State of California
AIR RESOURCES BOARD

Resolution 96-12

March 28, 1996

Agenda Item No.: 96-2-2

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

WHEREAS, 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;

WHEREAS, Health and Safety Code section 43013 authorizes the Board to adopt and implement motor vehicle emission standards and in-use performance standards for the control of air contaminants which the Board has found to be necessary, cost-effective, and technologically feasible to carry out the purposes of division 26 of the Health and Safety Code;

WHEREAS, Health and Safety Code section 43018(a) 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 at the earliest practicable date, while section 43018(b) specifically directed 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, specified reductions in the emissions of reactive organic gases, oxides of nitrogen, particulates, carbon monoxide, and toxic air contaminants from vehicular sources;

WHEREAS, Health and Safety Code section 43018(c) provides that in carrying out the directive of section 43018, the Board shall adopt standards and regulations which will result in the most cost-effective combination of control measures including but not limited to reductions in motor vehicle exhaust and evaporative emissions and reductions in in-use vehicular emissions through durability and performance improvements;

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, the State Implementation Plan (SIP), which was adopted by the Board in November 1994 and which establishes the state strategy for attaining the national ambient air quality standard

for ozone in all areas of the state by 2010 as required by federal law, includes, as part of the mobile source element developed by the ARB, the California Low-Emission Vehicle (LEV) program, which was approved by the Board in 1990 to provide significant reductions of ozone precursor pollutant, *i.e.*, oxides of nitrogen (NOx) and nonmethane organic gases (NMOG), emissions from passenger cars and light-duty trucks;

WHEREAS, the California LEV program includes a provision that will require major auto manufacturers to introduce zero-emission vehicles (ZEVs), beginning in model year 1998, in quantities equal to two percent of the new vehicle fleet produced and delivered for sale in California, increasing to five percent in model year 2001 and ten percent in 2003 and beyond;

WHEREAS, in Resolution 90-58 approving adoption of the regulations creating the California LEV program, the Board directed the staff to consult with the regulated public and other interested parties and to prepare a report regarding the status of the implementation of the LEV program including the ZEV requirement for submission to the Board by the Spring of 1992 and at least biennially thereafter;

WHEREAS, in 1995, the Air Resources Board staff (staff) held a series of public forums to solicit information on issues related to zero-emission vehicles covering such topics as hybrid-electric vehicles, consumer marketability, infrastructure, fleet issues, technology review, and benefits and costs;

WHEREAS, in 1995 the Board commissioned a study by a panel of four experts, Dr. Fritz Kalhammer of the Electric Power Research Institute, Dr. Carl Moyer of Acurex Environmental Corporation, Dr. Akiya Kozawa, a retired Research Fellow from Union Carbide, and Dr. Boone Owens of Research International in North Carolina, who spent much of August and September traveling through the United States, Europe and Japan meeting with vehicle and battery manufacturers to assess the status of the development of battery technology for electric vehicle applications;

WHEREAS, at an October 26, 1995 public meeting, the staff presented an informational update to the Board summarizing the major findings of the series of public forums held to that date and the draft findings of the Battery Technology Advisory Panel (Battery Panel);

WHEREAS, at a November 16, 1995 public meeting, the staff summarized for the Board information gathered at the Benefits and Cost forum held on November 8, 1995 and the Board directed the staff to conduct another public forum to discuss the proposals received for modifying the ZEV requirement and to solicit additional proposals;

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WHEREAS, on December 6, 1995, the staff held a public forum to discuss the direction the ZEV program should assume in the future focusing on three main concepts representing different perspectives regarding the ZEV requirement;

WHEREAS, on December 11, 1995, the Battery Panel issued a final report entitled "Performance and Availability of Batteries for Electric Vehicles: A Report of the Battery Technical Advisory Panel" with seven key findings as follows:

> "Improved lead acid batteries will be available for electric vehicles in 1998 as will nickel-cadmium batteries designed for EV applications, ... major automakers believe that limited range will restrict these vehicles to a market share less than the objectives of the current regulations;"
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> "From major development efforts undertaken in Europe, Japan, and the United States in recent years, several types of high-energy/high-power batteries are emerging with the promise to satisfy USABC mid-term goals and give electric vehicles greatly increased range, acceleration and top speed;"
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> "Prototypes of these advanced batteries have been evaluated in the laboratory, on test stands and, in most cases, in vehicles [and] [t]heir performance has been good enough for battery developers to begin investing in pilot-scale cell, module and battery fabrication facilities, and for car makers to become involved in the evaluation of these batteries;"
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> "The key steps required in the next few years are pilot-scale production of advanced batteries in numbers sufficient to prove out production processes in terms of product quality and process economics, and to permit the evaluation of the performance, reliability, safety, and life of these batteries as mechanically and electrically integral components of electric vehicles under representative driving conditions;"
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> "Decisions to build commercial-scale battery production plants with typical capacities of 10,000 to 40,000 battery packs per year will be made by battery manufacturers only after commitments are received from car manufactures to buy batteries on that scale [and] [f]rom the time of mutual decision, typically 2 years will be required to construct the plant and achieve volume production of batteries [while] [a]dditional time (up to 2 years) may be required to achieve fully mature production processes and costs;"
>
> "In a complete success scenario -- no technical or decision delays in any of the pilot plant, fleet testing, production planning and production implementation phases by either battery or car manufacturer -- electric vehicles with commercial-production advanced batteries could become available in 2000 or 2001;" and

