State of California
California Environmental Protection Agency
AIR RESOURCES BOARD

**Final Statement of Reason for Rulemaking,
Including Summary of Comments and Agency Responses**

PUBLIC HEARING TO CONSIDER PROPOSED NEW SPECIFICATIONS FOR DIESEL ENGINE CERTIFICATION FUEL, PROPOSED AMENDMENTS TO THE OXYGEN SPECIFICATION FOR NATURAL GAS CERTIFICATION FUEL, AND PROPOSED AMENDMENTS TO THE COMMERCIAL MOTOR VEHICLE LIQUEFIED PETROLEUM GAS REGULATIONS

Scheduled for Consideration: September 22, 1994

Agenda Item: 94-9-1

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I. GENERAL

This rulemaking was initiated by the publication on August 5, 1994, of a notice of public hearing to consider adoption of proposed new specifications for diesel engine certification fuel, proposed amendments to the oxygen specification for compressed natural gas certification fuel, and proposed amendments to the commercial motor vehicle liquefied petroleum gas regulations. The staff of the Air Resources Board (ARB) also issued a Staff Report: Initial Statement of Reasons (Staff Report) for the proposed regulatory amendments, which was available for public inspection on August 5, 1994. The Staff Report included the text of the proposed amendments, along with a description of the background of and rationale for the proposal. The Staff Report is incorporated by reference herein.

On September 22, 1994, the Board conducted a public hearing at which it received written and oral comments on the regulatory proposals. At the conclusion of the hearing, the Board adopted Resolution 94-53, in which the amendments were adopted as proposed.

The regulatory action consists of amendments to sections 1956.8(b), 1956.8(d), 1960.1(k), and 2292.6 of Title 13 California Code of Regulations, and amendments to the following ARB documents (referred to collectively as the test procedures) which are incorporated by reference in sections 1956.8(b), 1956.8(d), and 1960.1(k) respectively:

- "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engine and Vehicles," adopted April 8, 1985, as last amended October 23, 1992.

- "California Exhaust Emission Standards and Test Procedures for 1987 and Subsequent Model Heavy-Duty Otto-Cycle Engines and Vehicles," adopted April 25, 1986, as last amended May 28, 1993.

- "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-duty Trucks, and Medium-Duty Vehicles" adopted May 20, 1987, as last amended September 22, 1993.

Title 13, CCR sections 1956.8(b), 1956.8(d), and 1960.1(k) identify the incorporated ARB documents by title and date. The ARB documents are readily available from the ARB upon request and were made available during the subject rulemaking in the manner specified in Government Code section 11346.2.

The test procedures incorporate portions of the Code of Federal Regulations because the ARB requirements are substantially based on the federal regulations. Manufacturers typically certify vehicles and engines to both the federal and state emissions standards and test procedures. Incorporation of the federal regulations by reference makes it easier for manufacturers to know

when the two sets of requirements are identical and when they differ. The incorporated federal regulations are also identified by date. The Code of Federal Regulations is published by the Office of the Federal Register, National Archives and Records Administration, and is therefore reasonably available to the affected public from a commonly known source.

The test procedures are incorporated by reference because it would be impractical to print them in the California Code of Regulations. Existing ARB administrative practice has been to have test procedures incorporated by reference rather than printed in the California Code of Regulations. These procedures are highly technical and complex. They include "nuts and bolts" engineering protocols and have a very limited audience. Because the ARB has seldom printed test procedures in the California Code of Regulations, the affected public is accustomed to the incorporation format utilized herein. The ARB's test procedures as a whole are extensive and it would be both cumbersome and expensive to print these lengthy, technically complex procedures with a limited audience in the California Code of Regulations. Printing portions of the ARB's test procedures in the California Code of Regulations when the bulk of the test procedures are incorporated by reference would be unnecessarily confusing to the affected public.

The Board has determined that this regulatory action will not result in a mandate to any local agency or school district the costs of which are reimbursable by the state pursuant to Part 7 (commencing with section 175000), Division 4, Title 2 of the Government Code.

The Board has further determined that no alternative considered by the agency would be more effective in caring out the purpose for which the regulatory action was proposed or would be as effective and less burdensome to the affected private persons than the action taken by the Board. The summary of comments and agency responses in Section III identifies the bases for this determination.

II. SUMMARY OF COMMENTS AND RESPONSES

The Board received written comments on the proposed amendments before the hearing from the Western States Petroleum Association (WSPA), Chevron U.S.A. Products Company (CHEVRON), the American Automobile Manufacturers Association (AAMA), the California Natural Gas Vehicle Coalition, and MESA Environmental. The Board also received oral and written testimony at the September 22, 1994 hearing from WSPA, the Engine Manufacturers Association (EMA), and Navistar. The South Coast Air Quality Management District (SCAQMD) presented oral comments only.

