

**AIR RESOURCES BOARD**

1102 Q STREET  
P.O. BOX 2815  
SACRAMENTO, CA 95812

August 1, 1991

Dear Sir or Madam:

Public Consultation Meeting to Discuss  
Phase 2 Reformulated Gasoline Specifications

This letter is to invite your participation in a public consultation meeting being held by the Air Resources Board (ARB or Board) staff to discuss Phase 2 specifications for reformulated gasoline. The meeting is scheduled for the following time, date, and location:

Time: 9:30 a.m.

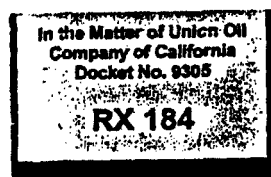
Date: August 14, 1991

Location: Resources Building Auditorium  
1416 9th Street  
Sacramento, California

Note that this is a change in location from our July 17, 1991, announcement of the public consultation meeting. In our previous announcement, we indicated that we would be sending you supporting documents when they became available. This notice serves to transmit to you the available information. Attached for your review are the following documents:

- Attachment 1 - Protocol for Calculating the Emission Reductions Resulting from the use of Phase 2 Reformulated and Oxygenated Gasoline
- Attachment 2 - Proposed Revision of Chapter 5 - Standards for Motor Vehicle Fuels
- Attachment 3 - Preliminary Draft of Proposed Regulation Order
- Attachment 4 - Synopsis and Preliminary Draft of the California Test Procedures for Evaluating Alternative Specifications for Phase 2 Reformulated Gasoline
- Attachment 5 - Synopsis of Benzene Element of the Proposed Specifications for Phase 2 Reformulated Gasoline

Phase 2 reformulated gasoline specifications will be considered by the Board in November 1991. Specifications that are being considered include aromatic hydrocarbon content, benzene content, olefin content, oxygen content, sulfur content, volatility of gasoline, and distillation



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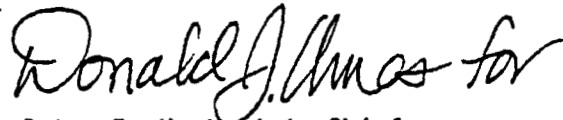
TP 005539

distribution. The objective of these specifications is to maximize reductions of criteria and toxic pollutants from the existing fleet of vehicles. We expect that these specifications will also reduce the reactivity (ozone-forming potential) of exhaust and evaporative emissions from gasoline-fueled vehicles.

At the consultation meeting, we will be discussing the information contained in the Attachments. We will also be discussing the status of our refinery linear programming modeling efforts and the status of the ongoing vehicle emission test programs. We welcome your input at the consultation meeting.

If you have any questions regarding the meeting or questions regarding Phase 2 reformulated gasoline specifications, please call Bob Fletcher, Manager of the Fuels Section, at (916) 322-6019.

Sincerely,



Peter D. Venturini, Chief  
Stationary Source Division

Attachments

**DRAFT - FOR DISCUSSION ONLY**

**ATTACHMENT 1**

**Protocol for Calculating the Emission Reductions Resulting from the Use of  
Phase 2 Reformulated Gasoline and Oxygenated Gasoline**

**July 30, 1991**

This protocol outlines the methodology for determining the reductions in emissions of hydrocarbons (HC), oxides of nitrogen (NO<sub>x</sub>), and carbon monoxide (CO) that will result from the use of Phase 2 reformulated gasoline and oxygenated gasoline.

The ARB staff's procedure to determine the emission reductions in any given year is summarized below.

- Step 1. Separate the vehicle fleet into groups according to technology and vehicle model year.
- Step 2. For the groups of vehicles in any given year, calculate the emission rates for running exhaust emissions, cold start exhaust emissions, hot start exhaust emissions, hot soak evaporative emissions, diurnal evaporative emissions, and running losses.
- Step 3. Determine the vehicle activities of each vehicle groups. Vehicle activity is represented by vehicle miles travelled (VMT), number of cold start trips, and number of hot start trips, and is used to calculate the amount of running exhaust emissions, cold start emissions, hot start emissions, hot soak evaporative emissions, diurnal evaporative emissions, and running losses.
- Step 4. Determine the baseline emissions from the vehicle groups.
- Step 5. For the different vehicle groups, calculate emission reduction factors for composite exhaust and composite evaporative emissions.
- Step 6. Calculate emission reductions.

**Step 1. Define Vehicle Groups**

The vehicle fleet of any particular year is separated into groups according to model years. The selection of the vehicle groups is based on the prevalent vehicle emission control technology. For the purpose of this analysis, the vehicle fleet is separated into the following groups:

Pre 1975	Pre-catalyst vehicles
1975 - 1980	Open loop oxidizing catalyst
1981 - 1985	Early closed loop three way catalyst
1986 - 1990	Current closed loop three way catalyst
1991 - 1995	Closed loop three way catalyst
Post 1995	

**Step 2. Determine Baseline Emission Factors**

The baseline emissions factors are to be calculated using the EMFAC7E emission model. For different vehicles and different vehicle activities, EMFAC7E calculates a set of emission factors for HC, NO<sub>x</sub>, and CO. An emission factor is an estimate of the rate at which a pollutant enters the atmosphere per unit of activity (e.g. miles driven). The types of emission factors contained within EMFAC7E are listed below:

**A. Exhaust Emission Factors****1. Running Exhaust Emission Factors**

The running exhaust emission factor is expressed in grams per mile. Running exhaust emission factors for total organic gases (TOG), reactive organic gases (ROG), NO<sub>x</sub>, and CO are determined at an ambient temperature of 75°F and various speeds. Temperature factors are used to adjust the running emission factors for ambient temperatures other than 75°F. These emission factors vary with vehicle speed and apply after the vehicle is warmed up and in a stabilized mode of operation. Running exhaust emissions includes emissions emerging from the tailpipe or through the crankcase as engine blowby.

**2. Cold Start Emission Factors**

The cold start emission factor is expressed in grams per trip. Cold start emissions occur from the time the engine starts, in a cold start mode, until it is fully warm. Cold start mode occurs after a long engine-off period, one or more hours for a catalyst equipped vehicle and four or more hours for a non-catalyst equipped vehicle. The cold start trip is assumed to have an average speed of 25.6 miles and average length of 3.59 miles.

### 3. Hot Start Emission Factors

The hot start emission factor is expressed in grams per trip. Hot start emissions occur from the time the engine starts, in a hot start mode, until it is fully warm. Hot start mode occurs after a short engine-off period, less than one hour for a catalyst equipped vehicle and less than four hours for a non-catalyst equipped vehicle. The hot start trip is assumed to have an average speed of 25.6 miles and average length of 3.59 miles.

### B. Evaporative Emission Factors

The ARB has determined that the current evaporative HC emission control systems are not capable of controlling emissions from vehicles during characterized by high ambient temperature and/or multiple-day diurnal episodes. The result is excess evaporative HC emissions during the environmental conditions which are most conducive to ozone formation.

In order to eliminate deficiencies in the current evaporative emission test procedures, the Board adopted revised evaporative emission test procedures which included more extreme temperature conditions for the tests, and running loss standards for motor vehicles. The modifications to the test procedures include: hot soak emissions measurement at higher temperature, real time diurnal testing, and a direct determination of running loss emissions.

The new standard for hot soak plus diurnal emissions is 2.0 grams per test, and the newly adopted standard for running loss emissions is 0.05 grams per test. Due to the higher temperatures specified in the new test procedures, an estimated 93 percent reduction in the zero mile emission rate for hot soak and diurnal emissions, and an estimated 85 percent reduction in the zero mile emission rate for running losses are likely to be needed to meet the new standards at 100,000 miles. The emission reductions resulting from the new evaporative emission test procedures are factored into the EMFAC7E evaporative emission factors for 1995 model year or newer vehicles.

#### 1. Hot Soak Emission Factors

The hot soak emission factor is expressed in grams per trip, the trip having any speed or length. Hot soak emissions are losses of gasoline vapor from the vehicle after the vehicle's engine has been turned off at the end of a trip. Hot soak emissions originate primarily from the vehicle's carburetor and occur immediately after the engine is turned off. When the engine is turned off, gasoline in the carburetor bowl vaporizes due to the temperature increase in the carburetor. The introduction of fuel-injected vehicles into the market in place of carbureted vehicles in recent years has resulted in reduced hot soak emissions from newer cars.

Hot soak testing is currently performed at an ambient temperature between 68°F and 86°F. The ARB's newly adopted procedure will require hot soak testing to be performed at 105°F. To calculate the hot soak emission factors based on the new test procedure, a temperature correction factor is applied to the old EMFAC7E hot soak emission factors for the year 1990 and later.

## 2. Diurnal Emission Factors

The diurnal emissions factor is expressed in grams per vehicle per day. Diurnal emissions are evaporative emissions resulting from the daily changes in the ambient temperature. In a partially-filled fuel tank, the air-fuel mixture expands and gasoline vapor is released into the atmosphere.

Currently, the test procedure for diurnal emission incorporates a single 60-84°F heat build following a cold soak. This diurnal test is performed over a one hour period during which the fuel tank is heated, simulating a linear ambient air temperature excursion. The new ARB test procedure requires:

- a. Real time diurnal testing to be performed over three days consisting of two 24-hour cycles and one 20-hour cycle.
- b. Diurnal heating to be performed by heating the ambient air in the shed rather than by heating the fuel in the tank.
- c. A diurnal heat build of 60-105°F during each cycle followed by a cool down period of eight hours.

To calculate the diurnal emission factor based on the new test procedure, a temperature correction factor is applied to the old EMFAC7E basic diurnal emission factors for the year 1990 and later.

## 3. Running Losses

The emission factor for running losses is expressed in grams per mile. Running losses are evaporative emissions that occur due to gasoline vaporization while the vehicle is operating. The losses occur as the vehicle's fuel tank temperature increases during operation. Test data indicate that running losses can account for a significant portion of vehicular evaporative emissions.

The new procedure requires that the running loss testing be performed at an ambient temperature of 105°F. To calculate the running loss emission factor at 105°F, a temperature correction factor is applied to the old EMFAC7E running loss emission factors for the year 1993 and later.

### Step 3. Determine Vehicle Activity

The activities of a vehicle define how the vehicle is operated. The activities of a vehicle are separated into VMT per day, number of daily trips, number of cold trips, and number of hot trips. To determine the emissions by any given group of vehicles, it is necessary to know the activities of the vehicle groups. The ARB maintains a data base of the activities of vehicles by model year in different areas. Vehicle activities are listed by county and air basin. This data base is used in conjunction with the EMFAC7E emission factors to determine the baseline emissions.

### Step 4. Determine the Baseline Emissions

Baseline emissions are defined as those emissions from vehicles operating on Phase 1 reformulated gasoline. Baseline emissions of a particular group or fleet of vehicles in any given area are estimated by multiplying the activities of the vehicles in the area by their emission factors. For example, the running exhaust emissions of a group of vehicles are determined by multiplying its EMFAC7E running emission factor by its daily VMT. The ARB determines the baseline emissions for different areas in the state using the BURDEN computer model.

For the purpose of this analysis, only baseline emissions from gasoline-powered light duty autos and light duty trucks are calculated. The baseline emissions are determined for the fleets of light duty vehicles in the years 1992, 1994, 1996, 1997, 2000, 2005, and 2010.

#### A. Annual Average Inventory

An annual inventory represents the emissions on an average day during a specific year. One temperature, usually 75°F, is assumed when calculating the emissions. The VMT are assumed to occur uniformly through the day.

#### B. Planning Inventory

Planning inventories for motor vehicle emissions are designed for those areas of the state that are not in attainment of the federal ambient air quality standards and only for those pollutants for which the areas are in nonattainment. For example, ozone planning inventories are prepared only for air basins designated as nonattainment areas for ozone. A planning inventory represents "typical episodic day" emissions in the nonattainment area. A "typical episodic day" is based on the ten worst air quality days of a particular pollutant. Typical episodic days are seasonal and they occur during different parts of the year for the different pollutants (ozone and CO) in different areas. The ozone planning inventories include ROG and NO<sub>x</sub> emissions estimates, and the CO planning inventories include CO emissions estimates.

### C. Selection of Emission Inventory

As discussed above, a planning inventory represents the highest level of emissions of a pollutant in any one day. The annual average inventory represents the emissions of an average day. Therefore, the emissions in the ozone planning inventories are higher than those in the annual average inventory. If estimates of the reductions in ROG and NO<sub>x</sub> emissions are based on the ozone planning inventory, it will result in higher emission reductions than what is really achieved with Phase 2 reformulated gasoline. This would also be the case when the CO planning inventory is used calculating the CO benefits for the year-round fuel oxygen content requirement.

The winter oxygenate requirement will only be effective during the high CO seasons, so the emission reductions based on the CO planning inventory will reflect the reductions that will be achieved with the wintertime oxygenated fuel requirement.

The staff plans to use an annual average inventory for ozone to determine the emission reductions resulting from the use of Phase 2 reformulated gasoline and the CO planning inventory to determine the reductions in CO emissions resulting from the use of wintertime oxygenated gasoline.

### Step 5. Calculate Emission Reduction Factors

An emission reduction factor is the ratio of the amount of emissions reduced from the baseline emissions to the baseline emissions. For the purpose of this analysis, emission factors for composite exhaust emissions (running exhaust emissions + cold start exhaust emissions + hot start exhaust emissions) and composite evaporative emissions (hot soak evaporative emissions + diurnal evaporative emissions + running losses) are calculated for the groups of vehicles listed in Step 1.

