State of California
AIR RESOURCES BOARD

Resolution 06-11

May 25, 2006

Agenda Item No.: 06-5-4

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

WHEREAS, sections 43013 and 43018 of the Health and Safety Code authorize the Board to adopt standards and regulations to control emissions from off-road or non-vehicle engine categories to achieve the maximum degree of emission reductions possible at the earliest practicable date;

WHEREAS, section 209(e)(1) of the federal Clean Air Act preempts states and their political subdivisions, including the State of California and the local districts, from adopting or enforcing emission standards or other requirements relating to the control of emissions (other than in-use operational controls) of new nonroad engines less than 175 horsepower used in farm and construction equipment and vehicles;

WHEREAS, the United States Environmental Protection Agency (U.S. EPA) has adopted regulations at title 40, Code of Federal Regulations, section 85.1601, et seq., to define the scope of preemption as those new engines used primarily in farm and construction equipment;

WHEREAS, section 209(e)(2) authorizes California to adopt standards and to seek authorization from the U.S. EPA prior to enforcing emission standards or other requirements relating to the control of emissions (other than in-use operational controls) from nonroad engines (of which large spark-ignition engines are a subpart), not otherwise preempted by section 209(e)(1);

WHEREAS, because of federal preemption of control of emissions from farm and construction equipment under 175 horsepower, ARB and the U.S. EPA have worked together to develop a harmonized national program in order to reduce emissions from equipment with new large spark-ignition engines;

WHEREAS, in 1998 the Board originally adopted regulations to control exhaust emissions from off-road large spark-ignition engines of 25 horsepower or more used in eleven agreed upon non-preempted categories, but these regulations do not contain

requirements for transient testing during certification or compliance determinations or requirements for on-board diagnostics (OBD) systems;

WHEREAS, in 2002 U.S. EPA promulgated emission standards for hydrocarbons (HC) and oxides of nitrogen (NOx) that harmonized with the ARB's 1998 regulations beginning in 2004, but required more stringent new engine emission standards and evaporative emission standards, transient test procedures, and OBD systems requirements beginning in 2007 because U.S. EPA believes that transient testing procedures better reflect actual emissions from off-road large spark-ignition engines, and OBD systems allow engine service personnel to evaluate the performance of the engine's emission control system;

WHEREAS, federal test data have shown that evaporative emissions from gasoline-fueled off-road large spark-ignition engines can be significantly reduced with the use of properly designed fuel tanks and fuel hoses yet existing ARB regulations do not explicitly control evaporative emissions associated with off-road large spark-ignition engines;

WHEREAS, manufacturers have requested that ARB harmonize with the 2007 federal exhaust emission standards for off-road large spark-ignition engines and ARB seeks to harmonize with the federal power designation of kilowatt (kW) for off-road large spark-ignition engines;

WHEREAS, the State Implementation Plan for Ozone (SIP) adopted by the Board in October 2003 directed ARB to harmonize with the more stringent 2007 federal requirements by adopting an exhaust emission standard for off-road large spark-ignition engines of 2.7 grams per kilowatt-hour (2.0 grams per brake horsepower-hour) and an equivalent evaporative emission requirement and directed ARB to develop more stringent near-, mid-, and long-term standards for off-road large spark-ignition engines and equipment that reflected the availability and feasibility of zero- and near zero-emission technologies;

WHEREAS, test and certification data have shown that exhaust emissions from off-road large spark-ignition engines can be significantly reduced with the addition of an emission control system incorporating closed-loop fuel control systems, fuel injection systems, three-way catalysts, and combinations thereof;

WHEREAS, the application of automotive-derived-catalyst and fuel-delivery technologies have allowed commercially available large spark-ignition engines to achieve HC+NOx emission levels of 1.34 grams per kilowatt-hour (1.0 gram per brake horsepower-hour) or less, with the cleanest engines having emissions of less than 0.134 grams per kilowatt-hour (0.1 gram per brake horsepower-hour);

WHEREAS, the existing regulation divides off-road large spark-ignition engines into two categories based on engine displacement, with engines in the first category having a displacement of less than or equal to one liter, and engines in the second category

having a displacement of greater than one liter and being typically derived from automotive engines;

WHEREAS, more stringent new federal exhaust emission standards for federal Class II engines (less than 19 kW) are expected to be promulgated prior to the end of 2007 and these standards also apply to engines greater than 19 kW, but with a displacement of less than 1 liter;