A number of commenters generally supported adoption of the proposed amendments. These commenters include MESA Environmental, EMA, Navistar, AAMA, and the SCAQMD. We have not summarized the specific comments in support of the proposed amendments.

A. Proposed New Specifications for Diesel Engine Certification Fuel

1. Comment: One of the ARB's major regulatory philosophies has been to require more stringent standards than exist in the federal program; this is certainly true of fuels both diesel and gasoline. The ARB's extra stringency in fuels' emissions performance results in extra vehicle emissions performance when California fuels are used in vehicles certified to federal standards--using higher-emitting federal certification fuels--but operated in California. To the extent that California vehicles are allowed to be certified on cleaner-burning California fuels, California will have lost its extra air quality "bang for the buck" from its cleaner-burning fuels. (CHEVRON)

Agency Response: The commenter's characterization of the ARB's regulatory program for motor vehicles and motor vehicle fuels is accurate only up to the advent of the Low-Emission Vehicle and Clean Fuel regulations. In the past, when the Board adopted more stringent standards for commercial fuel, it typically did not revise the specifications for the corresponding fuel used in motor vehicle emissions certification testing. Thus the emission control systems on the vehicles would not change, and the cleaner commercial fuel would result in reduced emissions from the in-use fleet. With the Low-Emission Vehicle and Clean Fuels regulations, the Board for

the first time set emission standards for the vehicle and the fuel as a system. The Board set stringent new exhaust emission standards for low-emission vehicles, and allowed manufacturers to certify vehicles to these standards using the cleaner motor vehicle fuels that would be available commercially.

The current ARB exhaust emission standards for most diesel vehicles and engines were adopted prior to establishment of the low-emission vehicle program, and were premised on the use of diesel certification fuel no cleaner than the U.S. EPA diesel certification fuel. This includes the emission standards for all heavy-duty diesel engines except for 1996 and 1997 model-year engines used in urban buses. This rulemaking does not affect the fuel that must be used in certification emission tests of these engines. However, there are three instances where the Board has recently adopted more stringent emission standards for diesel vehicles and engines which were premised on the availability of a cleaner diesel certification fuel meeting the California 10 percent aromatic hydrocarbon content standard. These are the standards for 1995 and subsequent model-year medium-duty vehicles, for 1995 and subsequent model-year passenger cars and light-duty trucks, and for 1996 and 1997 urban bus diesel engines. Similarly, the identical standards for 1995 and subsequent model-year light- and medium-duty Otto-cycle (gasoline) vehicles allow the use of cleaner Phase 2 reformulated gasoline for certification testing. For these classes of vehicles and engines, the emission benefits of the cleaner diesel fuel or gasoline (what the commenter calls "the extra air quality 'bang for the buck'") are already factored into the more stringent vehicle and engine emission standards.

2. Comment: Any diesel engine certification fuel specifications should be set based on the emission performance of the entire fuel pool including true 10 volume percent aromatics fuel, alternative formulations and small refiner fuel. We do not believe that the methodology used by the ARB staff to set the recommended certification fuel specifications has or will produce a certification fuel reflective of the emission performance of the current in-use diesel fuel pool. Basing the certification fuel specifications solely on the characteristics of the 10 volume percent aromatics fuel that exists in the marketplace now ignores both the contribution to the in-use pool of alternative formulations certified to the large refiner standard and the contribution of small

refiner fuel. Either one of these categories of fuel will lower the average emission performance of the in-use fuel pool. (CHEVRON)

The specifications for certification fuel should match those of commercial fuel as closely as possible. The staff's proposed certification fuel is not representative of commercial fuel and will produce lower emissions than average commercial fuel. Consequently, the use of this fuel will permit certification of engines and vehicles that will fail to achieve desired emission reduction goals under real-life operating conditions. (WSPA)

Agency Response: This rulemaking revises the specifications for the low-aromatics diesel certification fuel that may be used for the three categories of diesel vehicles or engines for which the Board recently established more stringent exhaust emission standards premised in part on the availability of that fuel. As originally adopted, these specifications were identical to the specifications for the 10 percent aromatic hydrocarbon content "reference fuel" used in evaluating whether alternative diesel fuel formulations resulted in emissions no greater than diesel fuel meeting the 10 percent aromatic hydrocarbon content standard applicable to commercial diesel fuel in California. While the reference fuel specifications identify a maximum aromatic hydrocarbon limit of 10 volume percent, they do not limit the minimum aromatic content, the minimum sulfur content, or the maximum cetane. Thus diesel fuels with widely varying properties could be used for certification testing, leading to emission results that could vary significantly. The amendments now being adopted identify more narrow ranges for these properties which will assure results that are more consistent and reflect the 10 percent aromatic hydrocarbon content diesel fuel that is currently commercially available in California.

