

**AIR RESOURCES BOARD
DRAFT ADVISORY ON BIODIESEL USE
Revised 11/14/06**

Purpose

The purpose of the advisory is to clarify the use of biodiesel with respect to existing Air Resources Board (ARB) regulations and to provide guidance on the voluntary use of biodiesel. It is not the intent of this advisory to address issues related to emissions, health risk assessment methodology, or the need to assess possible multimedia impacts that may result from the use of biodiesel. These issues will be addressed based on information obtained from a biodiesel research study that will be sponsored by the ARB and other information.

Background

A summary of enacted Senate Bill 975 and ARB and the Department of Food and Agriculture, Division of Measurement Standards (DMS) regulations is provided to describe the regulatory framework that may limit the use of biodiesel in California.

Senate Bill 975: Senate Bill 975 enacted new provisions in the California Health and Safety Code, Division 26, Part 5, Chapter 4, Article 6, Section 43860 that allow the use of biodiesel in retrofitted fleet vehicles. Specifically, any federal, state, or local agency, or any regulated utility, or any owner or operator of a solid waste collection vehicle or collection vehicle, as defined in Section 2021 of Title 13 of the California Code of Regulations, may utilize a biodiesel blend fuel consisting of not more than 20 percent biodiesel in any retrofitted vehicular or off-road diesel engine certified by the state board, whether or not biodiesel is expressly identified as a fuel for use with the retrofit system. Biodiesel is required to meet the American Society for Testing and Materials (ASTM) D-6751 specification and any diesel that the biodiesel is blended into must meet applicable fuel specifications for California diesel fuel. The provisions of Article 6 remain in effect until January 1, 2008.

The effect of Article 6 is to allow the voluntary use of biodiesel blends up to 20 percent in vehicles and engines with retrofit devices that have been verified as in-use strategies using California diesel fuel under Title 13, California Code of Regulations (CCR), sections 2700 through 2710.

ARB Regulations

California diesel fuel regulations, Title 13, CCR, Sections 2281 and 2282: These regulations define "diesel fuel" to mean any fuel that is commonly or commercially known, sold or represented as diesel fuel, including any mixture of primarily liquid hydrocarbons – organic compounds consisting exclusively of the elements carbon and hydrogen – that is sold or represented as suitable for use in an internal combustion,

compression-ignition engine. This allows other organic compounds such as biodiesel to be used up to 49 percent by volume.

These regulations require diesel fuel to contain no more than 15 parts per million (ppm) sulfur and 10 percent aromatics. These regulations also allow for diesel fuels with an aromatic content higher than 10 percent to be produced as long as the fuels have been demonstrated to have equivalent emissions as a 10 percent aromatic fuel. These fuels are certified diesel fuel formulations and production is limited to the fuel specifications that are contained in individual Executive Orders (EO) issued by the ARB. Certified diesel fuel formulations generally meet American Society for Testing and Materials (ASTM) D975 fuel specifications.

As previously mentioned, under ARB's diesel fuel regulations, biodiesel blends of less than 50 percent (B50) are defined as meeting the definition of diesel. Therefore, biodiesel blends of less than B50 must comply with the sulfur and aromatic specifications of the regulations. Biodiesel blends of B50 or greater are not defined as diesel fuel and the diesel regulations do not apply to these blends. Note that when using biodiesel as a blend stock to produce complying California diesel fuel, the finished diesel fuel must meet the applicable specifications under Title 13, CCR, sections 2281 and 2282 and, as applicable, any Executive Order issued for a certified diesel fuel formulation.

Airborne Toxic Control Measures (ATCMs): The Board has adopted a number of ATCMs to control diesel particulate matter (PM). This includes measures for portable and stationary engines, transportation refrigeration units, transit buses, solid waste collection vehicles, and cargo handling equipment. Additional measures for on-road trucks, off-road vehicles, and commercial harbor craft are under development. Diesel fuels used under these ATCMs must meet the requirements of CARB diesel fuel regulations 2281-2285 and ASTM D975. As currently written, several of these regulations allow the use of alternative diesel fuels¹ if these fuels are verified under Title 13, CCR, sections 2700 through 2710 as described below. The main purpose for requiring verification is to ensure that alternative diesel fuels are reviewed under a multi-media evaluation.

Title 13, CCR, sections 2700 through 2710, "In-use strategies verification procedure," was adopted to verify strategies that reduce diesel PM emissions. In-use strategies such as particulate filters must be verified using California diesel fuel containing 15 ppm sulfur or less unless otherwise specified by the applicant.