WHEREAS, existing State regulations do not control exhaust emissions from off-road large spark-ignition engines manufactured prior to 2001 and only control 25 percent of those engines manufactured in 2001, 50 percent of those engines manufactured in 2002, and 75 percent of those engines manufactured in 2003, and emissions from uncontrolled in-use engines may exceed those of engines certified to the State and federal standards by 300 percent or more;

WHEREAS, test data show that many of these uncontrolled engines may be controlled to existing HC+NOx emission standards or better through the use of retrofit emission control systems;

WHEREAS, a standardized procedure is necessary to verify the performance level of retrofit emission control systems;

WHEREAS, small fleets, defined as fleets with less than four pieces of equipment, are least able to absorb the costs of in-use requirements; it is believed that these users, in general, use their equipment fewer hours per year than mid- or large-size fleets;

WHEREAS, many operators of off-road large spark-ignition equipment can incorporate battery electric or "zero-emission" equipment, especially forklifts, sweeper/scrubbers, airport ground support equipment, and industrial tow tractors into their fleets;

WHEREAS, zero-emission equipment is readily available and is increasingly more capable as equipment manufacturers incorporate features that enable the equipment to be used in a wider variety of environments; these features include waterproof or sealed electronics compartments to make them water resistant for outdoor conditions, alternating-current motors that enhance performance capabilities, batteries that allow for fast-charging, eliminating the need to swap out batteries and maintain a battery charging room, and in the mid- to long-term, hydrogen fuel cell technologies that further extend the capabilities of electric equipment;

WHEREAS, zero-emission technology is suitable and cost-effective in many applications and provides ongoing zero-emission benefits for the life of the equipment;

WHEREAS, in late 2002, air carriers operating in the South Coast air basin signed a Memorandum of Understanding (MOU) with ARB committing to reduce HC and NOx emissions from new and in-use ground support equipment used in airport operations;

the MOU included a requirement to have electric or zero-emission vehicles represent at least thirty percent of the 1997 baseline fleet, in aggregate, by December 31, 2010;

WHEREAS, the staff has proposed regulatory amendments, set forth in Attachment A hereto, that include the adoption of new emission standards and test procedures for forklifts and other industrial equipment with 2007 and later model-year off-road large spark-ignition engines, requirements for fleet users of such equipment, and verification procedures for retrofit control systems;

WHEREAS, the proposed amendments to existing California standards and test procedures are designed to harmonize as closely as possible with the federal program to minimize administrative burden, complexity, and expenses that could result from different state and federal testing requirements for non-preempt engines while still maintaining the emission reduction benefits of the California program;

WHEREAS, adoption of procedures in close alignment with the U.S. EPA's program for large spark-ignition engines would additionally simplify the processes of certification and production line testing and reduce the compliance burden placed on industry;

WHEREAS, optional lower-emission standards have been shown to provide an incentive for developing emission controls that perform beyond mandatory standards, and compliance with, and promotion of, optional lower-emission standards may aid engine and equipment manufacturers in their marketing of less-polluting products, thus harnessing competitive forces to spur research and development of cleaner technology;

WHEREAS, the Board has considered the effects of the proposed standards on the economy of the State;

WHEREAS, the availability of high quality, motor-vehicle-grade liquefied petroleum gas is critical to the efficient operation of fuel delivery and emission control systems;

WHEREAS, periodic reviews of industry's progress, both in meeting current ARB regulatory requirements and in striving to meet requirements with future effective dates, have helped the Board determine whether it needs to reevaluate those requirements;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project that may have significant adverse environmental impacts be adopted as originally proposed if feasible alternatives or mitigation measures are available to reduce or eliminate such impacts;

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:

Exhaust and evaporative HC+NOx emissions from off-road large spark-ignition engines will account for approximately 35 tons per day in 2010 making the category a significant source of air pollution;

To meet SIP requirements, ARB must continue to seek proportional and incremental reductions from mobile sources, including off-road large spark-ignition engines;

Cost-effective control technologies are available that can significantly reduce exhaust and evaporative emissions from new off-road large spark-ignition equipment and engines;

The greatest contribution to off-road large spark-ignition engine emissions comes from uncontrolled in-use engines;

Cost-effective emission reductions are possible through the retrofit, replacement or retirement of uncontrolled in-use off-road large spark-ignition engines and equipment;

The proposed exemption for small fleets significantly reduces the economic impact on equipment dealers and small fleets while still controlling the majority of in-use engines;