We do not believe it would be appropriate to revise the specifications for low-aromatics diesel certification fuel to reflect the proportion of the commercial diesel fuel pool that is produced by small refiners and is subject to a less stringent 20 volume percent aromatic hydrocarbon content standard. The ARB's regulation limiting the aromatic hydrocarbon content of commercial diesel fuel--Title 13, California Code of Regulations section 2282--has included the less stringent small refiner standard since it was originally adopted following a November 1988

hearing. In each of the three instances the Board subsequently allowed the use of a low-aromatics diesel certification fuel in conjunction with a more stringent exhaust emission standard, it specified a 10 percent aromatic hydrocarbon content certification fuel without further adjustment to account for small refiner fuel. The Board recognized in adopting the low-aromatics commercial fuel standards that the small refiner provisions would reduce the emissions benefits of the regulation. It does not follow that the reduction in emission benefits associated with the small refiner provisions must be "made up" at this time by revising the diesel certification fuel specifications to require marginally more effective on-board emission controls.

There is also a sound justification for basing the certification fuel specifications on the properties of commercially available diesel fuel sold subject to the 10 volume percent aromatic hydrocarbon content standard, without factoring in diesel fuel sold as alternative formulations. Unlike the 10 percent aromatics fuels, alternative formulations have widely varying properties, such as different aromatic hydrocarbon and cetane levels. Since there necessarily is a single set of specifications for low-aromatics diesel fuel, it is appropriate to base them on the commercial diesel fuel with a narrow range of aromatic hydrocarbon contents. In addition, the alternative formulations should not result in significantly different emissions because the mechanism for approving alternative formulations is designed to result in emissions benefits equivalent to those resulting from 10 percent aromatic hydrocarbon content diesel fuels. This is borne out by the analysis in the response to Comment 4.

3. Comment: The most appropriate method to generate an accurate certification fuel specification would be to use in-use fuel property data and production volumes to generate a "composite" formulation. Since many of these formulations are proprietary, WSPA, as a trade organization, does not have the data to calculate the properties of the composite fuel. CARB, however, does have all necessary data and should use this as the basis for setting certification fuel specifications which would accurately represent the majority of commercially available fuel. (WSPA)

The best basis for the determination of in-use fuel characteristics is, of course, actual fuel inspection data, although we understand that ARB staff does not have this data. (CHEVRON)

Agency Response: We have not factored small refiner diesel fuel into the diesel certification fuel specifications for the reasons set forth in the response to the previous comment. As one of the commenters knowledges, sufficient data is not available at this time to accurately identify specifications of a sales-weighted "composite" diesel fuel manufactured to satisfy alternative formulations or the 10 percent standard. We have, however, been able to base the properties of the amended certification specification on the properties of in-use diesel fuels sold subject to the 10 volume percent aromatic hydrocarbon content standard.

4. Comment: In the absence of actual fuel inspection data on all fuels, some sort of approximation should be used. There is a simple way to design a 10 volume percent aromatics certification fuel approximating the emissions of the in-use pool. The methodology assumes that all alternative formulations can be represented by a surrogate 10 volume percent aromatics fuel, specifically, the reference fuel requirements that all large refiner certified alternatives must be equivalent to, i.e., a 10 volume percent aromatics and 48 cetane fuel. Similarly, all small refiner fuel can be represented by the small refiner alternative certification reference fuel with a 20 volume percent aromatics and 47 (or 45) cetane. Weighing these contributions by their respective market share as estimated by ARB staff (29 percent for true 10 volume percent aromatics fuel, 14 percent for small refiner fuel, and 57 percent for large refiner certified alternative) would result in a fuel with a 10 volume percent aromatics and 49 cetane. Thus, a 10 volume percent aromatics fuel with emission performance reflective of the in-use diesel pool would have a cetane of 49--two numbers below the 51 cetane midpoint of the proposed specification. (CHEVRON, WSPA)

