

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item: Public Hearing to Consider Adoption of Regulations Regarding
Low-Emission Vehicles and Clean Fuels

Agenda Item No.: 90-14-1

Public Hearing Date: September 28, 1990

Response Date: January 31, 1991

Issuing Authority: Air Resources Board

Comment: Several comments were received identifying significant environmental issues pertaining to this item. These comments are summarized and responded to in the Final Statement of Reasons, which is incorporated by reference herein. See particularly comments 113-114, 225 and 234-240, and the responses thereto.

Resolution 90-58 is also incorporated herein and attached hereto. In the Resolution the Board made various findings pertaining to potential environmental impacts of the proposed regulations, particularly on pages 5 to 6 and 11 to 12. The Board found that there are no feasible mitigation measures or alternatives available to the Board which would substantially reduce the potential adverse impacts of the proposed regulations while at the same time providing the substantial overall public health benefit from the emissions reductions that will result from the regulations.

Response: See above.

Certified:

Pat Hutchens
Pat Hutchens
Board Secretary

Date:

7/9/91

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State of California
AIR RESOURCES BOARD

Resolution 90-58

September 28, 1990

Agenda Item No: 90-14-1

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

WHEREAS, in Health and Safety Code section 43000 the Legislature has declared that the emission of air contaminants from motor vehicles is the primary cause of air pollution in many parts of the state, and that the control and elimination of those air contaminants is of prime importance for the protection and preservation of the public health and well-being, and for the prevention of irritation to the senses, interference with visibility, and damage to vegetation and property;

WHEREAS, Health and Safety Code section 43018(a), enacted by the California Clean Air Act of 1988, directs the Board to endeavor to achieve the maximum degree of emission reduction possible from vehicular and other mobile sources in order to accomplish the attainment of the state ambient air quality standards at the earliest practicable date;

WHEREAS, Health and Safety Code section 43018(b) directs the Board no later than January 1, 1992 to take whatever actions are necessary, cost-effective, and technologically feasible in order to achieve, by December 31, 2000, a reduction of reactive organic gases (ROG) of at least 55 percent and a 15 percent reduction in the emissions of oxides of nitrogen (NOx) from motor vehicles, and the maximum feasible reductions in particulates (PM), carbon monoxide (CO), and toxic air contaminants from vehicular sources;

WHEREAS, Health and Safety Code section 43018(c) provides that in carrying out section 43018, the Board shall adopt standards and regulations which will result in the most cost-effective combination of control measures on all classes of motor vehicles and motor vehicle fuel, including but not limited to reductions in motor vehicle exhaust and evaporative emissions, reductions in in-use vehicular emissions through durability and performance improvements, requiring the purchase of low-emission vehicles by state fleet operators, and specification of vehicular fuel composition;

WHEREAS, Health and Safety Code section 43101 directs the Board to adopt and implement emission standards for new motor vehicles which the Board has found to be necessary and technologically feasible to carry out the purposes of Division 26 of the Health and Safety Code;

WHEREAS, Health and Safety Code sections 40460(a) and 40463(a) direct the South Coast Air Quality Management District (SCAQMD) to prepare and

periodically update a plan to achieve and maintain the state and federal ambient air quality standards in the South Coast Air Basin, and section 40460(c) provides that in consultation with specified government agencies, the Board shall provide the emission reductions attributed to technological vehicular source control strategies included in the plan;

WHEREAS, Health and Safety Code section 39663 directs the Board by June 30, 1990, to consider a plan for reducing public exposure to known and suspected toxic air contaminants; and section 39667 directs the Board, based on its determinations pursuant to section 39663, to consider adoption of regulations to achieve the maximum possible reduction in public exposure to toxic air contaminants, which regulations may include, but are not limited to, the modification, removal, or substitution of vehicle fuel, vehicle fuel components, or fuel additives, or the required installation of vehicle control measures on new motor vehicles;

WHEREAS, the Board has adopted a "Post-1987 Motor Vehicle Plan" containing the schedule for the adoption of additional vehicular emission control measures and the introduction of clean fuels;

WHEREAS, the South Coast Air Quality Management Plan (the "South Coast Plan"), adopted by the SCAQMD and the Southern California Association of Governments on March 17, 1989 and approved by the Board on August 15, 1989, contains emission reduction goals for motor vehicles which require the development and widespread use of low-emitting and extremely low-emitting vehicles by the years 2000 and 2007 respectively, where extremely low-emitting vehicles are defined as being essentially emission-free; in approving these goals in Resolution 89-66 the Board directed the Executive Officer to continue to develop measures which will result in the use of sufficient low-emission vehicles and clean fuels in the South Coast Air Basin to achieve the motor vehicle emission reduction goals for such measures;

WHEREAS, the California Advisory Board on Air Quality and Fuels, created by Assembly Bill 234 (Leonard, 1987; Health and Safety Code sections 43837-8), has found that: the use of alternative fuels will provide improvements in air quality beyond what is achievable from conventionally-fueled vehicles using the most advanced emission controls, the extra costs would be justified by the air quality benefits obtained, and the increased use of cleaner alternative fuels can be achieved by adopting air-quality-based performance standards for vehicles and fuels;

WHEREAS, the Motor Vehicle Toxics Control Plan, approved by the Board June 21, 1990 and prepared pursuant to Health and Safety Code section 39663, identifies the adoption of regulations requiring low-emission vehicles and the appropriate distribution and availability of clean fuels as a key element of the plan;

WHEREAS, in Resolution 89-102 adopted December 14, 1989, the Board endorsed the staff's intent to propose regulations requiring the production of light-duty low-emission vehicles and the distribution of clean fuel that enable the low emissions to be achieved, with the objectives of reducing the emissions of criteria and toxic pollutants from light-duty motor vehicles to

the maximum degree possible, providing flexibility in the means of compliance, and providing an opportunity for all technologies and fuels to compete consistent with their emissions performance and impact on air quality;