#### A. Exhaust Emission Reduction Factors

The emission reduction factor for composite exhaust emissions can be calculated with the following equation:

$$\text{ERF} = (\text{Phase 2 emission factor} - \text{Phase 1 emission factor}) / (\text{Phase 1 emission rate})$$

where

ERF = Emission reduction factor

The Phase 2 emission factors rates are those emitted when vehicles are operated on Phase 2 reformulated gasoline or oxygenated gasoline. The Phase 1 emission factors are those emitted from the same vehicles operating on Phase 1 gasoline. The exhaust emission reduction factors are calculated using data collected from various emissions tests conducted on vehicles that are representative of the vehicle groups.



**B. Evaporative Emissions Reduction Factors**

A number of vehicle studies test programs have been conducted to evaluate the influence of different properties of gasoline on evaporative emissions. Properties that may affect evaporative emissions include RVP, distillation temperature, and oxygenate content.

Based on the results of the available test programs, the staff plans to develop the relationships between evaporative emissions and the above properties. These relationships will be used to determine the reductions in evaporative emissions from each of the various groups of vehicles.

**Step 6. Determination of Emission Reductions**

The reductions in emissions from each of the vehicle groups, for each pollutant, are determined by multiplying its baseline emission inventory by its emission reduction factor. The total emissions reductions are calculated for the fleet by summing the individual group reductions.

## ATTACHMENT 2

### Proposed Revision of Chapter 5 - Standards for Motor Vehicle Fuels

July 30, 1991

Currently, the fuels regulations are in Chapter 5, "Standards for Motor Vehicle Fuels," Article 1, §§ 2250-2257. There is also an Article 2., "Sampling and Testing Procedures," which contains two sections--2261 and 2262. There is a Chapter 6 on certifying emission control systems in IC engines (§§ 2275 and 2276), and Chapter 7 on Specifications for Fill Pipes (§ 2290). The clean fuels regulations are to be in new Chapter 8, "Clean Fuels Program."

We are proposing to do an editorial revision (submitted to OAL; no notice necessary) by moving Chapters 6 and 7 to be new Chapters 4.2 and 4.4; §§ 2230-1 and 2235. This clears up everything before the clean fuel program sections starting with 2300. We would then structure Chapter 5 as follows:

#### Subchapter 5. Standards for Motor Vehicle Fuels

##### Article 1. Standards for Gasoline

###### Subarticle 1. Standards for Gasoline Sold Prior to January 1, 1996

- § 2250. Degree of Unsaturation
- § 2251. Reid Vapor Pressure of Gasoline [Sold Prior to January 1, 1992]
- § 2251.5 Reid Vapor Pressure of Gasoline [Sold Between January 1, 1992 and December 31, 1995]
- § 2252. Sulfur Content of Gasoline Represented as Unleaded [Sold Prior to January 1, 1996]

[We would move 2252 (d)-(o) to 2280 indicated below, keeping the variance section, 2252(m), here as well. Could all be done as editorial revision]

- § 2253.2. Lead in Gasoline Sold Before January 1, 1992
- § 2253.4. Lead in Gasoline
- § 2254. Manganese Additive Content
- § 2257. Required Additives in Gasoline
- § 2258. Wintertime Oxygenates Program

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Proposed Revision of Chapter 5 - Standards for Motor Vehicle Fuels  
(continued)

Subarticle 2. Standards for Gasoline Sold Beginning January 1, 1996

- § 2260. Definitions
- § 2261. Basic Prohibitions
- § 2262.1. Standards for Reid Vapor Pressure
- § 2262.2. Standard for Sulfur Content
- § 2262.3. Standard for Benzene Content
- § 2262.4. Standard for Olefin Content
- § 2262.5. Standard for Oxygen Content
- § 2262.6. Standards for Distillation Temperatures
- § 2262.7. Standard for Aromatic Hydrocarbon Content
- § 2263. Sampling Procedures and Test Methods
- § 2264. Alternative Means of Compliance with Benzene Standards
- § 2265. Certified Gasoline Formulations Resulting in Equivalent Emission Reductions Based on a Predictive Model
- § 2266. Certified Gasoline Formulations Resulting in Equivalent Emission Reductions Based on Motor Vehicle Emission Testing
- § 2267. Exemptions
- § 2268. Violations
- § 2269. Submittal of Compliance Plans
- § 2270. Variances

Subarticle 3. Sampling and Testing Procedures

- § 2275. Gasoline Sampling Procedures for Reid Vapor Pressure
- § 2276. Test Method for the Determination of the Reid Vapor Pressure Equivalent Using an Automated Vapor Pressure Test Instrument

Article 2. Standards for Diesel Fuel

- § 2280. Sulfur Content of Diesel Fuel in the South Coast Air Basin Prior to October 1, 1993.  

[This would come from 2252(d)-(o). We would either reletter everything, or just label (a)-(c) "[Reserved]" ((c) is already so designated).]
- § 2281. Sulfur Content of Diesel Fuel.
- § 2282. Aromatic Hydrocarbon Content of Diesel Fuel.

Article 3. Specifications for Alternative Motor Vehicle Fuels

- §§ 2290-2299 [Reserved]

**ATTACHMENT 3**  
**PRELIMINARY DRAFT OF PROPOSED REGULATION ORDER**

**CARB 10003041**

**TP 005550**

PROPOSED REGULATION ORDER

Amend section 2250, Title 13, California Code of Regulations, to read as follows:

Section 2250. Degree of Unsaturation for Gasolines Sold Before January 1, 1996.

(c) This section shall not apply to gasoline sold or supplied on or after January 1, 1996.

NOTE: Authority cited: sections 39600, 39601, 43013, 43018, 43101, and 43831, 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, 39606, 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).

Amend section 2251.5., Title 13, California Code of Regulations, to read as follows:

Section 2251.5. Reid Vapor Pressure of Gasoline Sold After January 1, 1992, and Before January 1, 1996

(a) Regulatory Standards.

(1) Basic Regulatory Standard.

(A) Starting January 1, 1992, within each of the air basins during the regulatory period set forth in section (a)(1)(B), no person shall sell, offer for sale, dispense, supply, offer for supply, or transport California gasoline which has a Reid vapor pressure exceeding 7.80 pounds per square inch.

(B) Basic Regulatory Control Periods.

(i) April 1 through October 31:

South Coast Air Basin (*Including Ventura County*)

San Diego Air Basin

Southeast Desert Air Basin

(ii) May 1 through September 30:

Great Basin Valley Air Basin

(iii) May 1 through October 31:

San Francisco Bay Area Air Basin

San Joaquin Valley Air Basin

Sacramento Valley Air Basin

Mountain Counties Air Basin

Lake Tahoe Air Basin

(iv) June 1 through September 30:

North Coast Air Basin

Lake County Air Basin

Northeast Plateau Air Basin

(v) June 1 through October 31:

North Central Coast Air Basin

South Central Coast Air Basin (*Excluding Ventura County*)

(2) Additional Regulatory Standards for Gasoline Sold, Supplied or Transferred from a Production or Import Facility.

(A) Starting January 1, 1992, no producer or importer shall sell, offer for sale, supply, or offer to supply from its California production facility or California import facility in an air basin during the regulatory period specified in section (a)(2)(B), California gasoline which has a Reid vapor pressure exceeding 7.80 pounds per square inch. Starting January 1, 1992, no person shall transport directly from a California production facility or California import facility in an air basin during the regulatory period set forth in section (a)(2)(B), California gasoline which has a Reid vapor pressure exceeding 7.80 pounds per square inch.

(B) Additional Regulatory Control Periods.

(i) March 1 through March 31:

South Coast Air Basin (*Including Ventura County*)

San Diego Air Basin

Southeast Desert Air Basin

(ii) April 1 through April 30:

San Francisco Bay Area Air Basin

San Joaquin Valley Air Basin

Sacramento Valley Air Basin

Great Basin Valley Air Basin

Mountain Counties Air Basin

Lake Tahoe Air Basin

(iii) May 1 through May 31:

North Central Coast Air Basin

South Central Coast Air Basin (*Excluding Ventura County*)

North Coast Air Basin

Lake County Air Basin

Northeast Plateau Air Basin

(3) Special Provisions for Blends of Gasoline Containing Ethanol.

(A) Any blend of gasoline containing at least 10 percent ethanol by volume shall not result in a violation of this section (a) unless the gasoline used in the blend exceeds the standards set forth in this section (a).

(B) This section (a)(3) shall be effective only so long as Health and Safety Code section 43830 establishes special provisions for the volatility of gasoline blends containing at least 10 percent ethanol by volume.

(4) (A) Section (a)(1) shall not apply to a transaction occurring in an air basin during the basic regulatory control period where the person selling, supplying, or offering the gasoline demonstrates as an affirmative defense that, prior to the transaction, he or she has taken reasonably prudent precautions to assure that the gasoline will be delivered to a retail service station or bulk purchaser-consumer's fueling facility when the station or facility is not subject to a basic regulatory control period.

(B) Section (a)(2) shall not apply to a transaction occurring in an air basin during the additional regulatory control period for producers and importers where the person selling, supplying, offering or transporting the gasoline demonstrates as an affirmative defense that, prior to the transaction, he or she has taken reasonably prudent precautions to assure that the gasoline will be delivered to a retail service station or bulk purchaser-consumer's fueling facility located in an air basin not then subject to the basic regulatory control period or the additional control period for producers and importers.

(C) Section (a)(1) shall not apply to a transaction occurring in an air basin during the basic regulatory control period where the transaction involves the transfer of gasoline from a stationary storage tank to a motor vehicle fuel tank and the person selling, supplying, or offering the gasoline demonstrates as an affirmative defense that the last delivery of gasoline to the stationary storage tank occurred more than fourteen days before the start of the basic regulatory control period.

(5) For the purposes of section (a)(1), each sale of California gasoline at retail, and each dispensing of California gasoline into a motor



vehicle fuel tank, shall also be deemed a sale or supply by any person who previously sold or supplied such gasoline in violation of section (a)(1).

[No changes to subsections (b) - (e)]

\* \* \* \*

(f) *This section shall not apply to gasoline sold or supplied on or after January 1, 1996.*

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, and 43101 of the 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, 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).

Amend section 2252., Title 13, California Code of Regulations, to read as follows:

**Section 2252. Sulfur Content of Gasoline Represented as Unleaded Sold Before January 1, 1996**

[No change to subsection (a)]

\* \* \* \*

(b) The maximum sulfur content limitations specified in subsection (a) shall be determined by ASTM Test Method D2622-8287, or any other test method determined by the executive officer to give equivalent results.

[No changes to subsections (c) - (o)]

\* \* \* \*

(p) *This section shall not apply to gasoline sold or supplied after January 1, 1996.*

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, 39500, 39515, 39516, 39606, 41511, 43000, 43013, 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).

Adopt new subarticle 2, sections 2260 - 2274, Title 13, California Code of Regulations, to read as follows:

[NOTE: The entire text of subarticle 2. is NEW TEXT to be added to the California Code of Regulations.]

**Subarticle 2. Standards for Gasoline Sold Beginning January 1, 1996**

**Section 2260. Definitions**

(a) For the purposes of this article, the following definitions apply:

(1) "ASTM" means the American Society of Testing and Materials.

(2) "Bulk purchaser-consumer" means a person that purchases or otherwise obtains gasoline in bulk and then dispenses it into the fuel tanks or motor vehicles owned or operated by the person.

(3) "California import facility" means the facility at which imported California gasoline is first received in California, including, in the case of gasoline imported by cargo tank and delivered directly to a facility for dispensing gasoline into motor vehicles, the cargo tank in which the gasoline is imported.

(4) "California gasoline" means gasoline sold, intended for sale, or made available for sale as a motor vehicle fuel in California.

(5) "California oxygenate blending facility" means the facility (including a truck) at which oxygenate is added to California gasoline, and at which the quality or quantity of gasoline is not altered in any other manner.

(6) "California production facility" means a facility in California at which gasoline is produced; it does not include a facility whose sole operation is to transfer gasoline or to blend additives, other than oxygenates, into gasoline.

(7) "Designated alternative limit" means an alternative gasoline specification limit, expressed in appropriate limits, which is assigned by a producer or importer to a final blend of California gasoline pursuant to section 2264.

(8) "Ethanol" means ethyl alcohol which meets any additional requirements for ethanol or ethyl alcohol in Health and Safety Code section 43830.

(9) "Executive Officer" means the executive officer of the Air Resources Board, or his or her designee.

(10) "Final blend" means a distinct quantity of gasoline which is introduced into commerce in California without further alteration which would tend to affect a regulated gasoline specification of the fuel.

(11) "Further process" means to perform any activity on gasoline, including distillation, treating with hydrogen, or blending, for the purpose of bringing the gasoline into compliance with the standards in this subarticle.

(12) "Gasoline" means any fuel that is commonly or commercially known, sold or represented as gasoline, and any blend of fuels where more than 50 percent by weight is fuel that is commonly or commercially known, sold or represented as gasoline.

(13) "Importer" means any person who first accepts delivery in California of California gasoline.

(14) "Motor vehicle" has the same meaning as defined in section 415 of the Vehicle Code.