Agency Response: We have explained in the response to Comment No. 2 why diesel fuel subject to the 20 volume percent aromatic hydrocarbon content standard for small refiners should not be considered in setting the certification fuel specifications. As to the alternative formulations produced by large refiners which must be equivalent or better than the reference fuel with 10 volume percent aromatics maximum and 48 cetane minimum, we believe that it would be more appropriate to derive their surrogate cetane number from the actual reference fuels used in the certification of the alternative formulations. Because most of these are proprietary, we cannot

discuss them individually. However, the average of the reference fuels is 10 volume percent aromatics and 50 cetane (assuming that all formulations are equally likely to be produced). In the Staff Report we indicated that the average cetane number of diesel fuel then being produced subject to the 10 percent aromatic hydrocarbon content standard was 52. Both these values fit well within the 47 to 55 cetane range being adopted for certification diesel fuel.

5. Comment: It is arguable that today's in-use fuel pool will change significantly in the near future and that engine certification fuels should reflect future in-use fuels. We also recognize that engine manufacturers may have already committed significant resources to certifying engines for the 1995 model year using a fuel meeting the staff's recommended specification and that, in any case, the contribution to the emissions inventory of the engines allowed to be certified on California diesel is relatively small. While our preference is for the Board to adopt our recommended certification fuel cetane number of 49, given these considerations we would understand if the Board adopted staff's recommendation. However, the Board should concurrently state its intention that the classes of engines now allowed to be certified on California diesel not be expanded unless and until a more thorough assessment of the in-use diesel pool were made and a new certification fuel adopted. (CHEVRON)

Agency Response: Any expansion of the classes of engines and vehicles that may be certified using low-aromatics certification diesel fuel would have to be effected by a formal rulemaking. The hearing process will provide an adequate assurance that the concerns raised by the commenters are considered. It would be premature to announce at this time what the certification fuel specifications will be in that eventuality.

6. Comment: I understand that the staff's proposal is to identify a maximum cetane number of 57. It would probably be most prudent to identify a maximum cetane number not to exceed 55 in the interest of trying to align your in-use average midpoint fuel with what is actually occurring in the field. If necessary, you could make the maximum cetane number of 55 effective starting with 1996 model-year engines. (SCAQMD)

Agency Response: The staff proposal does identify a maximum cetane number of 55, and the Board is adopting this value.

B Proposed Amendment to the Oxygen Content Standard for CNG Certification Fuel

7. Comment: AAMA supports the proposed change to the oxygen content. However, we recommend a maximum oxygen content of 0.3 mole percent. The staff's proposed change solves the safety concerns associated with blending the oxygen content required by the initial CARB specification but it does not go far enough in limiting the fuel variability. (AAMA)

Agency Response: The intent of the amendment to the oxygen content was to resolve the safety issues raised by fuel suppliers. While a 0.3 mole percent oxygen standard would reduce the variability of the fuel, we believe that it is not necessary. Testing conducted by ARB indicates that oxygen at the specified levels does not have a significant impact on emissions. Also, we believe that having a maximum oxygen level of 0.5 mole percent is adequate to ensure proper engine performance. The United States Environmental Protection Agency recently established compressed natural gas certification fuel specifications which contain a maximum oxygen content standard of 0.6 mole percent (59 F.R. 48507-8 (September 21, 1994), adding 40 CFR section 86.113-94(e)).

C. Proposed Amendments to the Liquefied Petroleum Gas Regulations

8. Comment: AAMA does not oppose the proposed two-year delay in the implementation of the 5.0 volume percent propene content requirement until January 1, 1997. However, we request that CARB make available, for review and comment, the proposal from the Western Propane Gas Association (WPGA) to conduct a testing program to evaluate emissions of propene and other emissions from LPG-fueled vehicles. (AAMA)

Agency Response: Staff will make available the draft test protocol submitted to the ARB.

9. Comment: We urge that ARB staff establish a plan to ensure that the propene content requirement is resolved within the two-year deferral period. (AAMA)

Agency Response: As discussed on page 21 of the Staff Report, modifications to refinery processes to produce Phase 2 reformulated gasoline by March 1, 1996 have the potential to reduce or eliminate propene in LPG fuel produced at refineries. Further, we expect that the WPGA emissions study will be completed within two years.

10. Comment: The Board should go on record indicating that the two-year extension of the 10 volume percent propene standard is a one time accommodation so that industry is aware that they need to comply by January 1, 1997. (SCAQMD)

Agency Response: We believe that industry is aware that they must comply with the regulation requirements by January 1, 1997. However, while we don't anticipate a need to continue the 10 volume percent propene standard beyond January 1, 1997, we do not believe it is appropriate to exclude further action because we do not know what circumstances will exist in the future.