¹ Alternative Diesel Fuel means any fuel used in diesel engines that is not a reformulated diesel fuel as defined in Sections 2281 and 2282 of Title 13, of the California Code of Regulations, and does not require engine or fuel system modifications for the engine to operate, although minor modifications (e.g. recalibration of the engine fuel control) may enhance performance. Ref. Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines Title 13, California Code of Regulations, section 2701(a)(2).

Division of Measurement Standards Regulations: Division of Measurement Standards (DMS) has adopted regulations that apply to the retail marketing of biodiesel. Title 4 CCR, Division 9, section 4147, requires biodiesel blending stocks meet ASTM 6751 specifications and finished biodiesel fuel blends meet ASTM D975. However, finished biodiesel blends not meeting section 4147 can be sold under a developmental engine fuel variance. A developmental engine fuel means any experimental automotive spark-ignition engine fuel or compression-ignition fuel that does not meet current standards but has characteristics that may lead to an improved fuel standard or the development of an alternative fuel standard.

Finally, DMS regulations under Title 4, Division 9, section 4148 specifies labeling and price advertising sign requirements for biodiesel sold in commerce.

Additional information on these regulations can be obtained from Mr. David Lazier, Chief, Weighmaster, Petroleum Products Branch of DMS at (916) 229-3044.

Use of Biodiesel

The Air Resources Board (ARB) staff recommends that if biodiesel blends are used in on- and off-road diesel vehicles, portable engines, and stationary engines, the following conditions should apply.

- Biodiesel fuel characteristics:
 - The biodiesel portion of the blend complies with the American Society for Testing and Materials (ASTM) specification D6751 applicable for 15 ppm sulfur content,
 - The diesel fuel portion of the blend complies with Title 13, California Code of Regulations (CCR), sections 2281 and 2282 (diesel regulations); and
 - The resulting biodiesel blend contains no more than 20 percent biodiesel by volume.
- Vehicles retrofitted with verified devices under Title 13, CCR, sections 2700 through 2710 can use biodiesel blends up to 20 percent, so long as the retrofit method employed on the engine was verified based on the use of commercial diesel fuel meeting CCR, sections 2281 and 2282 and for the purpose of reducing diesel particulates only, but not verified devices for both diesel particulate and oxides of nitrogen. As discussed above, biodiesel blends must meet other applicable state requirements.
- - Users of biodiesel blends should determine if the use of biodiesel blends up to 20 percent will affect their engine warranties and are advised to avoid use of fuel that would negate a warranty.
 - ARB will pursue modifications to update the warranty provisions that applied to verified devices under the original Executive Order with device manufacturers.

Use of biodiesel blends is generally expected to reduce diesel particulate matter and organic compounds; however, nitrogen oxide emissions may increase. These effects tend to increase as the percent of biodiesel in the fuel increases.

Use of blends of no more than 20 percent biodiesel is expected to enable expanded use of an alternative renewable fuel. However, with the prospect of widespread use of biodiesel the ARB is beginning to develop the technical information to support setting specifications to ensure that the emissions benefits of California diesel fuel are retained.

Other Information

Summarized below is information for consideration when using biodiesel.

- The biodiesel portion of the blend meeting ASTM D 6751 should contain less than 10 percent aromatics and have a cetane number of 53 or above.
- Use of biodiesel blends greater than 20 percent and B100 are not recommended at this time.
- The Engine Manufacturers Association (EMA) has recently published draft test specifications for biodiesel. These draft specifications are intended to result in a biodiesel blend fuel with consistent properties. The draft specifications recommend limiting biodiesel blends to 20 percent or less and contain recommended performance requirements. EMA encourages fuel users to obtain biodiesel from sources known to produce quality fuels that meet these specifications. EMA's draft test fuel specifications for biodiesel can be accessed at the following:
<http://www.enginemanufacturers.org/admin/library/upload/924.pdf>

Next Steps

Staff intends to address other issues as described below.

- Conduct a biodiesel research study to:
 - Assess emissions impacts (criteria, toxic pollutants, and greenhouse gas emissions) from the use of biodiesel including sources of biodiesel;
 - Assess effects of biodiesel blends; and
 - Assess effects of test protocols (chassis and engine dynamometers tests) on emissions.
- Evaluate the need to develop biodiesel fuel specifications to preserve the benefits of California diesel.
- Conduct a multimedia evaluation if necessary
- Evaluate the need to develop recommendations on biodiesel specifications to address issues other than those related to air pollution.