(15) "Oxygenate" is any oxygen-containing, ashless, organic compound, such as an alcohol or ether, which, when added to gasoline increases the amount of oxygen in gasoline.

(16) "Oxygenate blender" is any person who owns, leases, operates, controls, or supervises a California oxygenate blending facility.

(17) "Produce" means to convert liquid compounds which are not gasoline into gasoline. When a person blends volumes of blendstocks which are not gasoline with volumes of gasoline acquired from another person, and the resulting blend is gasoline, the person conducting such blending has produced only the portion of the blend which was not previously gasoline. When a person blends gasoline with other volumes of gasoline, without the addition of blendstocks which are not gasoline, the person does not produce gasoline.

(18) "Producer" means any person who owns, leases, operates, controls or supervises a California production facility.

(19) "Refiner" means any person who owns, leases, operates, controls or supervises a refinery.

(20) "Refinery" means a facility that produces liquid fuels by distilling petroleum. A small refiner's refinery includes all bulk storage and bulk distribution facilities jointly owned or leased with the facility that produces liquid fuels by distilling petroleum.

(21) "Regulated gasoline specification" means any constituent in California gasoline for which standards are listed in this subarticle.

(22) "Supply" means to provide or transfer a product to a physically separate facility, vehicle, or transportation system.

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, 40000, 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 2261. Applicability

(a) The standards contained in this subarticle shall not apply to a sale, offer for sale, or supply of California gasoline to a refiner if the refiner further processes the gasoline at the refiner's refinery prior to any subsequent sale, offer for sale, or supply of the gasoline.

(b) California gasoline sold or supplied on or after January 1, 1996, is also subject to section 2253.4 (Lead/Phosphorus in Gasoline), section 2254 (Manganese Additive Content), section 2257 (Required Additives in Gasoline), and section 2258 (Wintertime Oxygenated Gasoline).

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 2262.1. Standards for Reid Vapor Pressure**

**(a) Basic Regulatory Standard.**

(1) Starting January 1, 1996, no person shall sell, offer for sale, dispense, supply, offer for supply, or transport California gasoline which has a Reid vapor pressure exceeding 7.00 pounds per square inch within each of the air basins during the regulatory period set forth in section (a)(2).

**(2) Basic Regulatory Control Periods.**

**(A) April 1 through October 31:**

South Coast Air Basin (Including Ventura County)

San Diego Air Basin

Southeast Desert Air Basin

**(B) May 1 through September 30:**

Great Basin Valley Air Basin

**(C) May 1 through October 31:**

San Francisco Bay Area Air Basin

San Joaquin Valley Air Basin

Sacramento Valley Air Basin

Mountain Counties Air Basin

Lake Tahoe Air Basin

**(D) June 1 through September 30:**

North Coast Air Basin

Lake County Air Basin

Northeast Plateau Air Basin

**(E) June 1 through October 31:**

North Central Coast Air Basin

South Central Coast Air Basin (Excluding Ventura County)

**(b) Additional Regulatory Standards for Gasoline Sold, Supplied or Transferred from a Production or Import Facility.**

(1) Starting January 1, 1996, California gasoline sold, offered for sale, supplied or offered for supply by a producer or importer from its California production facility or California import facility in an air basin during the regulatory period specified in section (b)(2) shall have a Reid vapor pressure not exceeding 7.00 pounds per square inch. Starting January 1, 1996, California gasoline transported directly from a California

production facility or California import facility in an air basin during the regulatory period set forth in section (b)(2) shall have a Reid vapor pressure not exceeding 7.00 pounds per square inch.

(2) Additional Regulatory Control Periods.

(A) March 1 through March 31:

South Coast Air Basin (Including Ventura County)

San Diego Air Basin

Southeast Desert Air Basin

(B) April 1 through April 30:

San Francisco Bay Area Air Basin

San Joaquin Valley Air Basin

Sacramento Valley Air Basin

Great Basin Valley Air Basin

Mountain Counties Air Basin

Lake Tahoe Air Basin

(C) May 1 through May 31:

North Central Coast Air Basin

South Central Coast Air Basin

North Coast Air Basin

Lake County Air Basin

Northeast Plateau Air Basin

(c) Special Provisions for Blends of Gasoline Containing Ethanol.

(1) Any blend of gasoline containing at least 10 percent ethanol by volume shall not result in a violation of this section (a)(1) unless the gasoline used in the blend exceeds the standards set forth in this section (a)(1).

(2) This section (c) shall be effective only so long as Health and Safety Code section 43830 establishes special provisions for the volatility of gasoline blends containing at least 10 percent ethanol by volume.

(d) Applicability

(1) Section (a) shall not apply to a transaction occurring in an air basin during the basic regulatory control period where the person selling, supplying, or offering the gasoline demonstrates as an affirmative defense that, prior to the transaction, he or she has taken reasonably prudent

precautions to assure that the gasoline will be delivered to a retail service station or bulk purchaser-consumer's fueling facility when the station or facility is not subject to a basic regulatory control period.

(2) Section (b) shall not apply to a transaction occurring in an air basin during the additional regulatory control period for producers and importers where the person selling, supplying, offering or transporting the gasoline demonstrates as an affirmative defense that, prior to the transaction, he or she has taken reasonably prudent precautions to assure that the gasoline will be delivered to a retail service station or bulk purchaser-consumer's fueling facility located in an air basin not then subject to the basic regulatory control period or the additional control period for producers and importers.

(3) Section (a)(1) shall not apply to a transaction occurring in an air basin during the basic regulatory control period where the transaction involves the transfer of gasoline from a stationary storage tank to a motor vehicle fuel tank and the person selling, supplying, or offering the gasoline demonstrates as an affirmative defense that the last delivery of gasoline to the stationary storage tank occurred more than fourteen days before the start of the basic regulatory control period.

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 2262.2. Standard for Sulfur Content

(a) Starting January 1, 1996, no person shall sell, offer for sale, dispense, supply, offer for supply, or transport California gasoline which has a sulfur content exceeding 30 parts per million 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 2262.3. Standards for Benzene Content**

(a) Starting January 1, 1996, no person shall sell, offer for sale, dispense, supply, offer for supply, or transport California gasoline which has a benzene content exceeding 1.2 percent by volume.

(b) Starting January 1, 1996, each producer or importer of gasoline sold, offered for sale, supplied, or offered for supply as California gasoline shall comply with either the standard in (b)(1) or the standard in (b)(2).

(1) The benzene content shall not exceed 1.00 percent by volume; or

(2) The benzene content of no final blend shall exceed 0.80 percent by volume unless for that blend:

(A) a designated alternative limit has been established in accordance with section 2264 (a), and

(B) the benzene content of the blend does not exceed the designated alternative limit, and

(C) the benzene corresponding to the excess of the designated alternative limit over 0.80 percent by volume has been offset in accordance with section 2264 (b).

(c) On or before September 1, 1995, each producer or importer of California gasoline shall notify the executive officer of the producer's or importer's intent to comply with the standard in subsection (b)(1) or with the standards in subsection (b)(2). Whichever standard is elected by a particular producer or importer, all California gasoline produced or imported by that entity shall comply with that standard for at least one year. Any producer or importer may change the selection of benzene standard for any subsequent calendar year if he or she notifies the executive officer of the change no later than October 1 of the preceding year.

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 2262.4. Standard for Olefin Content**

(a) Starting January 1, 1996, no person shall sell, offer for sale, dispense, supply, offer for supply, or transport California gasoline which has an olefin content exceeding 5.0 percent by volume.

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 2262.5. Standards for Oxygen Content**

(a) Starting January 1, 1996, no person shall sell, offer for sale, dispense, supply, offer for supply, or transport California gasoline which does not meet the following standards.

(1) The oxygen content shall be at least 1.5 percent by weight, and

(2) The oxygen content shall not exceed 2.1 percent by weight, unless the only oxygenate the gasoline contains is methyl-tertiary-butyl-ether, in which case the oxygen content shall not exceed 2.7 percent oxygen by weight.

(b) Starting January 1, 1996, California gasoline sold, offered for sale, supplied or offered for supply by a producer, importer, or oxygenate blender from its California production facility, California import facility, or California oxygenate blending facility shall comply with the standards listed in either (b)(1) or (b)(2).

(1) The oxygen content shall be at least 2.0 percent by weight, or

(2) The gasoline shall be reported in accordance with all of the requirements of section 2264, and:

(A) The oxygen content shall not be less than the designated alternative limit, and

(B) Where the designated alternative limit is less than 2.1 percent by weight, the difference must be fully offset in accordance with the requirements of section 2264.

(c) On or before September 1, 1995, each producer, importer, or oxygenate blender of California gasoline shall notify the executive officer of the producer's, importer's, or oxygenate blender's intent to comply with the standard in subsection (b)(1) or with the standards in subsection (b)(2). Whichever standard is elected by a particular producer, importer, or oxygenate blender, all California gasoline produced, imported, or blended by that entity shall comply with that standard for at least one year. Any producer, importer, or oxygenate blender may change the selection of benzene standard for any subsequent calendar year if he or she notifies the executive officer of the change no later than October 1 of the preceding year.

(d) The provisions of this section shall not apply during the regulatory control period specified for an air basin regulated under section 2258.

[EXPLANATORY NOTE 1: The ARB is extremely concerned about the potential for NOx increases from the use of oxygenates. The limits specified above are similar to those being considered by the EPA in its negotiated rulemaking process. The ARB welcomes comments on the appropriateness of this approach.]

[EXPLANATORY NOTE 2: The ARB intends on modeling the averaging provisions after the procedure listed in section 2264 with the difference that averaging would occur over a  $\pm 90$  day period, on a rolling average. This provision would be similar to the provision in section 2256 concerning aromatic hydrocarbon in diesel fuel. The ARB does not intend on allowing trading between companies on oxygen.]

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 2262.6. Standards for Distillation Temperatures**

(a) Starting January 1, 1996, no person shall sell, offer for sale, dispense, supply, offer for supply, or transport California gasoline which has a 90 percent distillation temperature which exceeds 300 degrees Fahrenheit.

(b) Starting January 1, 1996, no person shall sell, offer for sale, dispense, supply, offer for supply, or transport California gasoline which has a 50 percent distillation temperature which exceeds 200 degrees Fahrenheit.

(c) Starting January 1, 1996, no person shall sell, offer for sale, dispense, supply, offer for supply, or transport California gasoline which has a driveability index which exceeds 1100, as calculated using the following equation:

$$\text{Driveability Index} = (1.5)(T_{10}) + (3.0)(T_{50}) + (T_{90})$$

where:  $T_{10}$  = the temperature, in degrees Fahrenheit, at which 10 percent of the gasoline evaporates;

$T_{50}$  = the temperature, in degrees Fahrenheit, at which 50 percent of the gasoline evaporates;

$T_{90}$  = the temperature, in degrees Fahrenheit, at which 90 percent of the gasoline evaporates;

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 2262.7. Standard for Aromatic Hydrocarbon Content**

(a) Starting January 1, 1996, no person shall sell, offer for sale, dispense, supply, offer for supply, or transport California gasoline which has a total aromatic hydrocarbon content exceeding 25 percent by volume.

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 2263. Sampling Procedures and Test Methods**

**(a) Sampling Procedures.**

(1) Compliance with the Reid vapor standards set forth in subarticle 2, shall be determined by use of an applicable sampling methodology set forth in 13 CCR section 2261 [present section 2261; to be renumbered].

**(b) Test Methods.**

(1) The test methods presented in Table 1 shall be used to determine compliance with the requirements of this subarticle. All identified test method are incorporated by reference herein.

**Table 1**

Section	Gasoline Specification	Test Method
2262.1.(a)(b)	Reid Vapor Pressure	ASTM D 323-58 <u>a/</u> or 13 CCR Section 2262 <u>b/</u>
2262.1.(c)	Ethanol Content	ASTM D 4815-88 <u>c/</u>
2262.2.(a)	Sulfur Content	ASTM D 2262-87
2262.3.(a)	Benzene Content	ASTM D 3606-87
2262.4.(a)	Olefin Content	ASTM D 1319-88
2262.5.(a)	Oxygen Content	ASTM D 4815-88
2262.6.(a)	Distillation Temperatures	ASTM D 86-82
2262.7.(a)	Aromatic Hydrocarbon Content	ARB GC-PID/FID

a/ Delete paragraph 4(b) concerning sampling.

b/ Present section 2262; to be renumbered.

c/ The volume of ethanol shall include the volume of any denaturant approved for that purpose by the United States Bureau of Alcohol, Tobacco and Firearms, provided those denaturants do not exceed 5 percent of the volume of alcohol (including denaturants).

**(c) Equivalent Test Methods.**

(1) Whenever this article provides for the use of a specified test method, another test method may be used following a determination by the executive officer that the other method produces results equivalent to the results with the specified method.

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 2264. Alternative Means of Compliance with Benzene Standards

##### (a) Designated Alternative Limit

(1) A producer or importer electing to comply with the regulation pursuant to subsection (b)(2) of section 2262.3 may assign a designated alternative limit to a final blend of California gasoline produced or imported by the producer or importer, if the benzene content of that blend is less than 0.80 percent by volume. Such refiner or importer must assign a designate alternative limit to every blend with a benzene content exceeding 0.80 volume percent. In no case shall a designated alternative limit be less than the benzene content of the final blend shown by the sample and test conducted pursuant to subsection (c).