WHEREAS, in preparing the proposal for low-emission vehicles and clean fuels the staff conducted five workshops and conducted numerous meetings with members of the regulated public and other interested parties;

WHEREAS, the staff has now formally proposed comprehensive and integrated regulations which would phase in much more stringent exhaust emission standards and would require the distribution and availability of cleaner-burning fuels where needed to meet the exhaust emission standards;

WHEREAS, the vehicle elements of the staff proposal include:

Four new levels of exhaust emission standards for light-duty vehicles, in order of increasing stringency called transitional low-emission vehicles (TLEVs), low-emission vehicles (LEVs), ultra-low-emission vehicles (ULEVs), and zero-emission vehicles (ZEVs);

Hydrocarbon standards which are expressed as non-methane organic gases (NMOG), and are adjusted according to reactivity adjustment factors to account for the reduced ozone-forming potential of clean fuels;

Annually descending fleet average NMOG standards for light-duty vehicles, starting with the 1994 model year, with provisions for marketable credits;

Two-tiered NMOG standards for vehicles certified to a low-emission vehicle standard on an alternative clean fuel and also capable of operating on gasoline;

Light-duty vehicle exhaust emission standards for NO_x, CO, PM and formaldehyde, with the NO_x standard becoming more stringent for LEVs and ULEVs, and the CO, PM, and formaldehyde standards becoming more stringent for ULEVs;

Requirements that, starting with the 1998 model year, two percent of a manufacturer's light-duty vehicle production would have to be ZEVs, with the percentage increasing in succeeding years and reaching ten percent in 2003; small-volume manufacturers would not be subject to this requirement, and intermediate-volume manufacturers would not be subject until 2003;

Two new categories of standards, LEV and ULEV, for medium-duty vehicles, with emission standards of equivalent stringency to those for light-duty vehicles taking into account the greater size and weight of medium-duty vehicles, and with an implementation schedule starting with the 1998 model year under which each manufacturer would have to certify an increasing percentage of each model year's fleet to LEV and ULEV standards;

WHEREAS, the clean fuel elements of the staff proposal include:

A two-phase program, applicable from 1994 through 1996 in the SCAQMD to major gasoline suppliers who have a California refinery with a capacity over 50,000 barrels per day and who own or lease 25 or more retail stations in the SCAQMD, and applicable statewide starting in 1997 to all gasoline suppliers that produce or import gasoline, and to the owners, lessors and operators of service stations;

A requirement that gasoline suppliers distribute for use in motor vehicles assigned minimum volumes of alternative clean fuels (other than compressed natural gas (CNG) and electricity) on a quarterly basis to the extent the fuels are used to certify low-emission vehicles; the volume would be determined by the Executive Officer based on the overall clean fuel demand and the gasoline supplier's market share, and would be adjusted by a gradually increasing adjustment factor ranging from 0.25 in 1994 to 0.90 in 2000;

Provisions allowing compliance with the fuel volume distribution requirements through the use and banking of credits generated by the distribution by another person of the same clean fuel in excess of the minimum amount, or by the distribution of CNG or electricity to motor vehicles;

A requirement that the owner/lessors of gasoline retail outlets equip a minimum number of the outlets so that they are capable of dispensing clean fuels for which the distribution requirements apply, with an allowance for the "constructive allocation" of a clean fuel dispensing facility from one person to another for purposes of compliance; CNG would be included in these requirements upon appropriate findings of the California Public Utilities Commission (PUC);

Procedures for the Executive Officer to determine on an annual basis one year in advance the necessary number of outlets for each clean fuel after accounting for the fuel volumes supplied by fleet outlets and a minimum retail outlet throughput volume (25,000 gallons per month (gpm) for 1994-1997 and 50,000 gpm thereafter), and to allocate the required number of outlets among station owner/lessors based on a "minimum ownership level" which triggers the requirement for equipping outlets;

A requirement that the operator of any retail outlet required to be equipped to dispense a clean fuel have the fuel on hand and available for sale to the public;

A provision allowing a gasoline supplier to meet the distribution and retail outlet requirements for a particular clean fuel with a substitute fuel if the Board determines that the substitute fuel will not increase emissions in low-emission vehicles certified on the original clean fuel, and other vehicles capable of using the fuel, and will not adversely affect the durability of vehicle emission control systems;

Provisions making the distribution and retail outlet requirements for a given alternative clean fuel inapplicable until the Executive Officer

estimates that either 10,000 (1994-1996 in the SCAQMD only) or 20,000 (1997 and subsequent statewide) low-emission vehicles certified on the fuel will be operating in the state;

WHEREAS, the proposal would be effected by amendments to Title 13, California Code of Regulations, sections 1900, 1904, 1956.8, 1960.1, 1960.1.5, 1960.5, 1965, 2061, 2111, 2112, 2125, 2139, and the documents incorporated by reference therein, as set forth in Attachments A and C through G hereto; by the adoption of the "Non-Methane Organic Gas Test Procedures" and the "California Test Procedures for Evaluating the Emission Impacts of Substitute Fuels or New Clean Fuels", as set forth in Attachments H and I hereto; and the adoption of new Subchapter 8 of Chapter 3, Title 13, California Code of Regulations, sections 2300 through 2345, as set forth in Attachment B hereto;

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

WHEREAS, it is the Board's policy to evaluate the effects of control measures on global-warming compounds with the objective of not increasing the emissions of such compounds;

WHEREAS, the Board has considered the impact of the proposed regulations on the economy of the state;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with the provisions of Chapter 3.5 (commencing with Section 11340), Part 1, Division 3, Title 2 of the Government Code; and

WHEREAS, the Board finds that:

The state and national health-based ambient air quality standards for ozone, CO, and PM10 are regularly and significantly exceeded in many areas of California, most severely in the South Coast Air Basin;

Motor vehicles contribute more than half of the emissions in California of hydrocarbons and NOx, the precursors of ozone formation;

