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Agency Secretary

# Air Resources Board

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Arnold Schwarzenegger  
Governor

February 28, 2005

Mail-Out #MSC 05-08

TO: All Interested Parties

SUBJECT: PUBLIC WORKSHOPS TO DISCUSS A REGULATORY PROPOSAL FOR NEW AND IN-USE LARGE SPARK-IGNITION (LSI) ENGINES GREATER THAN 25 HORSEPOWER

The California Air Resources Board (ARB) staff invites you to participate in a public workshop to discuss a regulatory proposal to obtain emission reductions from off-road equipment that use large spark ignition (LSI) engines. This equipment includes, but is not limited to, most forklifts, street sweepers, generators, airport ground support equipment and large turfcare equipment. The key elements of the proposal include new engine certification engine standards for equipment manufacturers and fleet-average requirements for users of the equipment.

- The proposed engine certification standards would require engine manufacturers to meet emission standards consistent with those required by the United States Protection Agency (U.S. EPA) in 2007. The proposal would also require more rigorous emissions standards in 2010.
- The proposed fleet average requirement would require LSI users to meet a prescribed fleet average emission level for their fleet beginning January 1, 2009. Record keeping requirements are also part of the proposal. More stringent fleet average requirements are proposed for 2011 and 2013.
- The regulatory proposal includes an alternative compliance option for agricultural fleets to address issues specific to this industry.

The proposal provides the LSI user with the flexibility to use a combination of retrofits, low-emission purchases, and zero-emission electric purchases to meet the fleet average emission level, which would become progressively more stringent over time. Voluntary low emission standards for manufacturers of new LSI engines will allow manufacturers to certify engines at levels significantly lower than current or pending standards. The workshops will discuss these voluntary new engine certification levels and new retrofit kit verification levels.

In order to allow greater participation in the regulatory process, workshops will be held at the two locations below. All elements of the proposal will be discussed at both meetings. However, the workshop in Fresno is specifically designed to solicit input from

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California Environmental Protection Agency

the agricultural community regarding the fleet average requirement for users and the alternative compliance option. ARB staff will focus on the new engine standards and retrofit requirements at the Sacramento workshop. ARB staff is especially interested in receiving comments from LSI fleet owners and users. The Sacramento workshop will also be webcasted (live Internet broadcast).

### **Fresno**

Tuesday, March 22, 2005  
9:00 AM – 1:00 PM (Pacific)  
San Joaquin Valley APCD  
Auditorium  
1990 E. Gettysburg Avenue  
Fresno, California 93726  
[http://www.valleyair.org/General\\_info/directions\\_fresno1.htm](http://www.valleyair.org/General_info/directions_fresno1.htm)

### **Sacramento**

Thursday, March 24, 2005  
9:00 AM – 1:00 PM (Pacific)  
Cal/EPA Headquarters Building  
Sierra Hearing Room, 2<sup>nd</sup> Floor  
1001 I Street  
Sacramento, California 95814  
<http://www.arb.ca.gov/maps/sactomap.htm>

## **Background**

Over 90 percent of Californians breathe unhealthy air at times. To improve air quality and human health, the U.S. EPA and the ARB set ambient air quality standards for harmful air pollutants. One of these pollutants is ozone. Ozone is formed when hydrocarbons (HC) and oxides of nitrogen (NOx) combine through chemical reactions in the atmosphere in the presence of sunlight.

To achieve the ambient air quality standard for ozone, it is necessary to reduce HC and NOx emissions. Since greater than one-third of NOx emissions come from off-road vehicles, the ARB adopted regulations in late 1998 requiring that new LSI engines be certified to a standard of 3.0 grams per brake horsepower per hour (g/bhp-hr) HC+NOx. Those regulations were phased in between January 2001 and January 2004. The U.S. EPA later adopted its own LSI regulation incorporating test information obtained from the development of the 1998 ARB LSI regulation. The U.S. EPA regulation requires all new LSI engines nationwide to meet the same 3.0 g/bhp-hr standard beginning January 2004 and a 2.0 g/bhp-hr standard in 2007.

As a result of the State and federal regulations, new LSI engines are now 75 percent cleaner than an older uncontrolled LSI engine, and will become 84 percent cleaner beginning in 2007. However, significant opportunities exist to further reduce NOx emissions from LSI equipment. First, forklifts accounted for six percent of off-road emissions in 2000 and this percentage is increasing. Second, there are large numbers of older uncontrolled LSI engines still in use. These engines contribute significantly to the smog problems in California. For example, a forklift with an uncontrolled engine can emit as much in three shifts as a new car certified to California's lowest emission level would emit over its entire life. Finally, LSI engines are generally based upon automotive engine technology, and there are opportunities to adapt advanced automotive-inspired

emission control technologies into new and in-use LSI equipment to significantly reduce emissions.

In recognition of this, the 2003 State Implementation Plan included two measures for LSI engines. The first measure, LSI-1, proposed that the California program harmonize with the 2007 U.S. EPA 2.0 g/bhp-hr emission standard. The second measure, LSI-2, proposed that existing uncontrolled LSI engine emissions be reduced by 80 percent or to a 3.0 g/bhp-hr verification level. The measure also proposed that zero and near-zero emission standards be developed for new LSI engines.