Allowing industry to voluntarily certify engines to optional lower-emission standards and to promote the optional certification-level standards through equipment labeling could aid fleet operators in the purchase of lower emitting engines and could further reduce emissions;

The certification levels of several 2004 model year engines and the known capabilities of automotive-inspired emission control systems leads ARB to believe that still lower emission standards on the order of 0.27 to 0.40 grams per kilowatt-hour (0.2 to 0.3 grams per brake horsepower-hour) are technologically feasible; however, manufacturers of off-road large spark-ignition engines have little experience certifying their engines to the more stringent transient test procedures required in the 2007 model year; additionally, poor quality liquefied petroleum gas may have an adverse effect on the ability of the fuel delivery and emission control systems in these engines to operate optimally; thus, ARB should review the industry's progress in meeting the standards and should assess the ability to adopt yet lower standards as well as the degree to which ARB and U.S. EPA have been able to achieve the goal of harmonization;

WHEREAS, the Board further finds that:

The off-road large spark-ignition engine exhaust and evaporative regulations, procedures, and compliance programs are necessary to adequately enforce the

emissions standards, and will independently help to reduce emissions from such engines;

The requirements, procedures, and compliance programs for operators of off-road large spark-ignition engine fleets are also necessary to adequately address emissions from in-use engines;

The retrofit verification procedures for manufacturers of off-road large spark-ignition engine retrofit emission control systems are needed by operators striving to comply with the fleet requirements;

The regulations establish uniform, consistent and reasonable emission standards and fleet average emission level requirements for off-road large spark-ignition engines and associated equipment;

Adoption of the exhaust and evaporative standards, fleet standards, and test procedures would result in a reduction of more than 5.7 tons per day of combined HC and NOx emissions statewide in 2010, beyond the current ARB and federal programs addressing emissions from these engines;

The regulations will have no adverse impact on the environment;

The economic and cost impacts of the regulations have been analyzed as required by California law, and the conclusions and supporting documentation for their analyses are set forth in the Initial Statement of Reasons;

The cost-effectiveness for control beyond the current ARB and federal programs would range from no cost (based on overall lifecycle benefits) to $1.40 per pound of HC+NOx reduced for forklift equipment, with the cost effectiveness for control of other off-road large spark-ignition equipment estimated to be similar;

The cost of controlling evaporative emissions from new engines is already included in the cost of compliance with the 2007 U.S. EPA requirements;

The cost-effectiveness values of the regulations compare favorably with the values associated with other control measures adopted by the Board in furtherance of Health and Safety Code sections 43013 and 43018 and mobile source SIP measures;

The regulatory action will have some impact, although not significant, on small businesses that lease, rent, or sell new off-road large spark-ignition engine equipment;

The regulatory action will also have some impact, although not significant, on small businesses that operate the three categories of new and in-use off-road

large spark-ignition engine equipment that are covered by the fleet average emission level requirements;

Catalysts have been used safely in the control of exhaust emissions from engines operating in a variety of large off-road applications, including forklifts and generators;

Lower-emission off-road large spark-ignition engines are feasible and readily available and near-zero-emission engines are feasible and expected to be readily available in two to three years;

It is appropriate to encourage and promote through the adoption of fleet average requirements the use of zero-emission battery-powered and fuel cell-powered electric forklifts, sweeper/scrubbers, tow tractors, airport ground support equipment, and other equipment in applications where off-road large spark-ignition equipment is currently used;

Air carriers operating in the South Coast air basin who signed the MOU with ARB committing to reduce HC and NOx emissions from new and in-use ground support equipment used in airport operations have achieved the MOU requirement to have electric or zero-emission vehicles represent at least thirty percent of the 1997 baseline fleet, in aggregate;

The amendments to the off-road large spark-ignition engine regulations are necessary, cost-effective, and technologically feasible to carry out the purposes of the State and federal clean air laws; and

No alternative considered would be more effective in carrying out the purposes for which the regulations are proposed or would be as effective or less burdensome to affected private persons.