The emission reductions achievable by full implementation of all of the control measures committed to or proposed in the South Coast Plan are necessary to attain the national standards for ozone and PM10 and the national and state standard for carbon monoxide;

Even with the implementation of all such measures, the South Coast Plan does not identify emission reductions sufficient to result in attainment of the state standards for ozone, PM10, and visibility in the South Coast Air Basin;

Many areas outside the South Coast Air Basin are experiencing substantial population growth, and the vehicle miles traveled in these areas have risen dramatically and are expected to continue to rise;

In several areas outside the South Coast Air Basin, it is likely that the state ozone and PM10 standards will not be achieved until some time after 2000;

The emission reductions resulting from the regulations approved herein are a necessary component in the attainment and maintenance of the state ozone and PM10 standards within and outside the South Coast Air Basin;

A wide variety of toxic air contaminants and potentially toxic air contaminants are emitted by motor vehicles; the pollutants posing the majority of the potential toxic risk are benzene, 1,3-butadiene, formaldehyde, acetaldehyde, and diesel particulate; reductions in hydrocarbon emissions from motor vehicles also reduce emissions of the most significant vehicular toxic pollutants;

In order to achieve the maximum feasible reductions in emissions from new motor vehicles it is necessary and appropriate to treat the vehicle and its fuel as a system, to provide flexibility and to encourage the vehicle and fuel industries to work together to develop the least polluting and most cost-effective vehicle and fuel technologies;

In establishing long-range regulations to achieve maximum emission reductions from new motor vehicles, it is necessary and appropriate to recognize that the use of alternative clean fuels may reduce ozone-forming potential compared to conventional fuels; the proposed regulations do that by providing for the application of reactivity adjustment factors and numerically adjusting the mass hydrocarbon emission standards on the basis of relative ozone-forming potential;

Application of the reactivity adjustment procedure using Maximum Incremental Reactivity (MIR) in the proposed regulations is appropriate to help assure that the ozone-forming potential of various fuel/vehicle systems are properly compared; to the extent the MIR values are refined the Board can subsequently consider amending the values expressed in the regulations;

The establishment of exhaust emission standards for NMOG rather than nonmethane hydrocarbons is necessary and appropriate to assure that all significantly reactive organic gas emissions are measured regardless of the fuel used, so that the ozone-forming potential of hydrocarbon emissions from candidate vehicle/fuel systems can be fully evaluated;

Within the applicable timeframes, it is technologically feasible:

To meet the light-duty TLEV standards with small conventional vehicles with close-coupled catalysts and heated fuel preparation systems, or with flexible-fuel and dual-fuel vehicles with improved catalysts;

To meet the light-duty LEV standards with gasoline vehicles with electrically heated catalysts, alcohol vehicles with close-coupled catalysts and heated fuel preparation systems, and CNG or liquified petroleum gas (LPG) vehicles with close-coupled catalysts and electronic port fuel injection systems;

To meet the light-duty ULEV standards with vehicles equipped with electrically heated catalysts and heated fuel preparation systems and powered by the expected cleaner "Phase 2" certification gasoline or by alcohol, with CNG/LPG vehicles with close-coupled/electrically heated catalysts and electronic port fuel injection, and with hybrid electric vehicles;

To meet the light-duty ZEV with battery-powered electric vehicles; in addition, future technologies may prove promising;

Given the finding above, the light-duty emission standard phase-in schedule reflected in the proposed fleet average NMOG exhaust emission standards is technologically feasible;

The proposed regulations appropriately establish intermediate in-use standards which are up to 30 percent less stringent than the corresponding certification standards; these intermediate in-use standards will provide additional time to verify the in-use durability of emission control systems;

It is appropriate to have the proposed two-tiered standards for flexible-fuel and dual-fuel vehicles capable of operating on both gasoline and an alternative fuel; because of the limited availability of alternative fuels to motorists on the national level, it is likely in the short term that most alcohol-fueled vehicles will also be capable of operating on gasoline; requiring such vehicles to meet the same NMOG standard when operating on both gasoline and an alternative fuel would force the manufacturer to optimize the vehicle emission control system for gasoline and could lessen the value of introducing alternative fuel vehicles;

The proposed mandatory percentages of ZEVs in the 1998 and subsequent model years are necessary and appropriate in order to assure the development and widespread deployment of the cleanest possible technologies since it is unlikely that the state and federal ozone standards can be achieved in the South Coast Air Basin without substantial penetration of ZEVs; the provisions exempting small-volume manufacturers from the mandatory percentages and delaying their application to intermediate-volume manufacturers are necessary and appropriate because of the proportionately greater economic impact the mandatory percentages would have on such manufacturers;

The standards and implementation schedule for medium-duty vehicles are technologically feasible because the standards are of equivalent stringency to the light-duty standards considering differences in size and weight, and additional lead time is afforded compared to the light-duty standards;

The regulatory device of the fleet average NMOG standards, and the program for earning, banking, and trading marketable credits for introducing low-emission vehicles earlier or in greater quantities than required, will afford greater flexibility to manufacturers and help ease compliance with the standards;

It is appropriate to require the demonstration of the effectiveness of vehicle emission control systems at temperatures below 68 to 86 degrees F to ensure greater control of emissions at morning temperatures in the summer, when ambient ozone levels are highest, and during the winter months when exceedances of ambient CO standards are most likely to occur;

The clean fuel elements of the proposed regulations will ensure that the fuels used to certify low-emission vehicles are also readily available for routine consumer operation of those vehicles; to the extent that alternative clean fuels are used to certify low-emission vehicles, emission reductions will be achieved in customer use only if clean fuels are readily available and used by the vehicle owners;

It is appropriate to start the clean fuels requirements in 1994-1996 in the SCAQMD only, because that area has the most severe air quality problems in the state, and because the 1994-1996 program will provide an orderly transition to the statewide program starting in 1997;

