this section (a).
- (2) The producer or importer shall evaluate the candidate PM alternative specifications in accordance with the Air Resources Board's "California Procedures for Evaluating Alternative Specifications for Phase 2 Reformulated Gasoline Using the California Predictive Model," as adopted April 20, 1995 and last amended [Insert date of amendment], which is incorporated herein by reference (hereafter the "Predictive Model

Procedures"). If the PM alternative specifications meet the criteria for approval in the Predictive Model Procedures, the producer shall notify the executive officer of: (A) The identity, location, and estimated volume of the final blend; (B) the PM alternative specifications that will apply to the final blend, including for each specification whether it applies as a PM flat limit or a PM averaging limit; and (C) the numerical values for percent change in emissions for oxides of nitrogen, hydrocarbons, and potency-weighted toxic air contaminants as determined in accordance with the Predictive Model Procedures. The notification shall be received by the executive officer before the start of physical transfer of the gasoline from the production or import facility, and in no case less than 12 hours before the producer or importer either completes physical transfer or commingles the final blend.

- (3) Once a producer or importer has notified the executive officer pursuant to this section 2265(a) that a final blend of California gasoline is being sold or supplied from a production or import facility as a PM alternative gasoline formulation, all final blends of California gasoline subsequently sold or supplied from that production or import facility shall be subject to the same PM alternative specifications until the producer or importer either (A) designates a final blend at that facility as a PM alternative gasoline formulation subject to different PM alternative specifications, (B) elects in accordance with section 2264.2 to have a final blend at that facility subject to flat limit compliance options and/or averaging compliance options, or (C) elects in accordance with section 2266(c) to sell a final blend at that facility as an alternative gasoline formulation.
- (4) The executive officer may enter into a written protocol with any individual producer or importer for the purposes of specifying how the requirements in section (a)(2) shall be applied to the producer's or importer's particular operations, as long as the executive officer reasonably determines that application of the regulatory requirements under the protocol is not less stringent or enforceable than application of the express terms of section (a)(2). Any such protocol shall include the producer's or importer's agreement to be bound by the terms of the protocol.
- (5) If, through no intentional or negligent conduct, a producer or importer cannot report within the time period specified in section (a)(2) above, the producer or importer may notify the executive officer of the required data as soon as reasonably possible and may provide a written explanation of the cause of the delay in reporting. If, based on the written explanation and the surrounding circumstances, the executive officer determines that the conditions of this section (a)(5) have been met, timely notification shall be deemed to have occurred.

\* \* \* \*

NOTE: Authority cited: sections 39600, 39601, 43013, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal.3d 411, 121 Cal.Rptr. 249 (1975). Reference: sections 39000, 39001, 39002, 39003, 39010, 39500, 39515, 39516, 41511, 43000, 43016, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal.3d 411, 121 Cal.Rptr. 249 (1975).

**Attachment B**

State of California  
California Environmental Protection Agency  
AIR RESOURCES BOARD

**California Procedures for Evaluating  
Alternative Specifications for Phase 2 Reformulated Gasoline  
Using the California Predictive Model**

**Adopted: April 20, 1995**  
**Amended: [insert date of amendment]**

**Note:** The proposed amendment is shown in underline to indicate an addition and ~~strikeout~~ to indicate a deletion. The only proposed amendment is in Section I.A. Table 1, where the identified cap limit for maximum oxygen content would be changed from 2.7 wt.% to 3.5 wt.%. In light of the limited nature of the amendment, this document does not show the Table of Contents, the List of Tables, or the text following Section 1.A.

# California Procedures for Evaluating Alternative Specifications for Phase 2 Reformulated Gasoline Using the California Predictive Model

## I. INTRODUCTION

### A. Purpose and Applicability

1. The predictive model prescribed in this document may be used to evaluate gasoline specifications as alternatives to the gasoline specifications set forth in Title 13, California Code of Regulations (13 CCR), sections 2262.1 through 2262.7.

This procedure:

- ♦ prescribes the range of specifications that may be utilized to select a set of candidate Phase 2 RFG alternative gasoline specifications for evaluation,
  - ♦ defines the Phase 2 RFG reference specifications,
  - ♦ prescribes the calculations to be used to predict the emissions from the candidate specifications and the reference Phase 2 RFG specifications,
  - ♦ prescribes the calculations to be used to compare the emissions resulting from the candidate specifications to the reference Phase 2 RFG specifications,
  - ♦ establishes the requirements for the demonstration and approval of the candidate specifications as an alternative Phase 2 RFG formulation, and
  - ♦ establishes the notification requirements.
2. Gasoline properties for which alternative gasoline specifications may be set by this procedure include all eight Phase 2 RFG properties, except Reid vapor pressure (RVP).
  3. The Phase 2 RFG specifications, established in 13 CCR, sections 2262.1 through 2262.7, are shown in Table 1.



**Table 1**  
**Properties and Specifications for Phase 2 Reformulated Gasoline**

Fuel Property	Units	Flat Limit	Averaging Limit	Cap Limit
Reid vapor pressure (RVP)	psi, max.	7.00 <sup>1</sup>	none	7.00
Sulfur (SUL)	ppmw, max.	40	30	80
Benzene (BENZ)	vol.%, max.	1.00	0.80	1.20
Aromatic HC (AROM)	vol.%, max.	25.0	22.0	30.0
Olefin (OLEF)	vol.%, max.	6.0	4.0	10
Oxygen (OXY)	wt. %	1.8 (min) 2.2 (max)	none	1.8(min) <sup>2</sup> 2.7 3.5 (max)
Temperature at 50% distilled (T50)	deg. F, max.	210	200	220
Temperature at 90% distilled (T90)	deg. F, max.	300	290	330

<sup>1</sup> Applicable during the summer months identified in 13 CCR, sections 2262.1 (a) and (b).

<sup>2</sup> Applicable during the winter months identified in 13 CCR, section 2262.5 (a).

4. The pollutant emissions addressed by these procedures and the units of measurement are shown in Table 2.

**Table 2**  
**Predictive Model Pollutants and Units of Measurement**

Pollutant Emissions	Units
Oxides of nitrogen (NOx)	gm/mile
Hydrocarbons (HC)	gm/mile
Potency-weighted Toxics (PWT)	mg/mile

\* \* \* \*