(2) The producer or importer shall notify the executive officer of the volume (in gallons) and the designated alternative limit of each final blend receiving a designated alternative limit. This 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 comingles the final blend. If for any blend, a designated alternative limit is not reported per this paragraph, the benzene limit applicable to such a blend shall be 0.80 volume percent, unless subsection (3) below is satisfied.

(3) If, through no intentional or negligent conduct, a producer or importer cannot report within the time period specified in (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 subsection (a)(3) have been met, timely notification shall be deemed to have occurred.

(4) The executive officer may enter into a protocol with any individual producer or importer for the purposes of specifying how the requirements in subsection (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 subsections (a)(2). Any such protocol shall include the producer's or importer's agreement to be bound by the terms of the protocol.

(5) No person shall sell, offer for sale, or supply California gasoline, in a final blend to which a producer or importer has assigned a designated alternative limit exceeding 0.80 percent benzene content, where the total volume of the final blend sold, offered for sale, or supplied exceeds the volume reported to the executive officer pursuant to subsections (a)(2) or (a)(4).

(6) No person shall sell, offer for sale or supply California gasoline, in a final blend to which a producer or importer has assigned a designated alternative limit less than 0.80 percent benzene content, where the total volume of the final blend sold, offered for sale, or supplied is less than the volume reported to the executive officer pursuant to subsections (a)(2) or (a)(4).

(7) Whenever the final blend of a producer includes volumes of gasoline the producer has produced and volumes it has not produced, the producer's designated alternative limit shall apply only to the volume of gasoline the producer has produced. In such a case, the producer shall report to the executive officer in accordance with subsection (a)(2) both the volume of gasoline produced and the total volume of the final blend.

**(b) Generation and Use of Benzene Credits**

(1) For each location at which a producer or importer produces or imports California gasoline, if that producer or importer elects to comply with the regulation pursuant to subsection (b)(2) of section 2262.3, the executive officer shall establish a benzene credit account. At the request



of the producer or importer, credit shall be deposited in the producer's or importer's account according to the provisions of this subsection (b). Credit shall be withdrawn from the account to offset the benzene in any of the producer or importer's blends of gasoline with designated alternative limits exceeding 0.80 volume percent.

(2) Benzene credits may be generated by only California gasoline produced or imported at the facility into whose account the credit will be deposited. Credit from an account may be used to offset excess benzene in only gasoline blends that have designated alternative limits and that have been produced or imported at the location corresponding to the account.

(3) The amount of benzene credit deposited for a blend with a designated alternative limit less than 0.80 volume percent shall be:

$$\frac{0.80\% - \text{designated alternative limit}}{100} \times \text{volume of blend (gallons)}$$

(4) The maximum allowable balance of benzene credit in any account at any time shall be:

$$.012 \times \left[ \begin{array}{l} \text{one-half the volume of gasoline produced or imported at the} \\ \text{location during the most recent calendar year for which} \\ \text{such volume has been reported to the California Energy} \\ \text{Commission pursuant to the Petroleum Industry Information} \\ \text{Reporting Act.} \end{array} \right]$$

Benzene credit shall not be generated by any gasoline at a location when the account for that location contains the maximum allowed balance.

(5) For each blend with an alternative limit exceeding 0.80 percent by volume, the executive officer shall withdraw benzene credits from the producer's or importer's account equal to:

$$\frac{\text{designated alternative limit} - 0.80\%}{100} \times \text{volume of blend (gallons)}$$

(6) If the balance in an account is insufficient to provide offsetting benzene in the amount required by (5), the blend of gasoline requiring the offset shall be in violation of this regulation.

(c) Testing and Recordkeeping.

(1) Each producer shall sample and test for the benzene content in each final blend of California gasoline which the producer has produced, in accordance with an applicable test method identified in section 2263. If a producer blends gasoline components directly to pipelines, tankships, railway tankcars or trucks and trailers, the loading(s) shall be sampled and tested for the benzene content by the producer or authorized contractor. The producer shall maintain, for two years from the date of each sampling, records showing the sample date, product sampled, container or other vessel sampled, final blend volume, and the benzene content. In the event a producer sells, offers for sale, or supplies gasoline which the producer claims is not California gasoline and which has a benzene content specified in section (b)(2) of section 2262.3, such producer shall maintain, for two years from the date of any sale or supply of the fuel, records demonstrating that the gasoline was not California gasoline when it was sold or supplied by the producer. All gasoline produced by the producer and not tested as California gasoline by the producer pursuant to this subsection shall be deemed to have a benzene content exceeding 0.80 percent by volume, unless the producer demonstrates that the gasoline meets the requirements of subsection (a) of section 2262.3.

(2) Each importer shall sample and test for the benzene content in each shipment of California gasoline which the importer has imported by tankship, pipeline, railway tankcars, trucks and trailers, or other means, in accordance with an applicable test method identified in section 2263. The importer shall maintain, for two years from the date of each sampling, records showing the sample date, product sampled, container or other vessel sampled, the volume of the shipment, and the benzene content. All gasoline imported by the importer and not tested as California gasoline by the importer pursuant to this subsection shall be deemed to have a benzene content exceeding 0.80 percent by volume, unless the producer demonstrates

that the gasoline meets the requirements of subsection (a) of section 2262.3.

(3) A producer or importer shall provide to the executive officer any records required to be maintained by the producer or importer pursuant to this section within 20 days of a written request from the executive officer if the request is received before expiration of the period during which the records are required to be maintained. Whenever a producer or importer fails to provide records regarding a final blend of California gasoline in accordance with the requirements of this section, the final blend of gasoline shall be presumed to have been sold by the producer in violation of subsection (a) of section 2262.3.

(4) The executive officer may enter into a protocol with any producer, importer, or person who sells, offers for sale, or transfers gasoline to a producer for the purpose of specifying alternative sampling, testing, recordkeeping, or reporting requirements which shall satisfy the provisions of subsections (c)(1) or (c)(2). The executive officer may only enter into such a protocol if s/he reasonably determines that application of the regulatory requirements under the protocol will be consistent with the state board's ability effectively to enforce the provisions of subsection (b)(2) of section 2262.3. Any such protocol shall include the producer's or importer's agreement to be bound by the terms of the protocol.

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)

**2265. Certified Gasoline Formulations Resulting in Equivalent Emission Reductions Based on a Predictive Model.**

[EXPLANATORY NOTE: The ARB intends to develop predictive models based on past and current vehicle emissions testing programs. The ARB is interested

in obtaining any information or data that should be considered in developing the models.]

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).

**2266. Certified Gasoline Formulations Resulting in Equivalent Emission Reductions Based on Motor Vehicle Emission Testing.**

(a) A gasoline with specifications different from those specified in this subarticle, with the exception of section 2262.1 (Standards for Reid Vapor Pressure), may be certified as equivalent provided that the alternative gasoline formulation is tested in accordance with, and meets the criteria specified in the Stationary Source Division's California Test Procedures for Alternative Specifications for Phase 2 Reformulated Gasoline, dated July 30, 1991, which is incorporated herein by reference.

(b) Subsection (a) may only be used in the event that the alternative gasoline formulation includes parameters not incorporated in the model specified in section 2265 or when the parameter values fall outside of the modeled ranges specified in section 2265.

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).

**2267. Exemptions**

(a) Exemption for Gasoline Used in Research Programs.

(1) The executive officer may approve a written application from any person seeking to sell, dispense, supply or transport not more than 5000 gallons of gasoline having specifications exceeding any of the standards specified in this subarticle as part of a test program investigating the

effect of various gasoline characteristics on vehicle emissions, vehicle performance, or related research objectives. Upon approval of the application, the sale, dispensing, supply or transport of the gasoline described in the application shall not be subject to the standards in this subarticle.

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 2268. Violations

(a) For the purposes of this article, each sale of California gasoline at retail, and each dispensing of California gasoline into a motor vehicle fuel tank, shall also be deemed a sale or supply by any person who previously sold or supplied such gasoline in violation of any applicable section of this subarticle.

(b) The executive officer may perform any sampling and testing deemed necessary to determine compliance by any person with the requirements of this subarticle and may require that special samples be drawn and tested at any time.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, and 43101 of the 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, 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 2269. Submittal of Compliance Plans

(a) Each producer shall, by January 1, 1993, submit to the executive officer a plan showing the producer's schedule for achieving compliance with the standards set forth in this subarticle. Each producer shall, by January 1, 1994, and January 1, 1995, submit an update of the plan.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, and 43101 of the 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 2270. Variances**

(a) Any person who cannot comply with the requirements set forth in this article because of reasons beyond the person's reasonable control may apply to the executive officer for a variance. The application shall set forth:

- (1) The applicable section(s) in which the variance is sought;
- (2) the specific grounds upon which the variance is sought;
- (3) the proposed date(s) by which compliance with the provisions of the applicable section(s) will be achieved; and
- (4) a plan reasonably detailing the method by which compliance will be achieved.

(b) Upon receipt of an application for a variance containing the information required in section (a), the executive officer shall hold a hearing to determine whether, or under what conditions and to what extent, a variance from the requirements of the applicable section(s) is necessary and will be permitted. Notice of the time and place of the hearing shall be sent to the applicant by certified mail not less than 20 days prior to the hearing. Notice of the hearing shall also be submitted for publication in the California Regulatory Notice Register and sent to every person who requests such notice, not less than 20 days prior to the hearing.

(c) At least 20 days prior to the hearing, the application for the variance shall be made available to the public for inspection. Interested members of the public shall be allowed a reasonable opportunity to testify at the hearing and their testimony shall be considered.

(d) No variance shall be granted unless all of the following findings are made:

(1) that, because of reasons beyond the reasonable control of the applicant, requiring compliance with the applicable section(s) would result in an extraordinary economic hardship;

(2) that the public interest in mitigating the extraordinary hardship to the applicant by issuing the variance outweighs the public interest in avoiding any increased emissions of air contaminants which would result from issuing the variance; and

(3) that the compliance plan proposed by the applicant can reasonably be implemented and will achieve compliance as expeditiously as possible.

(e) Any variance order shall specify a final compliance date by which the requirements of the applicable section(s) will be achieved. Any variance order shall also contain a condition that specified increments of progress necessary to assure timely compliance be achieved, and such other conditions, such as limitations on the gasoline specifications, that the executive officer, as a result of the testimony received at the hearing, finds necessary to carry out the purposes of Division 26 of the Health and Safety Code.

(1) Any variance order addressing the Reid vapor pressure shall impose a substitute gasoline Reid vapor pressure limit as stringent as feasible under the circumstances, in no case to exceed 9.0 pounds per square inch.

(f) The executive officer may require, as a condition of granting a variance, that a cash bond, or a bond executed by two or more good and sufficient sureties or by a corporate surety, be posted by the party to whom the variance was granted to assure performance of any construction, alteration, repair, or other work required by the terms and conditions of the variance. Such bond may provide that, if the party granted the variance fails to perform such work by the agreed date, the cash bond shall be forfeited to the state board, or the corporate surety or sureties shall have the option of promptly remedying the variance default or paying to the state board an amount, up to the amount specified in the bond, that is necessary to accomplish the work specified as a condition of the variance.

(g) No variance which is issued due to conditions of breakdown, repair, or malfunction of equipment shall have a duration, including extensions, of more than six months.

(h) The executive officer may, after holding a hearing without complying with the provisions of sections (b) and (c), issue an emergency variance to a person from the requirements of the applicable section(s) upon a showing of reasonably unforeseeable extraordinary hardship and good cause that a variance is necessary. In connection with the issuance of an emergency variance, the executive officer may waive the requirements of section (f). No emergency variance may extend for a period of more than 45 days. If the applicant for an emergency variance does not demonstrate that he or she can comply with the provisions of the applicable section(s) within such 45-day period, an emergency variance shall not be granted unless the applicant makes a prima facie demonstration that the findings set forth in section (d) should be made. The executive officer shall maintain a list of persons who have informed the executive officer in writing of their desire to be notified by telephone in advance of any hearing held pursuant to section (h), and shall provide advance telephone notice to any such person.

(i) A variance shall cease to be effective upon failure of the party to whom the variance was granted substantially to comply with any condition.

(j) Upon the application of any person, the executive officer may review and for good cause modify or revoke a variance from the requirements the applicable section(s) after holding a hearing in accordance with the provisions of sections (b) and (c).

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, 40000, 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).



Adopt new section 2258, Title 13, California Code of Regulations, to read as follows:

[NOTE: The entire text of section 2259 is NEW TEXT to be added to the California Code of Regulations.]

**Section 2258. Wintertime Oxygenates Program**

**(a) Basic Regulatory Standard.**

(1) Starting January 1, 1992, within each of the air basins during the basic regulatory control period set forth in section (a)(4), no person shall sell, offer for sale, dispense, supply, offer for supply, or transport California gasoline which does not meet the following standards:

(A) The oxygen content shall be at least 1.5 percent by weight, and

(B) The oxygen content shall not exceed 2.1 by weight, unless the only oxygenate the gasoline contains is methyl-tertiary-butyl-ether, in which case the oxygen content shall not exceed 2.7 percent by weight.

(2) Starting January 1, 1992, within each of the air basins during the basic regulatory control period set forth in section (a)(4), no producer, importer, or oxygenate blender shall sell, offer for sale, dispense, supply, offer for supply, or transport California gasoline which does not comply with either the standard in (2)(A) or (2)(B).