> "Developers of advanced batteries are unanimous in their view that the California ZEV regulation has substantially accelerated investment and progress in developing advanced batteries for electric vehicles [and] [i]n view of the high costs of the pilot production and fleet testing phase ahead, most developers stress the importance of an orderly, stable program of fostering the introduction of EVs with advanced batteries;"

WHEREAS, promising zero-emitting technologies other than battery-powered electic vehicles are rapidly developing, in particular, fuel cell technology -- with its inherent high efficiency, high power density and zero-emission potential -- has advanced significantly over the past decade, is currently in use in several successful demonstration bus programs, and development of a fuel cell-powered light-duty vehicle that would provide the same performance and range as its gasoline-powered counterpart is nearing completion;

WHEREAS, at a public meeting held December 14, 1995 and continued to December 21, 1995, the staff presented to the Board the three main concepts that had emerged for modifying the existing ZEV program with a recommendation to suspend the ZEV requirements for the 1998 through 2002 model years and to create a technology development partnership to foster continued ZEV-related research and development consistent with the findings of the Battery Panel;

WHEREAS, at the December 21, 1995 public meeting the Board directed the staff to begin the regulatory process to modify the ZEV program consistent with the staff recommendation;

WHEREAS, staff has proposed amendments to title 13, California Code of Regulations, section 1900, section 1960.1 and the incorporated standards and test procedures, and section 1976 that eliminate the ZEV requirement for model years 1998 through 2002 and establish a system to provide multiple credits for early production of ZEVs that provides more credits for vehicles that have greater range or use advanced batteries;

WHEREAS, staff has negotiated memoranda of agreement (MOAs) with the seven vehicle manufacturers subject to the 1998 ZEV requirement that commit these automakers to certify, produce and sell nationwide cleaner light-duty vehicles beginning with the 2001 model year, three years earlier than could be required under federal law;

WHEREAS, the MOAs would further commit the signatory manufacturers (1) to continue ZEV-related research and development, including (a) the acquisition and evaluation of advanced technology battery prototypes prior to 1998 and, for the participating manufacturers, continued funding of Phase II of the U.S. Advanced Battery Consortium, and (b) participation in ZEV demonstration programs beginning with model year 1998; (2) to promote and develop a market for ZEVs; (3) to develop ZEV production capacity sufficient to meet market demand in California; (4) to submit to ARB ZEV product plans for model years through 2003; and (4) to submit to ARB annual reports with information regarding the status of the ZEV demonstration projects, the purchase of advanced battery prototypes prior to 1998, and the placement of ZEVs in California and the United States;

WHEREAS, the MOAs provide that the benefits of the agreements will only be achieved if all signatory manufacturers strictly adhere to the terms and conditions and that any failure to comply with those provisions will significantly impair the purposes for which the MOAs were created, and, therefore, the MOA's specifically establish consequences for noncompliance with the substantive provisions of the agreements, including liquidated damages in the form of monetary payments and recognition of the Board's authority to reinstate the regulatory ZEV requirement;

WHEREAS, the MOAs commit the ARB to continue conducting biennial reviews of the ZEV program including battery development and further commits ARB to work with state and local governments and others to help ensure the development of ZEV infrastructure and the removal of barriers to ZEV introduction;

WHEREAS, the seven signatory manufacturers have initialed the individual MOAs signifying each manufacturer's intent to execute the MOA as written if the Board approves the proposed amendments to the LEV program to eliminate the percentage ZEV requirements for the 1998 through 2002 model years and thus incurs an emission reduction deficit for the SIP;

WHEREAS, the California Environmental Quality Act and Board regulations provide that an action may 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 that would substantially reduce or eliminate 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 amendments on the economy of the state;

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

WHEREAS, the Board finds that:

> If California is to attain in a timely manner and thereafter maintain the state and federal ambient air quality standards for ozone, it is crucial that we take whatever steps are necessary and appropriate to develop a sustainable market for zero-emission vehicles that will result in the displacement of vehicle miles traveled (VMT) by vehicles powered by internal combustion engines with vehicle miles traveled by ZEVs to reduce emissions from passenger cars and light-duty trucks to acceptable levels even as the number of vehicles and amount of VMT increase;