It is appropriate for the 1994-1996 SCAQMD clean fuel requirements to apply only to major gasoline suppliers who have a California refinery with a capacity over 55,000 barrels per day, and who own or lease 25 or more retail stations in the SCAQMD, because such suppliers have both the direct control over retail outlets and the financial and physical resources needed to introduce clean fuels efficiently and economically; applying the requirements to smaller suppliers in the first three years would have a disproportionate economic impact on them;

It is premature to adopt at this time the regulatory provisions proposed by staff requiring gasoline suppliers to distribute assigned minimum volumes of alternative clean fuels because of present uncertainties regarding the need for the provisions; however, the staff should continue to investigate possible regulatory means to assure that clean fuels are distributed in a manner which achieves the maximum air quality benefits from low-emission vehicles certified while operating on alternative clean fuels;

The requirements in the proposed regulations relating to equipping retail outlets for the distribution of clean fuels is necessary to assure that convenient outlets for such fuels are available;

In order to assure that adequate volumes of alternative clean fuels are marketed attractively in the absence of the clean fuel distribution requirements deleted from the regulations approved herein, it is necessary to strengthen the requirements for equipping retail outlets for the distribution of clean fuels, and to require that gasoline suppliers demonstrate a capability to supply or assure the supply of

adequate quantities of alternative clean fuels other than CNG and electricity;

Upon a determination by the PUC that a practical mechanism exists under which a gasoline retailer may purchase CNG from a public utility and resell it for use as a fuel in motor vehicles, it is appropriate to include CNG in the retail outlet requirements because such requirements are necessary to assure that CNG is available and convenient to motorists;

In light of the various elements which mitigate potential hardships in complying with the requirements for equipping retail outlets for the distribution of clean fuels, including (i) the mechanism under which the requirements are not triggered until a minimum number of clean fuel vehicles are introduced, (ii) the mechanism under which fuel distributed by fleet operators is excluded from the calculation of the minimum number of clean fuel outlets, and (iii) the provisions allowing the "constructive allocation" of a clean fuel dispensing system from one person to another, compliance with the retail outlet requirements of the regulations approved herein appears to be practicable and feasible without undue economic hardship;

The requirement that operators of retail outlets have clean fuel on hand and offer it for sale to the public at any outlet required to be equipped to dispense the clean fuel is necessary and appropriate to ensure that the clean fuel is continually available to motorists with cars designed to operate on the fuel;

It is necessary and appropriate to impose the various clean fuel requirements in the regulations approved herein as conditions on the sale of gasoline by gasoline suppliers and retailers because the requirements help mitigate the air pollution burdens created by the sale of gasoline by the persons to be regulated; the gasoline being sold results in greater pollution than comparable clean fuels which would be distributed under the regulations, and the gasoline suppliers have cumulatively contributed to the development of a motor vehicle fuel distribution network in which gasoline and diesel fuel are the only fuels widely and conveniently available to the motoring public thereby deterring the introduction of alternative fuel vehicles; the proposed regulations will therefore substantially advance legitimate governmental interests;

The clean fuels elements of the regulations approved herein are consistent with the intent of the recommendations of the AB 234 California Advisory Board on Air Quality and Fuels because the proposal establishes emission-based performance standards which reflect the differing ozone-forming potentials of different fuels and allow various fuels to compete in the marketplace as clean fuels;

The regulations approved herein are expected to reduce statewide emissions from on-road mobile sources by about 29 tons per day of NMOG and 36 tons per day of NOx in 2000, and by about 185 tons per day of NMOG and 248 tons per day on NOx by 2010; these year 2010 emissions

reductions represent 28 percent of on-road vehicular NMOG emissions and 18 percent of on-road vehicular NOx;

The reductions in emissions of NMOG from light- and medium-duty vehicles resulting from the regulations approved herein are expected to also result in substantial reductions in benzene, 1,3-butadiene, formaldehyde, acetaldehyde, and diesel particulate, with an expected annual reduction of 20 to 40 potential cancer cases statewide by 2010;

Despite the relatively modest emission benefits from the regulations approved herein during the early years of implementation, it is necessary and appropriate to institute the program within the specified timeframe in order to encourage the early introduction of an infrastructure for the distribution of clean fuels; the gradual phase-in periods provide additional flexibility to the oil industry in implementing the clean fuel elements;

The overall cost-effectiveness of the regulations approved herein in reducing the emissions of ozone precursors in 2010, assigning one-half of the program costs to reductions of criteria air pollutants and one-half to reductions of toxic air contaminants, could range from \$0.02 per pound to \$4.90 per pound, with most likely scenarios having a range of \$0.50 per pound to \$3.30 per pound; these cost-effectiveness values are within the range of other measures that may be reasonably necessary to attain the state ambient standards pursuant to Health and Safety Code section 43018;

The overall cost-effectiveness of the regulations approved herein in reducing emissions of toxic pollutants in 2010, assigning one-half of the program costs to reductions of criteria air pollutants and one-half to reductions of toxic air contaminants, are \$0.1 million to \$78 million per potential cancer case avoided, with most likely scenarios having a range of \$4 million to \$53 million per case avoided;

The economic impacts of the regulations approved herein are warranted in light of the public health benefits associated with the regulations;

The modifications to the regulations described in Attachment J hereto by staff at the hearing are appropriate and necessary to clarify them and improve their effectiveness; and

WHEREAS, the Board also finds that:

Implementation of the proposed standards will result in significant reductions in emissions of ozone precursors, NMOG and NOx, and ozone concentrations as well as reduction in emissions of CO and certain motor vehicle toxics, including benzene, 1,3-butadiene, acetaldehyde and diesel particulates;

The production and use of low-emission vehicles and clean fuels is not expected to result in any increase in emissions which would contribute to global warming, and use of clean fuels may result in a decrease in greenhouse gases depending on the method of fuel production;