(A) The oxygen content shall be at least 2.0 percent, or

(B) The oxygen content shall average 2.0 percent by weight over the regulatory control period specified in subsection (a)(4), pursuant to the requirements of subsection (h).

(3) On or before July 1, 1992, each producer, importer, or oxygenate blender of California gasoline shall notify the executive officer of the producer's, importer's, or oxygenate blender's intent to comply with the standard in subsection (a)(1) or (a)(2). Whichever standard is elected by a particular producer, importer, or oxygenate blender, all California gasoline producer, imported, or blended by that entity shall comply with that standard for at least one year. Any producer, importer, or oxygenate blender may change the selection of the oxygen standard for any subsequent regulatory control period if he or she notifies the executive officer of the change no later than July 1 preceding the regulatory control period.

(4) Basic Regulatory Control Periods.

- (A) September 1 through February 29  
South Coast Air Basin
- (B) October 1 through January 31  
Sacramento Valley Air Basin  
San Joaquin Valley Air Basin  
San Francisco Bay Area Air Basin  
Lake Tahoe Air Basin  
Great Basin Valley Air Basin  
Mountain Counties Air Basin  
North Coast Air Basin  
Lake County Air Basin  
Northeast Plateau Air Basin  
North Central Coast Air Basin
- (C) November 1 through February 29  
San Diego Air Basin  
South Central Coast Air Basin

(c) Applicability

(1) Section (a)(1) and (a)(2) shall not apply to a transaction occurring in an air basin during the basic regulatory control period where the person selling, supplying, or offering the gasoline demonstrates as an affirmative defense that, prior to the transaction, he or she has taken reasonably prudent precautions to assure that the gasoline will be delivered to a retail service station or bulk purchaser-consumer's fueling facility when the station or facility is not subject to a basic regulatory control period.

(2) Section (a)(1) and (a)(2) shall not apply to a transaction occurring in an air basin during the basic regulatory control period where the transaction involves the transfer of gasoline from a stationary storage tank to a motor vehicle fuel tank and the person selling, supplying, or offering the gasoline demonstrates as an affirmative defense that the last delivery of gasoline to the stationary storage tank occurred more than fourteen days before the start of the basic regulatory control period.

(d) Violations

(1) For the purposes of section (a)(1) or (a)(2), each sale of California gasoline at retail, and each dispensing of California gasoline

into a motor vehicle fuel tank, shall also be deemed a sale or supply by any person who previously sold or supplied such gasoline in violation of section (a)(1) or (a)(2).

(2) The executive officer may perform any sampling and testing deemed necessary to determine compliance by any person with the requirements of subsection (a) and may require that special samples be drawn and tested at any time.

(e) Definitions.

For the purposes of this section:

(1) "Bulk purchaser-consumer" means a person that purchases or otherwise obtains gasoline in bulk and then dispenses it into the fuel tanks or motor vehicles owned or operated by the person.

(2) "California oxygenate blending facility" means the facility (including a truck) at which oxygenate is added to California gasoline, and at which the quality or quantity of gasoline is not altered in any other manner.

(3) "California gasoline" means gasoline sold or intended for sale as a motor vehicle fuel in California.

(4) "California production facility" means a facility in California at which gasoline is produced; it does not include a facility whose sole operation is to transfer gasoline or to blend additives into gasoline.

(5) "Gasoline" means any fuel which is commonly or commercially known or sold as gasoline, or which is a mixture of more than 50 percent fuel commonly known or sold as gasoline and alcohol.

(6) "Importer" means any person who first accepts delivery in California of California gasoline.

(7) "Import facility" means the facility at which imported California gasoline is first received in California, including, in the case of California gasoline imported by cargo tank and delivered directly to a facility for dispensing gasoline into motor vehicles, the cargo tank in which the gasoline is imported.

(8) "Motor vehicle" has the same meaning as defined in section 415 of the Vehicle Code.

(9) "Oxygenate" is any oxygen-containing, ashless, organic compound, such as an alcohol or ether, which, when added to gasoline increases the amount of oxygen in gasoline.

(10) "Oxygenate blender" is any person who owns, leases, operates, controls, or supervises a California oxygenate blending facility.

(11) "Produce" means to convert liquid compounds which are not gasoline into gasoline.

(12) "Producer" means any person who owns, leases, operates, controls or supervises a California production facility.

(13) "Supply" means to provide or transfer a product to a physically separate facility, vehicle, or transportation system.

(f) Sampling and Test Methods.

(1) Compliance with the standards set forth in section (a)(1) and (a)(2) shall be determined by use of American Society for Testing and Materials Method ASTM D 4815-88 (which is incorporated by reference herein).

(g) Variances.

(1) Any person who cannot comply with the requirements set forth in section (a)(1) or (a)(2) because of reasons beyond the person's reasonable control may apply to the executive officer for a variance. The application shall set forth:

(A) the specific grounds upon which the variance is sought;

(B) the proposed date(s) by which compliance with the provisions of section (a)(1) or (a)(2) will be achieved; and

(C) a plan reasonably detailing the method by which compliance will be achieved.

(2) Upon receipt of an application for a variance containing the information required in section (g)(1), the executive officer shall hold a hearing to determine whether, or under what conditions and to what extent, a variance from the requirements in section (a)(1) or (a)(2) is necessary and will be permitted. Notice of the time and place of the hearing shall be sent to the applicant by certified mail not less than 20 days prior to the hearing. Notice of the hearing shall also be submitted for publication in the California Regulatory Notice Register and sent to every person who requests such notice, not less than 20 days prior to the hearing.

(3) At least 20 days prior to the hearing, the application for the variance shall be made available to the public for inspection. Interested members of the public shall be allowed a reasonable opportunity to testify at the hearing and their testimony shall be considered.

(4) No variance shall be granted unless all of the following findings are made:

(A) that, because of reasons beyond the reasonable control of the applicant, requiring compliance with section (a)(1) or (a)(2) would result in an extraordinary economic hardship;

(B) that the public interest in mitigating the extraordinary hardship to the applicant by issuing the variance outweighs the public interest in avoiding any increased emissions of air contaminants which would result from issuing the variance; and

(C) that the compliance plan proposed by the applicant can reasonably be implemented and will achieve compliance as expeditiously as possible.

(5) Any variance order shall specify a final compliance date by which the requirements in section (a)(1) or (a)(2) will be achieved. Any variance order shall also contain a condition that specified increments of progress necessary to assure timely compliance be achieved, and such other conditions that the executive officer, as a result of the testimony received at the hearing, finds necessary to carry out the purposes of Division 26 of the Health and Safety Code.

(6) The executive officer may require, as a condition of granting a variance, that a cash bond, or a bond executed by two or more good and sufficient sureties or by a corporate surety, be posted by the party to whom the variance was granted to assure performance of any construction, alteration, repair, or other work required by the terms and conditions of the variance. Such bond may provide that, if the party granted the variance fails to perform such work by the agreed date, the cash bond shall be forfeited to the state board, or the corporate surety or sureties shall have the option of promptly remedying the variance default or paying to the state board an amount, up to the amount specified in the bond, that is necessary to accomplish the work specified as a condition of the variance.

(7) No variance which is issued due to conditions of breakdown, repair, or malfunction of equipment shall have a duration, including extensions, of more than six months.

(8) The executive officer may, after holding a hearing without complying with the provisions of sections (g)(2) and (g)(3), issue an emergency variance to a person from the requirements of sections (a)(1) or (a)(2) upon a showing of reasonably unforeseeable extraordinary hardship and good cause that a variance is necessary. In connection with the issuance of an emergency variance, the executive officer may waive the requirements of section (g)(6). No emergency variance may extend for a period of more than 45 days. If the applicant for an emergency variance does not demonstrate that he or she can comply with the provisions of section (a)(1) or (a)(2) within such 45-day period, an emergency variance shall not be granted unless the applicant makes a prima facie demonstration that the findings set forth in section (g)(4) should be made. The executive officer shall maintain a list of persons who have informed the executive officer in writing of their desire to be notified by telephone in advance of any hearing held pursuant to this section (g)(8), and shall provide advance telephone notice to any such person.

(9) A variance shall cease to be effective upon failure of the party to whom the variance was granted substantially to comply with any condition.

(10) Upon the application of any person, the executive officer may review and for good cause modify or revoke a variance from the requirements of section (a)(1) or (a)(2) after holding a hearing in accordance with the provisions of sections (g)(2) and (g)(3).

(h) Alternative Means of Compliance

(1) Designated Alternative Limit

(A) A producer, importer, or oxygenate blender electing to comply with the regulation pursuant to subsection (a)(2)(B) may assign a designated alternative limit to a final blend of California gasoline produced, imported, or blended by the producer, importer, or oxygenate blender, if the oxygen content of that blend is greater than 2.0 percent by weight. A producer, importer, and oxygenate blender must assign a designated alternative limit to every blend with an oxygen content less

than 2.0 percent by weight. In no case shall a designated alternative limit be greater than the oxygen content of the final blend shown by the sample and test conducted pursuant to subsection (f).

(B) The producer, importer, or oxygenate blender shall notify the executive officer of the volume (in gallons) and the designated alternative limit of each final blend receiving a designated alternative limit. This notification shall be received by the executive officer before the start of physical transfer of the gasoline from the production, import, or oxygenate blending facility, and in no case less than 12 hours before the producer, importer, or oxygenate blender either completes physical transfer or commingles the final blend. If for any blend, a designated alternative limit is not reported per this paragraph, the oxygen limit applicable to such a blend shall be 2.0 percent by weight, unless subsection (h)(1)(C) below is satisfied.

(C) If, through no intentional or negligent conduct, a producer or importer cannot report within the time period specified in (h)(1)(B) above, the producer, importer, or oxygenate blender 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 subsection (h)(1)(C) have been met, timely notification shall be deemed to have occurred.

(D) The executive officer may enter into a protocol with any individual producer, importer, or oxygenate blender for the purposes of specifying how the requirements in subsection (h)(1)(B) shall be applied to the producer's, importer's, or oxygenate blender'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 subsections (h)(1)(B). Any such protocol shall include the producer's, importer's, or oxygenate blender's agreement to be bound by the terms of the protocol.

(E) No person shall sell, offer for sale, or supply California gasoline, in a final blend to which a producer, importer, or oxygenate blender has assigned a designated alternative limit less than 2.0 percent

oxygen by weight, where the total volume of the final blend sold, offered for sale, or supplied exceeds the volume reported to the executive officer pursuant to subsections (h)(1)(B) or (h)(1)(D).

(F) No person shall sell, offer for sale or supply California gasoline, in a final blend to which a producer, importer, or oxygenate blender has assigned a designated alternative limit greater than 2.0 percent oxygen by weight, where the total volume of the final blend sold, offered for sale, or supplied is less than the volume reported to the executive officer pursuant to subsections (h)(1)(B) or (h)(1)(D).

(G) Whenever the final blend of a producer, importer, or oxygenate blender includes volumes of gasoline the producer, importer, or oxygenate blender has produced and volumes it has not produced, the producer's, importer's, or oxygenate blender's designated alternative limit shall apply only to the volume of gasoline the producer has produced. In such a case, the producer, importer, or oxygenate blender shall report to the executive officer in accordance with subsection (h)(1)(B) both the volume of gasoline produced and the total volume of the final blend.

(2) Generation and Use of Credits

(A) For each location at which a producer, importer, or oxygenate blender produces or imports California gasoline, if that producer, importer, or oxygenate blender elects to comply with the regulation pursuant to subsection (a)(2)(B), the executive officer shall establish an oxygen credit account. At the request of the producer, importer, or oxygenate blender, credit shall be deposited in the producer's, importer's, or oxygenate blender's account according to the provisions of this subsection (2). Credit shall be withdrawn from the account to offset the oxygen in any of the producer's, importer's, or oxygenate blender's blends of gasoline with designated alternative limits less than 2.0 percent oxygen by weight.

(B) Oxygen credits may be generated by only California gasoline produced or imported at the facility into whose account the credit will be deposited. Credit from an account may be used to offset excess oxygen in only gasoline blends that have designated alternative limits and that have been produced or imported at the location corresponding to the account.



Credits may only be generated during the regulatory control periods specified in subsection (a)(4).

(C) The amount of oxygen credit deposited for a blend with a designated alternative limit greater than 2.0 percent by weight shall be:

$$\frac{\text{designated alternative limit} - 2.0\%}{100} \times \text{volume of blend (gallons)}$$

(D) For each blend with a designated alternative limit less than 2.0 percent by weight, the executive officer shall withdraw oxygen credits from the producer's, importer's, or oxygenate blender's account equal to:

$$\frac{2.0\% - \text{designated alternative limit}}{100} \times \text{volume of blend (gallons)}$$

(E) If the balance in an account is insufficient to provide offsetting oxygen in the amount required by (D), the blend of gasoline requiring the offset shall be in violation of this regulation.

(3) Testing and Recordkeeping.