Although the Battery Panel found that ZEVs powered by lead-acid or nickel-cadmium batteries will be available in 1998, there is a substantial risk that due to various factors, including vehicle performance, *e.g.*, range, and expected initial vehicle price, consumer demand may not support a market meeting the current regulatory requirements for model years 1998 through 2002, or alternatively that ZEVs introduced during that period may not meet consumer expectations and that the adverse effect of this situation may impact the viability of the market when advanced battery technologies are available;

The availability of advanced technology batteries is essential to the long-term success of ZEVs in the marketplace;

The proposed amendment of the ZEV regulation to eliminate the percentage production and delivery requirements for model years 1998 through 2002 provides the time necessary for advanced technology battery developers to achieve commercialization;

The existing ZEV requirement has substantially accelerated investment and progress in developing advanced technology batteries;

By retaining the ten percent ZEV requirement for model year 2003 and beyond, the Board intends to confirm its commitment to this technology and its importance for California's long-term strategy to attain and maintain air quality standards in this state and to encourage the continuation of necessary investment in and progress toward developing advanced technology batteries;

By retaining the ten percent ZEV requirement for model year 2003 and beyond, the Board also acknowledges that the requirement has substantially accelerated investment and progress in developing other ZEV-related advanced technologies, such as fuel cells, and intends to encourage the continuation of investment in and progress toward developing these technologies;

Granting multiple ZEV credits for ZEVs produced prior to the 2003 model year will encourage the development of ZEVs that have greater range or use advanced batteries and, consequently, have a greater market potential, thus increasing the likelihood of a successful program by 2003 and beyond;

The proposed amendment of the ZEV regulation will reduce the cost of compliance to the affected vehicle manufacturers, which should result in savings for consumers;

The proposed amendment may cause some small businesses in the advanced transportation industry to see a reduction in investment and demand for goods and services in the short-term, but the elimination of the ZEV requirement for the 1998 through 2002 model years is necessary to ensure the successful launch of a sustained market for ZEVs in California, which will result in greater, long-term benefits for these businesses;

Additional proposed amendments to the regulations and standards and test procedures are intended to conform these provisions to the proposed elimination of the ZEV requirements for the 1998 through 2002 model year or to make nonsubstantive clarifications to the ZEV regulations; and

WHEREAS, the Board further finds that:

The commitment of the signatory vehicle manufacturers to participate in a "49 state program," *i.e.*, introducing cleaner light-duty vehicles nationwide by opting into the voluntary National Low Emission Vehicle (NLEV) program under regulations to be promulgated by the U.S. Environmental Protection Agency (U.S. EPA) or alternatively by selling in all states (except those that already require California-certified vehicles) only California and U.S. EPA certified 50-state vehicles having a fleet average emission level equivalent to 0.075 grams per mile NMOG for passenger cars and light-duty trucks up to 3750 pounds loaded vehicle weight and 0.10 grams per mile NMOG for light-duty trucks up to 6000 pounds gross vehicle weight, will provide NOx and NMOG emission reductions from cleaner vehicles migrating into or traveling through California from other states;

Elimination of the ZEV requirement for model years 1998 through 2002 will not jeopardize the SIP because the NOx and NMOG emission reductions to be realized in California from implementation of a 49 state program are not encumbered by or otherwise available to meet any existing SIP commitment and are sufficient to offset the emission reductions included in the SIP that are attributable to the 1998 though 2002 ZEV requirement;

Under the MOAs the ARB may approve a manufacturer's request to implement a substitute program or programs to provide emission reduction benefits in California only if the emission reductions to be realized from the alternative program(s) are equivalent to those provided by the 49 state program (with any shortfall in reductions to be offset by the manufacturers) and only if the substitution will not jeopardize the SIP;

The MOAs further establish a Technology Development Partnership that will ensure the continuation of the necessary ZEV-related research and development and provide the means for carrying out the demonstration projects identified by the Battery Panel as critical to bringing advanced technology batteries to commercialization;

Under the MOAs each signatory manufacturer has committed to promoting and developing the market for ZEVs beginning as early as 1996, and specifically to have the production capacity sufficient to meet consumer demand for ZEVs in California and to craft a plan intended to ensure that the company is positioned to meet the ten percent ZEV requirement that will be retained as part of the existing LEV program;

The provisions of the MOAs calling for ZEV Product Plans and annual reports on the status of ZEV market development, ZEV-related research and development funding and activities, and the ZEV demonstration projects will provide information necessary to allow ARB to track the status of manufacturer's preparedness to comply with the ZEV requirement for the 2003 model year;