An increase in the use of methanol-fueled vehicles may have the following potential adverse effects: (1) short-term intermittent exposures to methanol, which has recognized acute health effects, and formaldehyde, a known animal carcinogen which is currently under review for identification by the Board as a toxic air contaminant; (2) an increase in the incidence of inadvertent ingestion of methanol, which due to its systemic toxicity may cause blindness and death if ingested, from fuel-siphoning, (3) methanol diffuses through ground water faster than gasoline and, if spilled, could contaminate surface or ground water supplies; (4) pure methanol burns with an invisible flame, making fire detection difficult;

Methanol has not been identified as a carcinogen or a reproductive toxin and it appears that inhalation of methanol is less of a health threat than inhalation of gasoline vapors;

Formaldehyde emissions are expected to remain within the range of formaldehyde emissions from vehicles using petroleum-based fuels because of the separate formaldehyde emission standards which were adopted on January 22, 1990;

Accidental ingestion of methanol will be prevented or minimized because the methanol vehicle regulations require vehicle manufacturers to design the fuel tank fill pipe assembly to discourage siphoning where feasible;

Aquatic life generally recovers faster from exposure to methanol than oil; also methanol is detectable in water and can be cleaned up although the best clean-up methods are not known at this time;

The Board is currently investigating additives that can be used to give flame luminosity for pure methanol, which has a lower flame temperature than gasoline; methanol containing 15 percent gasoline (M85) has adequate flame luminosity;

In general ethanol is less toxic than methanol and does not appear to pose significant environmental and safety risks, especially in comparison to gasoline or diesel fuel;

LPG is non-toxic, insoluble in water, and odorized for leak detection, and will be produced for vehicle use from currently operating gas fields;

LPG may pose a significant fire or explosion hazard in transport and use; however, this fuel is currently in use as a vehicle fuel in the United States without apparent problems;

CNG is non-toxic, insoluble in water and odorized for leak detection, and is distributed by pipeline, minimizing the danger of release in bulk during transport;

There is a potential for accidents during fueling of CNG vehicles or explosions in severe auto accidents; however, natural gas is less

flammable than gasoline and has not resulted in problems more severe than those associated with gasoline in use;

Electric vehicles produce virtually no emissions, and emissions from the production of electricity to fuel electric vehicles may be significantly less than emissions from the production of gasoline to fuel comparable vehicles, depending on the fuel source;

Improper handling of spent lead-acid batteries from electric vehicles could lead to contamination of water by hazardous metals;

State and federal regulations characterize lead acid batteries as hazardous waste and regulate their disposal to protect public health and the environment; therefore, it is expected that batteries used in electric vehicles will be integrated into the strong recycling mechanism currently in place for batteries used in motor vehicles;

Increased use of electric vehicles may result in increased demand for electricity generation; however, production of electricity can be done with less environmental effects than production of petroleum fuels, also the increased demand is not expected to require expansion of production sources because the increase will typically occur at night when existing generating sources are not operated at peak capacity;

There are no feasible mitigation measures or alternatives available to the Board which would substantially reduce the potential adverse impacts of the proposed standards while at the same time providing the substantial overall public health benefit from the reductions noted herein.

NOW, THEREFORE, BE IT RESOLVED that the Board hereby approves the amendments to Title 13, California Code of Regulations, sections 1900, 1904, 1956.8, 1960.1, 1960.1.5, 1960.5, 1965, 2061, 2111, 2112, 2125, 2139, and the documents incorporated by reference therein, as set forth in Attachments A and C through G hereto, approves the adoption of the "Non-Methane Organic Gas Test Procedures" and the "California Test Procedures for Evaluating the Emission Impacts of Substitute Fuels or New Clean Fuels" as set forth in Attachments H and I hereto, and approves the adoption of new Subchapter 8 of Chapter 3, Title 13, California Code of Regulations, sections 2300 through 2345, as set forth in Attachment B hereto, with the modifications to the above regulations and incorporated documents described in Attachment J hereto, and with additional modifications to the clean fuel regulations in Title 13, California Code of Regulations, sections 2300 through 2345 to: (1) delete the provisions requiring gasoline suppliers to distribute minimum assigned volumes of alternative clean fuels; (2) significantly expand the number of retail outlets required to be equipped to dispense alternative clean fuels; (3) include a mechanism that assures that owner/lessors and/or operators of retail outlets required to be equipped to dispense clean fuels: (a) locate clean fuel dispensers conveniently, mark them conspicuously, and maintain them in good working order, (b) provide a training program for attendants on operation of the dispensers and appropriate customer assistance, and (c) assure the posting of the retail prices of clean fuels in a manner that identifies the cost on an energy equivalent basis to a

gallon of gasoline; (4) require that gasoline suppliers demonstrate a capability to supply or assure the supply of adequate quantities of alternative clean fuels other than CNG and electricity; and (5) revise the definition of major gasoline supplier so that it covers persons with a California refinery crude oil capacity of 55,000 rather than 50,000 barrels per stream day.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer: (1) to incorporate into the approved regulations and incorporated documents the modifications described in Attachment J hereto, the other modifications approved herein, and such other conforming modifications as may be appropriate; (2) to conduct an informal workshop on the modified language if warranted; and (3) either to adopt the modified regulations, amendments, and new documents after making them available to the public for a supplemental written comment period of 15 days, with such additional modifications as may be appropriate in light of supplemental comments received, or to present the regulations, amendments, and documents to the Board for further consideration if he determines that this is warranted in light of supplemental written comments received.

BE IT FURTHER RESOLVED, that the Executive Officer is directed to report to the Board by the Spring of 1992, and thereafter at least biennially, on the status of implementation of the program approved herein, identifying any significant problems and proposing any appropriate regulatory modifications; the regulated public and other interested parties shall be consulted in the preparation of such reports and the public shall be provided an opportunity to make oral and written comments to the Board in conjunction with the reports.