(A) Each producer or oxygenate blender shall sample and test for the oxygen content in each final blend of California gasoline which the producer or oxygenate blender has produced, in accordance with an applicable test method identified in subsection (f). If a producer or oxygenate blender blends gasoline components directly to pipelines, tankships, railway tankcars or trucks and trailers, the loading(s) shall be sampled and tested for the oxygen content by the producer, oxygenate blender or authorized contractor. The producer or oxygenate blender shall maintain, for two years from the date of each sampling, records showing the sample date, product sampled, container or other vessel sampled, final blend volume, and the oxygen content. In the event a producer or oxygenate blender sells, offers for sale, or supplies gasoline which the producer or oxygenate blender claims is not California gasoline and which has a oxygen content less than 2.0 percent by weight, such producer or oxygenate blender shall maintain, for two years from the date of any sale or supply of the fuel, records demonstrating that the gasoline was not California gasoline when it was sold or supplied by the producer or oxygenate blender. All gasoline produced by the producer or oxygenate blender and not tested as

California gasoline by the producer or oxygenate blender pursuant to this subsection shall be deemed to have an oxygen content less than 2.0 percent by weight, unless the producer or oxygenate blender demonstrates that the gasoline meets the requirements of subsection (a).

(B) Each importer shall sample and test for the oxygen content in each shipment of California gasoline which the importer has imported by tankship, pipeline, railway tankcars, trucks and trailers, or other means, in accordance with an applicable test method identified in subsection (f). The importer shall maintain, for two years from the date of each sampling, records showing the sample date, product sampled, container or other vessel sampled, the volume of the shipment, and the oxygen content. All gasoline imported by the importer and not tested as California gasoline by the importer pursuant to this subsection shall be deemed to have an oxygen content less than 2.0 percent by volume, unless the importer demonstrates that the gasoline meets the requirements of subsection (a).

(C) A producer, importer, or oxygenate blender shall provide to the executive officer any records required to be maintained by the producer, importer, or oxygenate blender pursuant to this section within 20 days of a written request from the executive officer if the request is received before expiration of the period during which the records are required to be maintained. Whenever a producer, importer, or oxygenate blender fails to provide records regarding a final blend of California gasoline in accordance with the requirements of this section, the final blend of gasoline shall be presumed to have been sold by the producer, importer, or oxygenate blender in violation of subsection (a).

(D) The executive officer may enter into a protocol with any producer or oxygenate blender, importer, or person who sells, offers for sale, or transfers gasoline to a producer or oxygenate blender for the purpose of specifying alternative sampling, testing, recordkeeping, or reporting requirements which shall satisfy the provisions of subsections (h)(3)(A) or (h)(3)(B). The executive officer may only enter into such a protocol if s/he reasonably determines that application of the regulatory requirements under the protocol will be consistent with the state board's ability effectively to enforce the provisions of subsection (a)(2)(B). Any

such protocol shall include the producer, importer, or oxygenate blender's agreement to be bound by the terms of the protocol.

[EXPLANATORY NOTE: The ARB's intent is to incorporate a 2.7 percent oxygen by weight requirement effective January 1, 1995, for the South Coast and San Diego, and January 1, 1996, for the rest of the state. This change would also include a no NOX increase provision.]

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, and 43101 of the 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, 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).

DRAFT - FOR DISCUSSION ONLY

ATTACHMENT 4

Synopsis of Proposed California Test Procedure for  
Evaluating Alternatives to Phase 2 Reformulated Gasoline

July 30, 1991

OVERVIEW

What is the test procedure to be used for?

A provision in the proposed Phase 2 reformulated gasoline regulation allows gasoline producers to meet specifications other than Phase 2 gasoline specifications upon a demonstration that the alternative specifications would not lead to greater emissions. The test procedure establishes the method and criteria under which the demonstration would be made.

What would an applicant have to demonstrate?

The applicant for alternative specifications would have to demonstrate that carbon monoxide (CO) emissions, oxides of nitrogen (NOx) emissions, exhaust and evaporative emissions of non-methane organic gases (NMOG), the combined ozone forming potential of evaporative and exhaust NMOG emissions, and the potency-weighted sum of toxic pollutant emissions would not be greater from the on-road fleet using gasoline meeting the alternative specifications than from the fleet using Phase 2 gasoline.

How would this demonstration be made?

There would be a proposed test plan that would set forth the proposed specifications and describe a test fuel to be used to evaluate the specifications. The plan would also describe the test vehicles and other details of emission tests. The test plan would have to be approved by the ARB's executive officer before the emission testing could begin. In the testing, emissions from test vehicles would be compared between the candidate fuel and Phase 2 gasoline. The comparison, using the upper confidence limit on the difference in emissions between the fuels, would have to show that emissions of each pollutant from the on-road vehicle fleet would not increase if the fleet were to use the test fuel instead of Phase 2 gasoline.

What would follow a successful demonstration?

The executive officer would provide notice to interested parties requesting comments on the proposed approval of the alternative specifications. After consideration of these comments, the executive officer would determine whether or not to approve the specifications. An approval would be valid for five years, after which a re-approval procedure would have to be followed.

**How would the alternative specifications be set?**

The applicant would submit to the executive officer (in the test plan) a list of gasoline properties to be controlled. ARB staff would review the proposed list of properties and could require changes as needed to ensure that all gasoline meeting the specifications would be as "clean" as the test fuel.

The properties of the test fuel would be measured. The numerical values for these properties in the test fuel, with the appropriate designations as maxima or minima, would become the specifications for the commercial version of the alternative to the Phase 2 gasoline.

**VEHICLE TESTING**

**What pollutants would be tested for?**

Evaporative NMOG and exhaust emissions of CO, NOx, NMOG, benzene, 1,3 butadiene, formaldehyde and acetaldehyde. The last four substances are toxic air contaminants or potential toxic air contaminants. For the toxic pollutants, the combined potency-weighted emission rate of the four would be compared between fuels. The other pollutants would be separately compared between fuels.

**What types of vehicle would be tested?**

There are 8 different categories of vehicles for testing as defined below:

- Pre 1975 non-catalyst-equipped
- 1975 - 1980 open loop oxidizing catalyst
- 1981 - 1985 Early closed loop three way catalyst
- 1986 - 1990 Current closed loop three way catalyst
- Post 1990 vehicles
- Transitional low emission vehicles
- Low emission vehicles
- Ultra-low emission vehicles

**How many vehicles would be tested in each vehicle category?**

Testing would be required in any vehicle category that accounts for at least 3 percent of the total NMOG emissions or at least 5 percent of the total vehicle miles traveled among on-road gasoline-powered vehicles. At least five vehicles would be tested in each category for which vehicles meet the criteria above. A total of at least 20 vehicles must be tested.

**What type of vehicle pre-conditioning would be required?**

Before testing on any fuel, a test vehicle's fuel tank and delivery system would be drained. The fuel tank would receive a partial fill of the fuel to be tested and the vehicle would be run through the Highway Fuel Economy Driving Cycle. The fuel system would again be drained and refilled and the vehicle would undergo another highway driving cycle followed by two dummy Federal Test Procedure (FTP) cycles (dynamometer portion only).

Alternatives to this procedure would be allowable if shown to be as effective in preparing the vehicles.

What criteria would there be for vehicles selected for testing?

The test vehicles would need to have distributions of engine displacement, types of fuel/air metering, catalyst technology, emission control system and California vs. U.S. (49 state) certification that the executive officer deems sufficiently representative of the on-road fleet. No vehicles could be duplicates of the same model and model year. Vehicles having the same owner or manufacturer could comprise no more than 20 percent of any test category. Each vehicle would have to show at least a minimum odometer reading determined by the vehicle's age. Vehicles would be tested in as-received mechanical condition except for routine maintenance scheduled to occur per the manufacturer's recommendations.

How many tests would be run on each vehicle?

A minimum of two back-to-back tests per fuel would be required on each test vehicle.

#### ANALYSIS OF DATA; STATISTICAL TESTS

How would emissions data be analyzed?

For each pollutant, the values of emission differences between fuels would be averaged over all cars in a test category. These averages would be combined into a composite value that would serve as an estimate of the average emission difference among the on-road fleet of gasoline vehicles. In the composite result, each category average would have a weight in proportion to the miles travelled by on-road vehicles in the category (relative to other categories in the test fleet).

How would the potency-weighted toxic emissions be calculated?

For each emission test, the potency-weighted toxic emission rate would be the sum over the four toxic pollutants (benzene, 1,3-butadiene, formaldehyde, and acetaldehyde) of the emission rate times the relative cancer potency. The relative cancer potency is the compound's potency (potential lifetime risk per unit concentration) normalized to the potency of 1,3-butadiene:

<u>toxic pollutant</u>	<u>relative potency</u>
1,3-butadiene	1.0
benzene	0.21
formaldehyde	0.09
acetaldehyde	0.016

For benzene and 1,3-butadiene, these numbers reflect the "best estimate" recommendations by the California Department of Health Services. The values for formaldehyde and acetaldehyde reflect potency numbers contained in the risk assessment guidelines published by the California Air Pollution Control Officers Association (CAPCOA).

What statistical test would be used to compare emissions between the test fuel and the Phase 2 gasoline?

For each pollutant, the composite average emission difference would be used to compute an upper confidence limit for the mean effect of the candidate fuel among all on-road vehicles. The upper confidence limit will be computed using the one-tailed t-variate at the significance level 0.15 and an estimate of standard error that is derived from the standard deviations of the emission differences within the vehicle test categories. The upper confidence limit on the emission effect of the test fuel must not exceed one percent of the average emissions (in grams/mile) estimated for on-road vehicles using Phase 2 gasoline.

Passing this criterion for a pollutant would provide at least 85 percent confidence that if the test fuel were used in all gasoline vehicles, emissions would not exceed emissions from those vehicles using Phase 2 gasoline by more than one percent. The specifications in the test plan would ensure that actual gasolines corresponding to the test fuel would be at least as clean as the test fuel.

#### ADDITIONAL ELEMENTS

How long would an approval for a fuel last?

An approval would have a guaranteed duration of five years. Every five years, a new upper confidence limit on the emission difference and a new estimate of emissions on Phase 2 gasoline would be calculated. In the new calculations, the weights for the test category results would reflect the then-current composition of the on-road fleet. These weights are expected to differ from the weights in the initial calculation because of fleet turnover. Therefore, both the upper confidence limit and the average emissions on Phase 2 gasoline would be expected to change. If the criterion discussed above were still met, the approval would be extended for another five years. If the criterion were not met, the approval for the fuel would be withdrawn pending the submittal of new test data that satisfies the criterion. If no re-demonstration of satisfactory emissions would be made within two years from the initial rescinding of approval, the alternative specifications could no longer be used.

Would any new data ever have to be submitted?

New data could be submitted as needed to gain re-approval of alternative specifications. In addition, the applicant would have to submit test data (as part of the re-approval process) for categories of vehicle introduced after the original emission testing--e.g., TLEVs--and for categories no longer exempted from testing by the criteria of less than 3 percent of the emissions and less than 5 percent of the miles traveled among on-road vehicles. Also, the executive officer could require new test data for any category for which the previously tested vehicles were no longer representative.

CARB 10003084

**DRAFT - FOR DISCUSSION ONLY**

**STATE OF CALIFORNIA  
AIR RESOURCES BOARD  
STATIONARY SOURCE DIVISION**

**July 30, 1991**

**California Test Procedures for Evaluating  
Alternative Specifications for Phase 2 Reformulated Gasoline**

**I. INTRODUCTION**

**A. Purpose and Applicability**

1. The test procedures and analyses prescribed in this document ("test protocol") shall be used to evaluate gasoline specifications proposed as alternatives to the Phase 2 reformulated gasoline specifications set forth in Chapter 5, subarticle 2, sections 2260 et. seq., Title 13, California Code of Regulations (hereinafter referred to as Phase 2 gasoline specifications).
2. The pollutant measures addressed by this protocol are carbon monoxide (CO) emissions, oxides of nitrogen (NOx) emissions, exhaust and evaporative emissions of non-methane organic gases (NMOG), and the combined ozone forming potential of exhaust and evaporative emissions of NMOG, and the combined potency-weighted emissions of toxic air contaminants in exhaust. "Toxic air contaminants" means exhaust emissions of benzene, 1,3-butadiene, formaldehyde, and acetaldehyde.

**B. Synopsis of Protocol**

The difference in emissions between the candidate fuel and the certification fuel (candidate fuel emissions minus certification fuel emissions, in grams/mile) is computed for tests in each test vehicle and then averaged over all vehicles within each of several vehicle categories in a test fleet. These average differences by category are combined into a mileage-weighted mean that serves as an estimate of the difference in average emissions per mile between the candidate and certification fuels in the relevant on-road vehicle fleet. A statistical upper bound for this mileage-weighted estimate is computed. A mileage-weighted estimate of average emissions per mile from the certification fuel among the on-road vehicle fleet is also computed, using the same weights.

For each pollutant, the statistical upper bound for the average difference in emissions is compared to one percent of the average emissions of that pollutant from the certification fuel. If the statistical upper bound is the greater of these two numbers for any pollutant, the candidate fuel cannot be approved.



**C. Definitions**

1. "LDV" means light-duty vehicle. "MDV" means medium-duty vehicle. "TLEV" means transitional low-emission vehicle. "LEV" means low-emission vehicle. "ULEV" means ultra-low emission vehicle.
2. In this protocol, "low-emission vehicle" includes low-emission vehicles, transitional low-emission vehicles, and ultra-low-emission vehicles. Low-emission vehicles are defined in subchapter 9, Title 13, California Code of Regulations, and must be capable of using gasoline.
3. "Applicant" means the entity seeking approval of any alternative to Phase 2 gasoline specifications and responsible for the demonstration described in Section II.
4. "Certification fuel" means for a particular test vehicle, a fuel meeting the specifications of Phase 2 gasoline.
5. "Candidate fuel" means gasoline meeting proposed specifications other than the Phase 2 gasoline specifications.