## **Staff Proposal**

### Engine Manufacturer Proposal

The proposed manufacturer lower emission standard has three components. The first component harmonizes with more stringent U.S. EPA Tier 2 emission standards and test procedures that become effective in 2007. Under Tier 2, manufacturers of 2007 and later model year engines must meet a nominal 2.0 g/bhp-hr HC+NOx emission standard and a 3.3 g/bhp-hr carbon monoxide (CO) emission standard. Manufacturers may optionally certify according to the following formula:  $(\text{HC}+\text{NOx}) \times (\text{CO})^{0.784} \leq 8.57$ . This optional certification standard provides manufacturers the flexibility to let their CO emissions increase so that they may achieve lower HC+NOx levels. The ARB will incorporate these provisions into the first component of our manufacturer lower emission standards.

The second component lowers the ARB emission standard for 2010 and subsequent model year engines to 0.6 g/bhp-hr HC + NOx with a corresponding CO emission standard of 15.4 g/bhp-hr. This NOx standard corresponds to the minimum HC+NOx level in the HC+NOx vs. CO emission trade off curve established by the U.S. EPA optional certification formula. As such, our 2010 standard is basically equivalent to the 2007 U.S. EPA proposal, but limits flexibility to the most stringent HC+NOx emission level to maximize ozone benefits.

The third component establishes optional low emission standards below the 2007 and 2010 mandatory standards. Under this component, model year 2007 and subsequent engines could be certified to optional tiered new engine standards of 0.1, 0.2, 0.4, 0.6, 1.0, and 1.5 g/bhp-hr HC+NOx. The January 20, 2005 Manufacturers Advisory Correspondence already provides that manufacturers may voluntarily certify their 2005 and 2006 model year engines to these standards plus 2.0 g/bhp-hr HC+NOx. These low emission standards provide fleet users additional flexibility in meeting the proposed fleet average emission level requirements discussed in the following section. These standards also provide those manufacturers that make their equipment less polluting an opportunity to certify at the lower standard, thus providing additional value to the fleet owner.

### Fleet Users Proposal

Staff is proposing fleet average emission level requirements (fleet averages) for large and mid-size fleets. Fleet size is determined by aggregating each of a company's facilities operating in the State of California. Large LSI fleets are those with more than 25 pieces of equipment. Mid-size fleets have 4 to 25 pieces of equipment.

Large fleets would have to meet more stringent fleet averages than mid-size fleets because they have greater flexibility when incorporating combinations of emission-reduction strategies to achieve a prescribed level. Additionally, the fleet average would be more stringent for the forklift portion of the fleet than for the non-forklift portion of the fleet.

The user fleet average would be determined using the certification levels of 2001 and newer LSI engines and the retrofit verification levels of engines with retrofit kits. These values are clearly indicated on the engine label. To make the proposal less complex and less intrusive for the average fleet user while maintaining cost effective emission benefits, the fleet average will not incorporate load factor, horsepower, or hours of use.

Small fleets with 1 to 3 pieces of equipment would be exempt from the fleet average requirement, but would be required to have no uncontrolled equipment by January 1, 2011. The proposal allows small fleets until 2013 to comply with the retrofit requirements if their equipment is used 250 hours per year or less and has an hour of use meter.

The following table summarizes the proposed fleet average emission levels for forklift and non-forklift LSI fleets.

Fleet Average Emission Level Requirement (g/bhp-hr)

LSI Fleet Type	Number of units	By 1/1/2009	By 1/1/2011	By 1/1/2013
Large fleet – forklift component	26 +	2.4	1.7	1.1
Mid-size fleet – forklift component	4-25	2.6	2.0	1.4
Mid-size or Large Non-forklift fleet	N/A	3.0	2.3	1.7
Small fleet	1-3	No uncontrolled equipment by 1/1/2011		

Alternative Compliance Option for Agricultural Fleets

ARB staff is proposing an alternative compliance option for agricultural fleets that reflects the longer retention periods characteristic of agricultural operations. Under this option, agricultural fleet users are required to control (to a 3.0 g/bhp-hr level) ten percent of their uncontrolled forklift fleet each year for ten years through retrofit, repower, or retirement.

**Workshop materials**

The formal meeting agenda and a full detailed description of the staff's proposal will be available on our web site for your review at <http://www.arb.ca.gov/msprog/offroad/orspark/orspark.htm> prior to the workshop. If you did not receive this letter directly but would like to be on the mailing list for future notification, please sign up via our web site at <http://www.arb.ca.gov/listserv/orspark/orspark.htm>.

If you have a disability-related accommodation need, please go to <http://www.arb.ca.gov/html/ada/ada.htm> for assistance or contact the ADA Coordinator at (916) 323-4916. If you are a person who needs assistance in a language other than English, please go to <http://inside.arb.ca.gov/as/eo/languageaccess.htm> or contact the Bilingual Coordinator at (916) 324-5049. For public transit information, please view the transportation information on the California Environmental Protection Agency's web site at <http://www.calepa.ca.gov/epabldg/location.htm>.

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We welcome your participation in this effort. If you have general questions regarding either the workshop or the proposed LSI rulemaking, please contact Mr. Mark Williams, Air Pollution Specialist, at (916) 327-5610 or [mwilliam@arb.ca.gov](mailto:mwilliam@arb.ca.gov), or Mr. Jack Kitowski, Chief, On-Road Controls Branch, at (916) 323-6169 or [jkitowsk@arb.ca.gov](mailto:jkitowsk@arb.ca.gov).

Sincerely,

/s/

Robert H. Cross, Chief  
Mobile Source Control Division