BE IT FURTHER RESOLVED, that the Executive Officer is directed to monitor on an ongoing basis the pricing practices of wholesalers and retailers of motor vehicle fuel to determine how alternative clean fuels are being priced in comparison to gasoline, and to report the findings to the Board periodically.

BE IT FURTHER RESOLVED, that the Executive Officer is directed to continue to evaluate regulatory mechanisms for assuring that clean fuels are distributed in a manner which achieves the maximum air quality benefits from low-emission vehicles certified while operating on alternative clean fuels, and to report back to the Board on suggested approaches to achieve this objective.

BE IT FURTHER RESOLVED, that the Board hereby determines that the regulations pertaining to motor vehicle emissions approved herein, in conjunction with the rest of the California motor vehicle emissions regulations, will in the aggregate be at least as protective of public health and welfare than applicable federal standards, that such regulations are necessary to meet compelling and extraordinary conditions in California, and that such regulations are not inconsistent with section 202(a) of the federal Clean Air Act.

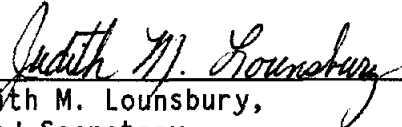
BE IT FURTHER RESOLVED, that the Executive Officer shall forward the amended motor vehicle exhaust regulations to the Administrator of the Environmental

Protection Agency with a request for a waiver of preemption pursuant to section 209(b)(1) of the federal Clean Air Act.

BE IT FURTHER RESOLVED, that where an air pollution control district or air quality management district (district) prepares a plan pursuant to Health and Safety Code sections 40910-40926 (district plan) which demonstrates attainment of the state ambient air quality standards by January 1, 1997 and demonstrates continued maintenance of the standards thereafter, where the district plan includes a request that Title 13, California Code of Regulations, sections 2300-2345 as approved herein not apply in the district, and where the Board has approved the plan including such provisions, it is the intent of the Board to amend at such time sections 2300-2345 as appropriate to make them inapplicable within the district.

BE IT FURTHER RESOLVED, that where a district other than the SCAQMD prepares a district plan which demonstrates that expansion of the 1994-1996 clean fuels provisions to include the district is reasonably necessary for timely attainment of the state ambient air quality standards within the district, and where the plan includes a request that the 1994-1996 clean fuels provisions in Title 13, California Code of Regulations, sections 2300-2345 as approved herein apply within the district, and where the Board has approved the plan including such provisions on or before December 31, 1992, it is the intent of the Board to amend at such time sections 2300-2345 as appropriate to make the 1994-1996 elements applicable within the district.

I hereby certify that the above is a true and correct copy of Resolution 90-58, as adopted by the Air Resources Board.



Judith M. Lounsbury,
Board Secretary

Resolution 90-58

September 28, 1990

Identification of Attachments to Resolution

Resolution 90-58 references 10 documents, Attachments A through J. All of the Attachments are identified below. The first 9 documents, Attachments A through I, appear either in the Staff Report or in the Technical Support Document. Therefore they are not separately appended herein. Attachment J, which was presented at the Board hearing, is appended.

Attachment A: Amendments to Title 13, California Code of Regulations, sections 1900, 1904, 1956.8, 1960.1, 1960.1.5, 1960.5, 1965, 2061, 2111, 2112, 2125, and 2139, as set forth in Appendix A of the Staff Report.

Attachment B: Title 13, California Code of Regulations, sections 2300 through 2345, as set forth in Appendix B of the Staff Report.

Attachment C: California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, as set forth in Appendix E-1 of the Technical Support Document.

Attachment D: California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles, as set forth in Appendix E-2 of the Technical Support Document.

Attachment E: California Exhaust Emission Standards and Test Procedures for 1987 and Subsequent Model Otto-Cycle Heavy-Duty Diesel Engines and Vehicles, as set forth in Appendix E-3 of the Technical Support Document.

Attachment F: California Motor Vehicle Emission Control Label Specifications, as set forth in Appendix E-5 of the Technical Support Document.

Attachment G: Guidelines for Certification of 1983 and Subsequent Model-Year Federally Certified Light-Duty Motor Vehicles for Sale in California, as set forth in Appendix E-6 of the Technical Support Document.

Attachment H: Non-Methane Organic Gas Test Procedures, as set forth in Appendix E-4 of the Technical Support Document.

Attachment I: California Test Procedures for Evaluating the Emission Impacts of Substitute Fuels or New Clean Fuels, as set forth in Appendix C of the Staff Report.

Attachment J: Staff's Suggested Changes to the Proposed Low-Emission Vehicles and Clean Fuels Regulations (8 pages; distributed at the hearing on September 28, 1990).

FOR CONSIDERATION BY THE AIR RESOURCES BOARD
AT THE PUBLIC HEARING ON
THE PROPOSED REGULATIONS FOR LOW-EMISSION VEHICLES AND CLEAN FUELS

SEPTEMBER 27 AND 28, 1990

Staff's Suggested Changes to the Proposed
Low-Emission Vehicles and Clean Fuels Regulations

The Proposed Regulations for Low-Emission Vehicles and Clean Fuels Staff Report, Technical Support Document, and Public Comments Document were released by the Air Resources Board staff ("staff") on August 13, 1990. Based on numerous public comments received on these documents and the regulations contained therein, the staff is suggesting the following modifications to the proposed low-emission vehicles and clean fuels regulations for consideration by the Air Resources Board ("Board") at this hearing.

I. Low-Emission Vehicles Regulations

1. Balancing Emission Average Shortfalls

Section affected: Title 13, Section 1960.1

The period for making-up deficits in manufacturer's fleet average emissions would be revised from one to three years to provide added flexibility in the early years of the program. The period of balancing deficits would revert again to one year after the 1998 model year when the program is well underway, and more options for compliance would be available to manufacturers.

2. Certification Fuel Specifications

(a). In order to align certification fuel requirements for low-emission vehicles with evaporative emission standards recently adopted by the Board, the use of a certification gasoline based on the specifications of Phase II gasoline will be specified for certification of 1995 and later low-emission vehicles.