**II. DEMONSTRATION REQUIRED FOR A CANDIDATE FUEL**

The demonstration of equivalency shall consist of emission tests on a test fuel whose properties identified per the test plan in Section VI. have been accurately measured. Comparisons of the results of these tests with the results of tests on the certification fuel must satisfy the criterion in section IV.

**III. EMISSION TESTS AND COMPARISONS REQUIRED FOR A CANDIDATE FUEL**

- A. Emission tests and comparisons shall be done on a fleet of on-road vehicles which exist at the time of the testing. The vehicle categories appropriate for inclusion in these fleets are defined in subsection V.A.
- B. Within each fleet in subsection III.A., comparisons using the criterion in section IV. shall be made between emissions measured in tests using a test fuel representing the candidate fuel and emissions measured in tests using Phase 2 gasoline.
- C. The criterion in section IV. shall be applied separately to CO emissions, NOx emissions, the combined evaporative and exhaust NMOG emissions, the combined ozone-forming potential of evaporative and exhaust NMOG emissions, and the combined potency-weighted emissions of toxic air contaminants. If the candidate fuel fails to meet the criterion in section IV. for any of these pollutants, the candidate fuel shall have failed its required demonstration.

#### IV. CRITERION FOR DEMONSTRATION OF NO INCREASE IN EMISSIONS

For each comparison required in section III., the upper confidence limit for the inferred mean difference in emissions between fuels (test fuel vs. certification fuel) among all on-road vehicles in the tested categories, computed at the significance level 0.15 for the one-sided t-statistic, shall be less than or equal to one percent of the average emissions (in grams/mile) estimated for those on-road vehicles using their certification fuels. The estimate of emissions with the certification fuels shall be based on the emission measurements in the test fleet. In terms of parameters calculated per section IX., the criterion is expressed as:

$$UCL = D + t_{.15, nu} * S.E. \leq 0.01 * E_c$$

where UCL is the upper confidence limit.

#### V. TEST VEHICLES

##### A. Vehicle Categories for Testing

1. There are 8 different categories of light duty vehicles or light duty trucks to be used for testing as defined below:

Pre 1975 non-catalyst-equipped  
1975 - 1980 open loop oxidizing catalyst  
1981 - 1985 Early closed loop three way catalyst  
1986 - 1990 Current closed loop three way catalyst  
Post 1990 vehicles  
Transitional low emission vehicles  
Low emission vehicles  
Ultra-low emission vehicles

2. The executive officer shall maintain estimates of the total emissions from, and total annual miles travelled by, vehicles in the state in each of the categories listed above. These estimates shall be for the same time as, consistent with, and updated on the same schedule as the estimates of miles travelled that the executive officer uses to determine the required numbers of new retail outlets for clean fuels under paragraph (d)(2) of section 2305 and paragraph (e)(2) of section 2307, Subchapter 8, Title 13, California Code of Regulations.
3. Over all emissions categories in subsection V.A.1., the executive officer shall sum all exhaust NMOG emissions and all miles travelled in the state for the time corresponding to the estimates described in subsection V.A.2., assuming that all the vehicles receive the candidate fuel all the time.
4. The test fleet required by subsection III.A.1. shall consist of each vehicle category contributing at least 3 percent of the sum of NMOG emissions (described in subsection III.A.3. over all

categories for the fleet or at least 5 percent of the sum of miles traveled over all categories.

**B. Number, Descriptions, and Preparation of Vehicles**

1. Within each vehicle category to be tested per subsection V.A.4., the emission comparisons described in subsection III. shall be conducted in at least five vehicles. Over all categories tested, the total number of vehicles shall be at least 20.
2. Except in the case described in subsection V.B.6., the group of vehicles within each test category shall meet these restrictions:
  - (a) no two vehicles shall be the same model and model year.
  - (b) not more than 20 percent shall have the same owner or the same manufacturer.
3. Except as provided in subsection V.B.6., within each vehicle category, the test vehicles shall have distributions of engine displacement, types of fuel/air metering, catalyst technology, emission control system, and California vs. U.S. (49-state) certification that the executive officer deems are sufficiently representative of the on-road fleet to make significant bias of the overall test results unlikely.
4. Except as provided in subsection V.B.6, each vehicle used under this protocol shall have accumulated at least the following miles travelled:

Age of vehicle, as determined by model year	Minimum miles travelled
0 to 1	4,000
2 to 5	18,000
6 to 10	41,000
11 to 15	61,000
> 15	76,000

5. Except as provided in subsection V.B.6., each vehicle shall be tested in its as-received condition; except, any routine maintenance scheduled to occur per the manufacturer's recommendation may be performed.
6. If the applicant demonstrates to the executive officer that the requirements in subsection V.B. are unreasonably difficult to meet for a vehicle category and unnecessary to provide a group of vehicles that reasonably represents the vehicle category, the executive officer may relax the requirements for that vehicle category.
7. Instead of following paragraphs 2 through 6 of this subsection B., the applicant may compose each category of test vehicles required

by subsection V.A.6. through random sampling of on-road vehicles. This option may be followed only after approval by the executive officer of the proposed sampling method as part of the plan described in section VI.

## VI. TEST PLAN

- A. The applicant shall submit to the executive office a test plan including the following information:
1. identification of properties of the fuel that affect exhaust emissions and would require specification in commercially available fuel;
  2. identification of the appropriate form of specification for each property identified in VI.A.1.; each specification shall be of one of the following forms:
    - (a) allowable value of property < [specified value]
    - (b) allowable value of property > [specified value]
    - (c) [specified value] < property < [specified value]
  3. the engine families, model years, and sources of vehicles with which the applicant proposes to satisfy subsection V.B. (if the option in subsection V.B.7 is not exercised);
  4. if the option in subsection V.B.7 is exercised, the method by which random sampling will be accomplished;
  5. the identities of any contractors who will conduct emission tests or analyses of samples;
  6. quality control provisions consistent with good laboratory procedures in testing for the emission levels expected to be encountered in the tests; and
  7. an approximate description of the test fuel, including all properties in subsection VI.A.1.
- B. If a specification is of the kind in subsection VI.A.2.(a) or (b), the value of [specified value] shall be the value measured for that property in the test fuel, as described in subsection VI.E.
- C. If a specification is of the kind in subsection VI.A.2.(c), the values of [specified value] shall be stated in the test plan.
- D. Unless the option in subsection V.B.7 is exercised, upon the executive officer's approval of the plan per subsections VI.F. and VI.G., the applicant shall specify to the executive officer the vehicle identification numbers of the vehicles to be tested. These numbers shall become part of the approved plan.
- E. Upon the executive officer's approval of the plan, the applicant shall supply measurements of the properties of the test fuel, including all

properties in subsection VI.A.1. Measurements shall be made in triplicate and, in the case of properties regulated by the ARB, by the test methods used to enforce such regulations. Also, if requested by the executive officer, the applicant shall supply a sample of the test fuel to the ARB.

- F. No datum shall be considered valid for the purpose of a demonstration controlled by this protocol unless that datum has been produced according to a plan approved by the executive officer before the datum has been taken.
- G. Except as provided by section VIII., no demonstration shall be valid unless all data corresponding to an approved plan have been taken and included in the calculations prescribed in section IX.
- H. Except as provided by section VIII., deviations from an approved plan shall not be permitted except by the prior permission of the executive officer.
- I. No more than 20 working days after receiving a proposed test plan, the executive office shall either inform the applicant that the plan is complete or advise the applicant of necessary additions or changes. No more than 15 working days after receiving requested additions or changes, the executive office shall advise the applicant that the amended plan is complete or further advise the applicant of necessary additions or changes. No more than 20 working days after advising the applicant that a plan is complete, the executive office shall either approve or reject the plan. A rejection shall be accompanied by specifications of deficiencies.
- J. The executive office shall not approve a test plan unless he or she finds that the demonstration that would be made under the plan would be reasonably adequate to ensure satisfaction of the requirements of section IV.

#### VII. EMISSION TEST PROCEDURES

- A. Each test vehicle shall undergo at least two back-to-back exhaust tests plus SHED tests under the Federal Test Procedure (Title 40, Code of Federal Regulations, Part 86) using the candidate fuel and two back-to-back tests using Phase 2 gasoline. For each vehicle, the order in which the two fuels are tested shall be determined randomly.
- B. Before the first FTP test is conducted on either fuel, a test vehicle's fuel tank and fuel delivery system shall be drained of fuel to the extent that is practicable. The fuel tank shall then receive a 40 percent fill of the fuel to be tested. The vehicle shall then be run through one Highway Fuel Economy Driving Cycle (HFEDC) (40 Code of Federal Regulations, Part 600, Subpart B). The fuel tank and fuel delivery system shall again be drained, and the tank shall receive a 40 percent fill of the test fuel. Finally, the vehicle shall undergo another HFEDC and two consecutive LA4 cycles. The test vehicle shall not be operated again before the back-to-back FTP tests required in A. above.

- C. Pre-testing procedures alternative to subsection VII.B. may be used if they are part of the approved plan described in section VI. Such alternatives may be approved only if found to be equivalent or superior in achieving a valid FTP test of the fuel under test.
- D. In each test run according to subsection VII.A., the NMOG emissions shall be speciated for determining the ozone-forming potential of the vehicle's exhaust. Species in the NMOG emissions shall be identified and quantified by the procedures in the "California Non-Methane Organic Gas Test Procedures" (referred to in the California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles). Exhaust emissions of benzene, 1-3 butadiene, formaldehyde, and acetaldehyde shall be identified and quantified using the procedures in the same document.

### VIII. EXCLUSION OF DATA OR VEHICLES

- A. Any datum from an individual FTP run may be excluded as an outlier relative to its replicate data if the exclusion leaves at least two replicate data and if the executive officer approves an analysis by the applicant justifying the exclusion. If an analysis is used to exclude one or more datum for a pollutant, the same analysis shall be applied to all data for that pollutant.
- B. Any vehicle may be excluded from the test program if it cannot be tested safely.

### IX. CALCULATIONS

#### A. Summary and Explanation of Calculations

This procedure calculates a statistical upper bound on the difference in average emissions per mile from the candidate fuel and from the certification fuel for the relevant on-road vehicle fleet. The emissions of all the pollutants measured during testing are expressed in units of mass per mile. The calculation procedure is the same for all pollutants.

For the replicate data on each vehicle, the difference in average emissions per mile is calculated as:

average emissions per mile from the candidate fuel  
minus  
average emissions per mile from the certification fuel

Within each vehicle category, the difference in emissions between the two fuels is the mean value of the difference values among vehicles. Within each vehicle category, the standard deviation of the difference among vehicles is also calculated.

The expectation value of the relevant on-road vehicle fleet's average difference in emissions per mile is the weighted average of the

differences in emissions among the vehicle categories. The weights used in the averaging are the estimates of total miles travelled by vehicles in the various categories.

Estimates of the standard error and degrees of freedom corresponding to the fleet-average difference in emissions are calculated from the weights, the numbers of test vehicles in the categories, and the standard deviations within categories.

The upper bound on the average difference in emissions for the on-road fleet is calculated from the expectation value, the standard error, and the one-sided student-t value for the 0.15 significance level and the calculated degrees of freedom.

The tolerance value for the upper bound is 0.01 times the weighted average value of the average emissions measured within vehicle categories on the certification fuels.

The type of statistical upper bound computed by this procedure is called an "upper confidence limit" in the statistical literature. Upper confidence limits for a statistical result have a high probability of exceeding the unknown true value of the quantity being measured. The probability is approximately 85 percent that the (unknown) true value of the mileage-weighted average difference of emissions per mile is less than its corresponding upper confidence limit. Consequently, if the true value of the difference in average emissions per mile is greater than the 1 percent tolerance, approximately 85 percent, or more, of all possible upper confidence limits will exceed this true value and therefore exceed the 1 percent tolerance. It follows that a candidate fuel with a true difference of emissions of a certain pollutant greater than the 1 percent tolerance will satisfy the criterion, and be accepted (with respect to that pollutant, only) as causing no increase in emissions, only about 15 percent of the time.

The upper confidence limits computed by this procedure are 85 percent one-sided upper confidence limits for a weighted average of normally distributed random variables. They are based on an approximate t-distribution. The degrees-of-freedom parameter of this distribution is calculated by Welch's approximation.

## B. Test Run Results

1. Emission rates of CO, NOx, and NMOG, expressed as "g/mile", and the emission rate of each toxic pollutant, expressed as "mg/mile", shall be determined in each test by the procedure described in the California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.
2. Values of ozone-forming potential, in "g ozone per mile", shall be determined for exhaust and evaporative emissions in each test according to Appendix VIII of the regulation stated in subsection IX.A.

3. In each test, the emission rate of each toxic pollutant shall be multiplied by its relative potency, as shown in the following table, and the four products shall be summed.