NOW, THEREFORE, BE IT RESOLVED that the Board hereby approves the adoption and amendment of the following sections of title 13, California Code of Regulations, and the documents incorporated by reference therein: division 3, chapter 15, Additional Off-Road Vehicles and Engines Pollution Control Requirements; article 2, Off-Road Large Spark-Ignition Engine Fleet Requirements, sections 2775, 2775.1, and 2775.2; division 3, chapter 15, Additional Off-Road Vehicles and Engines Pollution Control Requirements; article 3, Verification Procedure, Warranty, and In-Use Compliance Requirements for Retrofits to Control Emissions from Off-Road Large Spark-Ignition Engines, sections 2780 through 2789; division 3, chapter 9, Off-Road Vehicles and Engines Pollution Control Devices; article 4.5, Large Spark-Ignition Engines; sections 2430, 2433, and 2433, and the incorporated "California Exhaust Emission Standards and Test Procedures for New 2001 Through 2006 Off-Road Large Spark-Ignition Engines," the incorporated "California Exhaust Emission Standards and Test Procedures for New 2007 through 2009 Off-Road Large Spark-Ignition Engines," and the incorporated "California Exhaust Emission Standards and Test Procedures for

New 2007 and Later Off-Road Large Spark-Ignition Engines," as set forth in the attachments to the Initial Statement of Reasons, and as set forth in Attachment A hereto, with the modifications described in Attachment B hereto.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to adopt the above regulations as set forth in Attachment A hereto, with the modifications set forth in Attachment B hereto, and with such other conforming modifications and technical amendments as may be appropriate, after making the modified regulatory language and additional supporting documents and information available for public comment for a period of at least 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 she determines that this is warranted.

BE IT FURTHER RESOLVED that the Board hereby determines that pursuant to section 209(e)(2) of the federal Clean Air Act that the emission standards and other requirements related to the control of emissions adopted as part of these regulations are, in the aggregate, at least as protective of public health and welfare as applicable federal standards, that California needs the adopted standards to meet compelling and extraordinary conditions, and that the adopted standards and accompanying enforcement procedures are consistent with the provisions of section 209.

BE IT FURTHER RESOLVED that upon final adoption of the regulations relating to standards of other requirements for control of emissions, the Board directs the Executive Officer, to forward a request for authorization, or confirmation that the regulations are within the scope of previous authorizations, to U.S. EPA pursuant to section 209(e)(2) of the federal Clean Air Act.

I hereby certify that the above is a true and correct copy of Resolution 06-11, as adopted by the Air Resources Board.

Lori Andreoni

Lori Andreoni, Clerk of the Board

Resolution 06-11

May 25, 2006

Identification of Attachment A to the Resolution

ATTACHMENT A-1:	Proposed Regulation Order, Part 1: Amend California Code of Regulations, Title 13, Sections 2430, 2433, and 2434 for Off-Road Large Spark-Ignition Engines
ATTACHMENT A-2:	Proposed Regulation Order Part 2: Amendments to the incorporated "California Exhaust Emission Standards and Test Procedures for New 2001 and Later Off-Road Large Spark-Ignition Engines" (40 CFR, Part 86, Subpart A)
ATTACHMENT A-3:	Proposed Regulation Order Part 3: Amendments to the incorporated "California Exhaust Emission Standards and Test Procedures for New 2001 and Later Off-Road Large Spark-Ignition Engines" (ISO 8178)
ATTACHMENT A-4:	Proposed Regulation Order Part 4: Adoption of incorporated "California Exhaust Emission Standards and Test Procedures for New 2007 through 2009 Model-Year Off-Road Large Spark-Ignition Engines" (40 CFR, Part 1048)
ATTACHMENT A-5:	Proposed Regulation Order Part 5: Adoption of incorporated "California Exhaust Emission Standards and Test Procedures for New 2010 Model-Year and Later Off-Road Large Spark-Ignition Engines" (40 CFR, Part 1048)
ATTACHMENT A-6:	Proposed Regulation Order Part 6: Adoption of incorporated "California Exhaust Emission Standards and Test Procedures for New 2007 Model-Year and Later Off-Road Large Spark-Ignition Engines" (40 CFR, Parts 1065 and 1068)
ATTACHMENT A-7:	Proposed Regulation Order Part 8: Adopt California Code of Regulations, Title 13, Sections 2775, 2775.1, and 2775.2 for Large Spark-Ignition (LSI) Engine Fleet Requirements.
ATTACHMENT A-8:	Proposed Regulation Order Part 9: Adopt California Code of Regulations, Title 13, Sections 2780, 2781, 2782, 2783, 2784, 2785, 2786, 2787, 2788, and 2789 for Verification Procedures for Retrofit Systems Verification Procedure, Warranty, and In-Use Compliance Requirements for Retrofits to Control Emissions from Off-Road Large Spark-Ignition Engines.