The MOAs include adequate consequences for noncompliance with specified provisions of the agreements in the form of liquidated damages that are intended to compensate the full range of harm to all implicated state interests, and which are sufficient to ensure manufacturer adherence to the MOA terms and conditions, as well as the recognition that the Board retains full regulatory authority to reinstate the ZEV requirements as to a noncomplying manufacturer without affecting the MOAs with other signatory manufacturers; and

WHEREAS, the Board further finds that:

By 2010 the cumulative NOx and NMOG emission benefits from implementation of the 49 state program under the MOAs will be equivalent to the emission reductions attributable to the ZEV requirement for the 1998 through 2002 model years; however, in the initial years of implementation the proposed regulatory action will result in an increase in NOx and NMOG emissions;

The proposed regulatory action will result in slight increases in carbon monoxide (CO) and particulate matter (PM) as well as increases in certain motor vehicle toxic air contaminant emissions and emissions that contribute to global warming;

The proposed regulatory action that will result in these short-term or limited increases in emissions, however, is necessary to provide manufacturers additional time and flexibility to develop ZEVs that will succeed in the marketplace thus ensuring the significant emissions benefits resulting from the long-term success of the ZEV program; and
There are no additional feasible mitigation measures or alternatives available to the Board that would substanially reduce the potential adverse impacts of the proposed regulatory action while at the same time providing the substantial overall public health benefits to be realized from a successful launch of a sustained market for ZEVs in California.

NOW, THEREFORE, BE IT RESOLVED that the Board hereby approves title 13, California Code of Regulations, sections 1900 and 1976, and section 1960.1 and the incorporated "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as set forth in Attachment A hereto.

BE IT FURTHER RESOLVED that the Board approves the terms and conditions of the MOAs as set forth in Appendix C of the Staff Report and directs the Executive Officer to sign each of the MOAs upon execution by all of the signatory manufacturers.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer, upon execution of the MOAs by ARB and all seven of the signatory manufacturers, to adopt title 13, California Code of Regulations, sections 1900 and 1976, and section 1960.1 and the incorporated "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," after making the modified regulatory language and additional supporting documents and information available for public comment for a period of 15 days, provided that the Executive Officer shall consider such written comments regarding the modification and additional supporting documents and information as may be submitted during this period, shall make modifications as may be appropriate in light of the comments received, and shall present the regulations to the Board for further consideration if he determines that this is warranted.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer, in cooperation with an implementation committee made up of representatives of the Board, the public and the affected industries, to continue monitoring the status of the implementation of the ZEV program as part of the California LEV program biennial review.

BE IT FURTHER RESOLVED that to encourage full public participation in this monitoring process, the Board commits to making information regarding the status of the implementation of the ZEV program and the MOAs available to all interested parties consistent with disclosure and confidentiality provisions of the California Public Records Act, and will aggregate or otherwise present confidential information in a manner that will protect its confidentiality while allowing the broadest release of information possible.

BE IT FURTHER RESOLVED that the Board expects the signatory manufacturers to make good faith efforts to comply with the letter and spirit of the MOAs to ensure a successful launch of a sustainable market for ZEVs in California and will seriously consider reinstating a regulatory ZEV requirement if this expectation is not met.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to take whatever actions are necessary and appropriate to carry out the ARB's commitment under the MOAs, specifically commitments to work with state and local and other involved parties in the promotion and development of a market for ZEVs, the development of a ZEV infrastructure, and the removal of barriers to the successful introduction of ZEVs.

BE IT FURTHER RESOLVED that the Board hereby determines that the regulations adopted herein will not cause California motor vehicle emission standards, in the aggregate, to be less protective of public health and welfare than applicable federal standards.

BE IT FURTHER RESOLVED that the Board hereby finds that separate California emission standards and test procedures are necessary to meet compelling and extraordinary conditions.

BE IT FURTHER RESOLVED that the Board finds that the California emission standards and test procedures as adopted herein will not cause the California requirements to be inconsistent with section 202(a) of the Clean Air Act and raise no new issues affecting previous waiver determinations of the Administrator of the U.S. Environmental Protection Agency pursuant to section 209(b) of the Clean Air Act.

BE IT FURTHER RESOLVED that the Executive Officer shall, upon adoption, forward the regulations to the U.S. Environmental Protection Agency with a request for a confirmation that the regulations are within the scope of an existing waiver of federal preemption pursuant to section 209(b) of the Clean Air Act, as appropriate.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to submit to the U.S. Environmental Protection Agency documentation of the commitment to obtain emission reductions through the certification, production and sale of cleaner light-duty vehicles nationwide if necessary for inclusion in the SIP.

I hereby certify that the above is a true and correct copy of Resolution 96-12, as adopted by the Air Resources Board.

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Pat Hutchens, Board Secretary

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ATTACHMENT A