	<u>Relative Potency</u>
1,3-butadiene	1.0
benzene	0.21
formaldehyde	0.09
acetaldehyde	0.016

C. Upper Confidence Limit for Inferred Mean Emission Difference

1. The procedures in this section shall be followed for the test fleet in subsection III.A.1. The procedures shall be followed separately for CO, NOx, NMOG, the combined ozone-forming potential of evaporative and exhaust NMOG, and the combined potency-weighted toxic emissions.

2. For each vehicle, the results (g/mile for CO, NOx, NMOG, g ozone/mile, or mg/mile for combined potency-weighted toxic emissions) from all replicate tests on the candidate fuel shall be averaged, as shall the results from all replicate tests on the certification fuel. The average result when the vehicle is tested on the certification fuel shall be subtracted from the average when the vehicle is tested on the candidate fuel. The result of each such subtraction is a difference value for the vehicle,  $d_v$ .

3. Within each vehicle category, the mean value and standard deviation of mean difference values shall be calculated over all vehicles:

$m_d$  = mean value of  $d_v$  over all vehicles in a vehicle category

$s_d^2$  = square of standard deviation corresponding to  $m_d$   
 = sum over vehicles of  $\{(d_v - m_d)^2 / (n-1)\}$

4. The population-weighted mean value of  $m_d$  shall be calculated over all tested emission categories:

$D$  = Sum over all categories of  $\{m_d * p\}$

where  $p$  is total miles travelled by on-road vehicles in a vehicle category divided by the sum of total miles travelled by on-road vehicles in all categories that have been tested within the fleet. The values of "p" shall be determined for the same time as the sums of NMOG emissions and the sums of miles travelled described in subsections V.A.3.

5. The standard error of the weighted mean emission difference shall be calculated from the standard deviations within emission categories:

$S.E.^2$  = Sum over all categories of  $\{p^2 * s_d^2 / n\}$   
 where  $n$  is the number of test vehicles in the category



6. The number of degrees of freedom associated with D shall be calculated as:

$$nu = \frac{\text{Sum over all categories of } \{S.E.^2\}}{\text{Sum over all categories of } \{p^2 * s_d^2 / [n^2 * (n - 1)]\}}$$

7. The upper confidence limit for the population mean emission difference shall be calculated as:

$$UCL = D + t_{.15, nu} * S.E.$$

where t is the one-tailed "student's t" value for significance level (alpha) = .15 and degrees of freedom nu.

#### D. Emissions from the Use of Certification Fuels

1. Within each test vehicle category, the average of replicate emission results (mass/mile) when a vehicle's certification fuel is used, as computed in IX.B.2, shall be averaged over all vehicles. The result,  $e_c$ , is the emission rate for a category.
2. The estimate of the on-road fleet emissions from the use certification fuels shall be the weighted sum over categories of  $e_c$ , using the same weights, p, as in the calculation of D.

$$E_c = \text{sum over all categories of } \{p * e_c\}$$

#### XI. SUBMISSION OF RESULTS

By means agreed upon by the executive office and the applicant, the applicant shall submit documentation of adherence to the plan described in section VI. and to the procedures specified in section VII., the calculations required in section IX., any outlier analyses conducted per paragraph VIII.A., the output from all FTP runs and all speciations of NMOG.

#### XII. APPROVAL OF A CANDIDATE FUEL

- A. No more than 20 working days after receiving the information described in section XI., the executive office shall either inform the applicant that the information is complete or advise the applicant of necessary additions or changes. No more than 15 working days after receiving requested additions or changes, the executive office shall advise the applicant that the amended information is complete or further advise the applicant of necessary additions or changes. No more than 20 working days after advising the applicant that the information is complete, the executive office shall deem the demonstration required by subsection II.A., concerning emission comparisons, to be either accomplished or not accomplished. A rejection shall be accompanied by specifications of deficiencies.

- B. Within 10 working days of determining that the demonstration has been accomplished, the executive officer shall provide notice to interested parties requesting comments on the proposed approval of the fuel. After considering these comments, the executive officer shall approve or deny the candidate fuel.
- C. In approving a candidate fuel, the executive officer shall set specifications on properties according to subsections VI.A.1., VI.B., and VI.C.
- D. An approval shall be in force for five years, at which time the reapproval process in section XIII. shall be followed.

### XIII. PERIODIC REAPPROVAL

- A. Every five years, test data shall be provided for any vehicle category previously exempted from testing pursuant to section V.A.6. if the exempting criteria (less than 3 percent of emissions and less than 5 percent of miles travelled) are no longer met. Test data shall also be provided for any previously tested vehicle category for which the executive office determines that the vehicles tested no longer provide a reasonable representation of the on-road vehicles in that category.
- B. Every five years, the upper confidence limit specified in subsection IX.B. and the emissions from the use of certification fuel specified in subsection IX.C. shall be re-calculated for the test fleets identified in subsections V.A.1. and subsection V.A.2. The calculations shall use the original test data, any new test data provided pursuant to subsection XIII.A. or XIV.A., and the current statistical weights (p) as described in subsection IX.B.4. If the upper confidence level exceeds the criterion in section IV. for any pollutant, approval for the fuel shall be rescinded.
- C. After January 1 of the year that is three calendar years after the year of the executive order rescinding approval for a fuel under this section, no person shall sell that fuel for use in California, unless a new approval has been obtained under this protocol.

### XIV. AUGMENTATION OF ORIGINAL TEST DATA

- A. An applicant who made the petition that led to the approval may augment any portion of the information in the original test plan or the submission required in section XI. All new information shall be developed according to this test protocol.
- B. If new information or proposed changes are submitted, the executive officer shall evaluate and either accept or reject them by standards consistent with the requirements in this procedure for the original approval.

DRAFT - FOR DISCUSSION ONLY

ATTACHMENT 5

Synopsis

Benzene Element of the Proposed Specifications  
for Phase 2 Reformulated Gasoline

July 30, 1991

Benzene Limit

1. What limits are proposed for the benzene content of gasoline?

Gasoline exceeding 1.20 volume percent (v.%) benzene would not be permitted at any point in the distribution system for California.

In addition to meeting the limit at 1.20 v.%, each producer or importer of gasoline would be required to comply with either of two limits for its gasoline supplied to California:

- a. The producer/importer could elect to meet a benzene limit of 1.0 v.% on all gasoline (each batch); or
- b. The producer/importer could elect to meet a limit of 0.80 v.% on the average benzene content over all gasoline. Under this option, a producer/importer could supply batches of gasoline with benzene contents greater than 0.80 v.% (but less than 1.2 v.%) as long as he or she would report the high benzene contents to ARB and had accumulated sufficient credit from low-benzene batches to offset the excess benzene in the high batches. (The reporting would be by the "designated alternative limit" described in the next section. The accumulation and use of credit would be through the "banking" system described in the following section.)

2. Could a producer/importer meet the requirements of the proposed regulation by using either option at any time?

No. Each producer/importer would have to select one of the options and comply under that option for a minimum of one year. If a producer/importer intended to switch options in a subsequent year, it would have to inform the executive officer at least 90 days in advance.

3. What would be the effective date of the benzene limits?

January 1, 1996, for all limits.

CARB 10003096

## Designated Alternative Limit

### 1. What is a "designated alternative limit"?

A designated alternative limit (DAL) is a limit on the benzene in a batch of gasoline, other than 0.80 v.% and less than 1.2 v.%. It could be set only by a producer/importer who had selected the option of limiting the average benzene in gasoline to 0.80 v.%. A DAL for a particular batch of gasoline could not be less than the measured benzene content. It would be enforced by ARB just as would any other limit on gasoline. If a producer/importer under the averaging option would release gasoline without setting a DAL for it, the ARB would enforce the value 0.80 v.% for that gasoline's benzene content.

### 2. When would a DAL be needed?

A producer/importer (under the averaging option, only) would have to set a DAL for every batch of gasoline having a benzene content greater than 0.80 v.%. In addition, to gain credit for batches with benzene contents less than 0.80 v.%, a producer/importer would have to set DALs for such batches also.

### 3. How would a DAL be established?

A producer/importer would notify the executive officer of the DAL and the volume of a gasoline batch. The notification would have to be made before the start of physical transfer of the gasoline from the production/import facility and at least 12 hours before the batch of gasoline would be completely transferred or mingled with other gasoline.

### 4. Could a producer/importer sell a different volume of gasoline than had been reported with a DAL to the ARB ?

- o If the DAL exceeded 0.80 v.%, the volume sold under that DAL could not exceed the reported volume.
- o If the DAL were less than 0.80 v.%, the volume sold under that DAL could not be less than the reported volume.

### 5. Could a producer assign a DAL to a volume of gasoline it did not produce?

If a final blend of gasoline includes gasoline that the producer did not produce, the designated alternative limit would apply only to the part of the blend that the producer did produce.

CARB 10003097

Could the process for assigning DALs be modified?

The executive officer and a producer/importer could enter into a protocol for an alternative process if the process would be as effective and as enforceable as the process described by the proposed regulation.

Benzene Banking Provisions

1. How would benzene banking work?

A producer/importer could bank a credit for any batch of gasoline with a DAL less than 0.80 percent. The credit would be the benzene volume equal to the the volume of the batch times the difference between 0.80 v.% and the DAL. A producer/importer would be allowed to withdraw credits from its bank to offset the excess benzene in any batch with a DAL greater than 0.80 percent. A producer/importer could not release such high-benzene gasoline for use in California if the bank did not contain sufficient credit in the bank to offset the excess benzene.

2. What restrictions would apply to the use of banked benzene credits?

A benzene bank would be maintained for each refinery, importation point, or blending point. Credits could not be transferred between different locations owned by the same producer/importer or between producers/importers.

3. Would there be a maximum amount of credit that could be banked?

Yes. The maximum volume of benzene credit in any bank would be equal to one-half of the volume of gasoline produced/imported at the particular location during the previous calendar year times the average reduction in benzene content expected in California gasoline, 2.00 v.% minus 0.80 v.%, or .012.

4. Would there be a time limit on the use of banked benzene credits?

No.

5. When could a producer/importer begin banking benzene credits?

January 1, 1996.

CARB 10003098

## Benzene Testing and Recordkeeping Requirements

1. What test method would be used to determine benzene content?

Test Method ASTM D3606, with modifications, would be used to determine the benzene content of gasoline. An alternative test method would be allowed, if it were shown to produce equivalent results.

2. What testing would be required?

Producers/importers would be required to sample and test the benzene content of each final blend of California gasoline. If a producer blends gasoline directly in pipelines, tankships, railway tankcars or trucks and trailers, the loadings would be required to be sampled and tested for benzene content. If gasoline were not tested, it would be regarded as violating the proposed regulation.

3. What records would be required?

- o Producers/importers would be required to maintain records indicating sampling dates, the products sampled, the container or other vessel sampled, the final blend volume, and the benzene measured content.
- o Producers/importers would be required to keep these records for two years from sampling date.
- o If a batch of gasoline is not sold in California, the producer/importer would be required to maintain records for two years indicating that the gasoline was sold outside California.
- o Producers/importers would be required to submit any records required by the regulation to the ARB within 20 days of a written request from the Executive Officer.

## Benzene Compliance Plan

1. What option would a producer/importer have if it could not comply with the benzene limits?

A producer/importer could apply for a variance. The proposed regulation states procedures and conditions for variances.

2. Would a compliance plan be required?

Yes. The producer/importer would be required to submit a compliance plan to the ARB by January 1, 1993, and update it on January 1, 1994, and on January 1, 1995.

CARB 10003099

## Potential Cancer Cases Avoided

### 1. How are benzene emissions calculated?

- o EMFAC 7E/7EP and BURDEN 7D are used to determine motor vehicle emissions of hydrocarbons. These are multiplied by fractions of benzene in hydrocarbon.
- o The benzene fraction of hydrocarbons in exhaust emissions from late-model vehicles, as a function of the benzene content of gasoline, is based on 3 separate studies done on vehicles with catalytic converters. For all other gasoline vehicles, the ARB derived the benzene fraction of hydrocarbons from various sources as summarized in the Benzene Control Plan (1986).
- o The benzene fraction of hydrocarbons in evaporative emissions was derived by the ARB from data collected by NIPER and the assumption that the amount of evaporative benzene is proportional to the benzene content of gasoline.
- o The benzene fractions of organic compounds emitted from off-road vehicles and stationary engines are assumed to be the same as from non-catalyst on-road vehicles.

### 2. How are the potential cancer cases avoided estimated?

- o ARB data indicate that in 1986 the average ambient benzene concentration in California was 2.7 ppb. The ambient concentration in a future year is estimated as 2.7 ppb times the ratio of the total benzene emissions calculated for that year to emissions calculated for 1986. This calculation applies for both the baseline (no benzene limit) case and the case wherein the benzene emissions from vehicles would be reduced by the regulation.
- o Estimated differences in ambient concentrations, due to the regulation, are multiplied by the unit risk factor for benzene, 93 potential lifetime cancer cases per million people per ppb. The resulting value of reduced risk is multiplied by the estimated population of California to yield lifetime cases avoided corresponding to the conditions in a particular year.
- o For each year from 1996 to 2010, the lifetime cases avoided are divided by 70 years (to yield a per-year measure of effect). The average of these 15 annualized values is 20 to 22 cases per year (statewide), depending on whether gasoline is assumed to not be a fuel for low emission vehicles or to be the only fuel for those vehicles. (Analysis based on limit of 0.80 v.% benzene.

CARB 10003100