(b). The Reid Vapor Pressure of the certification gasoline would be lowered to 7.8 psi for certifying 1992 model year vehicles.

(c). The specifications of the certification diesel would be revised to more closely match the new commercial diesel fuel specifications adopted by the Board in 1989.

3. Small Volume Manufacturers

The regulation would require small volume manufacturers which sell fewer than 3000 vehicles per year to comply with fleet average standards in the year 2000. The criteria on which the small volume requirements would apply would be revised to be based on the average annual vehicle sales of the manufacturer during the 1989 through 1991 model years.

4. In-Use Compliance Requirements

Sections affected: Title 13, Section 1960.1

The in-use compliance requirements of the proposed regulation would be revised to be consistent with current and recently adopted regulations. In-use compliance testing would be limited to passenger cars and light-duty trucks with fewer than 75,000 miles and to medium-duty vehicles with fewer than 90,000 miles.

5. Other Revisions

There are also a number of less substantive revisions to the vehicle regulation:

(a). The non-methane organic gas definition would be revised to incorporate the organic gases emitted by diesel-fueled vehicles which have greater than twelve carbon atoms.

(b). The non-methane hydrocarbon test procedure would be replaced with the more recent procedure adopted in 1989.

(c). The test procedure for determining mid-range hydrocarbons, SOP MLD No. 103A, would be replaced with an updated version.

II. Clean Fuels Regulation

1. Determining the Number of Retail Gasoline Outlets Required to be Equipped to Dispense Each Clean Fuel

(a). A new subsection would be inserted into the proposed regulation to require the Executive Officer to reduce the total number of retail

gasoline outlets that must be equipped to dispense compressed natural gas (CNG) to account for the CNG already provided at retail by independent suppliers of clean fuel. The outlets provided voluntarily by these independent suppliers would satisfy part of the demand for CNG and reduce the number of retail gasoline outlets that would need to be equipped for CNG. The Executive Officer would have to determine the number of such independent CNG outlets, at least 12 months before the beginning of the year for which the determination is being made.

For the Executive Officer to count an independent supplier's retail CNG outlet against the statewide need for such outlets, the CNG outlet must meet the following criteria:

- (1) be owned or leased by an independent supplier of clean fuel;
- (2) meet the design criteria established in the proposed regulation (sections 2330 and 2332);
- (3) for outlets in the South Coast AQMD, the outlet would have to have been installed by December 1, 1992;
- (4) for outlets outside the South Coast AQMD, the outlet would have to have been installed by December 1, 1995; and
- (5) be in operation at least 13 months prior to the beginning of the year in which the outlet would be counted.

Such outlets could not be constructively allocated to an owner/lessor of a retail gasoline outlet.

Sections affected: 2334(b)(1), 2334(b)(2), 2334(b)(3) [all new], and 2334(c)

(b). A new section would be added to the proposed regulation to allow up to 6 months relief from the retail outlet and availability requirements due to unforeseen and reasonably unavoidable shutdown of CNG equipment, if certain criteria are met.

(c). The proposed regulation contains a method for calculating the total statewide number of new retail gasoline outlets required to be equipped to dispense a designated clean fuel in a particular year. The method requires that the number of new outlets for the year be determined by subtracting the total annual incremental number of retail outlets for the previous year from the total required number of retail outlets for the new year. The phrase "total annual incremental number" would be replaced by

"total required retail outlets" to use consistent terminology. The effect is the same--the number of new outlets needed equals the difference between the previous year's cumulative total and the new year's cumulative total.

Section affected 2334(c)

(d). The equation for determining the number of required retail gasoline outlets that must be equipped to dispense a clean fuel involves the use of several clean fuel volume inputs. A provision would be added to clarify that all clean fuel volumes would be expressed as gasoline equivalent gallons. A gasoline equivalent gallon is the amount of a non-gasoline fuel needed to equal the amount of energy in one gallon of gasoline. Units of non-gasoline fuels would be adjusted according to the "Volumetric Energy Conversion Factors" shown in the proposed regulation (renumbered section 2343).

Section affected 2334(a)

2. Substitute Clean Fuels

(a). The proposed regulation requires a proponent of a substitute fuel to make several demonstrations to the Board to qualify the fuel as a substitute for the primary clean fuel. The proponent is required to demonstrate that emissions of four toxic compounds (benzene, 1,3-butadiene, formaldehyde, and acetaldehyde) from vehicles fueled with the substitute fuel are no greater than from vehicles fueled with the primary clean fuel. This provision would be deleted and replaced with the requirement that the toxic potency-weighted emissions of the four toxic compounds from vehicles fueled with the substitute fuel is in the aggregate no greater than the aggregated toxic-weighted emissions of the four compounds from the same vehicles fueled with the primary clean fuel.

For a substitute fuel that could be used in any vehicles other than those low-emission vehicles certified on the primary clean fuel, a similar change would be made. For emissions of the same four toxic compounds, the proponent would be required to demonstrate no increase in the aggregate toxic-potency-weighted emissions from vehicles operating on the substitute fuel as compared with the same vehicles operating on their customary fuel.

Sections affected: 2345(a)(1), 2345(a)(2), and 2345(a)(3)

(b). The proposed regulation does not allow a substitute fuel to be used to satisfy the distribution and retail availability requirements for the primary clean fuel until the beginning of the next quarter after the effective date of the Board's designation of the substitute fuel by regulation. This provision would be changed to allow the substitute fuel to be used immediately after the effective date of the action.

Sections affected: 2345(c) and 2345(c)(2)

(c). Under the proposed regulation, a substitute clean fuel that can be used in vehicles other than those certified on the original (or "primary") clean fuel must be distributed in volumes greater than that required for the primary clean fuel. This is to assure that the equivalent of the minimum assigned volume for the primary fuel is ultimately dispensed into low-emission vehicles certified on that fuel. We propose a modification to allow gasoline suppliers an alternative to providing greater volumes of the substitute fuel. The gasoline supplier could choose to submit a marketing plan demonstrating that the distribution of a specified volume of the substitute fuel (at least as much on an energy equivalent basis as the required volume for the primary fuel) will result in the dispensing of sufficient quantities to vehicles certified on the original clean fuel. If the Executive Officer approves the plan, the gasoline supplier could comply by following the marketing plan and distributing the specified volume of the substitute clean fuel in the quarter.

Section affected: 2345(c)(2)

NOTE: The Test Procedure for Evaluating the Emission Impacts of Substitute Fuels or New Clean Fuels (as presented in the Proposed Regulations for Low-Emission Vehicles and Clean Fuels Technical Support Document, Appendix B-3) would also be revised to correspond with these suggested revisions to the substitute clean fuel provisions.

3. Compressed Natural Gas (CNG) Credits

The proposed regulation reflects the staff's previous intent to allow only utilities to generate credits for providing the CNG used in vehicles. Under this provision, a utility could generate credits by providing CNG to a retail outlet; the retail outlet owner/lessor who installed the CNG dispensing equipment and actually delivered the CNG to vehicles would not be able to generate credits. This provision would be changed to allow the owner/lessor of a CNG outlet that distributes CNG directly to vehicles to claim the credits that could then be used to satisfy other requirements, banked for future use, or sold.

Section affected: 2311(b)

4. Notification to Gasoline Suppliers and Affected Retail Gasoline Outlet Owners/Lessors

The proposed regulation requires the Executive Officer to notify gasoline suppliers of the minimum assigned volumes of each clean fuel they must distribute. The Executive Officer must also notify major gasoline suppliers (in the South Coast AQMD in 1994 through 1996) and owners/lessors of retail gasoline outlets (statewide from 1997 on) of the minimum number of retail gasoline outlets that each must equip to dispense each clean fuel in

the year. These provisions would be expanded to include in each notice a summary of how the values shown in the notice were derived. The notice of the minimum number of retail gasoline outlets required to be equipped to dispense a clean fuel would also include the basis for the estimate of how many low-emission vehicles will be certified on the clean fuel.

Sections affected: 2303(c)(1), 2303(c)(2), 2335(c), and 2337(d)

5. Minimum Fill Rate for Gaseous Clean Fuels at Retail Gasoline Outlets

The proposed regulation requires that retail gasoline outlets equipped to dispense designated clean fuels in gaseous form be able to provide a minimum of 4 hours of high volume operation with an average fill rate of at least 600 standard cubic feet per minute (scfm). This provision was not intended to require a 600 scfm compressor for each gaseous clean fuel, but rather a 600 scfm fill rate. To clarify this intent, the phrase "an average fill rate of at least 600 scfm" would be deleted and replaced with "per day". By requiring 4 hours of high volume operation per day, the staff's intent is that the gaseous fuel dispensing equipment be designed such that a low-emission vehicle may be filled as quickly with the gaseous fuel as with gasoline.

Sections affected: 2330 and 2332

6. De Minimus Levels of Low-Emission Vehicles Certified on a Clean Fuel

The proposed regulation provides that both the clean fuel distribution and retail availability requirements apply for a particular year only if the Executive Officer estimates that the number of low-emission vehicles certified on the clean fuel and operated in the state at any time in the year will exceed the de minimus levels of 10,000 for 1994 through 1996 (intended to include only vehicles operated in the South Coast AQMD) and 20,000 for 1997 on. This provision would be changed to eliminate the two tier approach to de minimus levels; the level would now be 20,000 low-emission vehicles statewide certified on the clean fuel in any year from 1994 on. Instead of estimating the total number of low-emission vehicles that would be certified on the clean fuel at any time in the year, the Executive Officer would estimate the number of vehicles expected to be operation as of September 30 of the year.

Sections affected: 2303(c)(3), 2335(d), and 2337(e)

7. Vehicle Conversion Credit

The definition of "vehicle conversion" would be clarified to allow only those vehicles not certified to a low-emission standard to be eligible for conversion. To qualify for vehicle conversion credit, a gasoline or diesel

fueled vehicle would still have to be modified to be capable of meeting low-emission vehicle exhaust standards using a designated clean fuel or compressed natural gas.

Section affected: 2300(26)

8. Determining Each Gasoline Supplier's Market Share Factor

The proposed regulation states that the market share factor for each gasoline supplier shall be used to calculate the volume of each clean fuel that the gasoline supplier must distribute each quarter. The Executive Officer must determine the market share factor based on the volume of gasoline distributed for use in motor vehicles by both the individual gasoline supplier and all of the gasoline suppliers in the state. The date by which the Executive Officer must determine each gasoline supplier's market share factor for each year would be changed from November 1 of previous year to September 1 of the previous year.

Sections affected: 2303(b)(1) and 2303(b)(2)

9. Determining the Volume of Each Clean Fuel to be Distributed by Each Supplier

The proposed regulation details the method by which the Executive Officer would determine the minimum assigned volume of a clean fuel that each gasoline supplier would be required to distribute in a quarter. That method is based on multiplying the total statewide demand volume for the clean fuel by the gasoline supplier's market share factor. The proposed regulation uses the total demand volume, but the staff's intent was to use the total required volume (a fraction of the demand volume). The method would be changed to reflect the total statewide required volume of the designated clean fuel as the basis for the calculation, rather than the total demand volume. This change would make the regulation consistent with the staff's original intent.

Sections affected: 2303(c)(1) and 2303(c)(2)

10. Miscellaneous, Nonsubstantial Changes

Other nonsubstantial changes would also be made to improve clarity or correct errors. These changes would include:

- additional citations of relevant state law;
- for gaseous fuels, most references to gallons and standard cubic feet would be changed to therms;
- revisions of terminology and references to other sections to assure internal consistency;