

Preliminary Rulemaking Proposal for Biodiesel Use as an Alternative Diesel Fuel

This document describes a preliminary regulatory proposal for the use of biodiesel as an Alternative Diesel Fuel (ADF). Air Resources Board (ARB) staff expects that this preliminary proposal will form a major element of a comprehensive ADF regulation for the Board's consideration in 2015. The other essential element of the comprehensive regulatory proposal contains provisions that establish a multi-stage legal pathway for future emerging diesel fuel alternatives. The regulatory proposal for the multi-stage pathway is fully described in the October 2013 Initial Statement of Reasons entitled, "Proposed Regulation on the Commercialization of New Alternative Diesel Fuels" (2013 ISOR). The 2013 ISOR can be found at:

<http://www.arb.ca.gov/regact/2013/adf2013/adf2013isor.pdf>.

As a basis for the preliminary proposal presented below, ARB staff examined whether any adverse air quality impacts occur in fuel blends containing biodiesel and California conventional diesel fuel. In general, staff found that biodiesel use results in emissions reduction of total particulate matter, toxic diesel exhaust particulate matter, hydrocarbons and carbon monoxide, but increased oxides of nitrogen (NOx) emissions in certain circumstances. Staff's major findings on NOx emissions (compared to conventional petroleum CARB diesel) include:

- NOx emissions increase about one percent in blends containing five volume percent soy-based biodiesel; however, no NOx increases occur in blends containing five volume percent animal-based biodiesel;
- NOx emissions increase about two percent in blends containing ten volume percent soy-based biodiesel;
- NOx emissions increase about four percent in blends containing twenty volume percent soy-based biodiesel;
- Biodiesel made from animal tallow generally exhibits about half or less the NOx increase compared to soy-based biodiesel;
- Blends containing twenty volume percent soy-based biodiesel, fifty-five volume percent renewable diesel and twenty five volume percent conventional diesel result in no NOx increase;
- Use of one volume percent di-tert-butyl peroxide in blends containing twenty percent soy-based biodiesel exhibit no NOx increase; and
- There are no NOx increases in light duty vehicles or new technology diesel engines (NTDE), which are expected to represent 95 percent of heavy duty engines by 2024.

An analysis of biodiesel blend NOx impacts can be found in the 2013 ISOR, and ARB emissions studies located at: <http://www.arb.ca.gov/fuels/diesel/altdiesel/biodocs.htm>.

Major findings at five volume percent biodiesel blends are preliminary and subject to change because new data was only recently released to the public, and staff is currently soliciting stakeholder feedback assessing the emissions data.

The proposal presented below represents ARB staff's current thinking about the use of biodiesel as an ADF in light of the new test data. A comprehensive regulation order will be developed over the upcoming months as part of the ADF rulemaking process. The preliminary proposal for biodiesel use presented below is anticipated to result in compliance costs, and is provided in conjunction with the solicitation of alternatives.

Regulation Goals

The goals of the proposed regulation are two-fold: 1) to establish a comprehensive, multi-stage process governing the commercialization of new ADF formulations in California, and 2) to establish special provisions for biodiesel as the first recognized ADF to permit its use within the commercial fuels market in volumes and blends that will ensure no significant adverse impacts on public health or the environment relative to conventional petroleum CARB diesel.

Regulatory Standard

On or after January 1, 2016, all biodiesel blends that reach the NOx significance threshold will be required to mitigate NOx increases to ensure no significant adverse impacts on public health relative to conventional CARB diesel, according to staff's current thinking. The methods by which NOx can be mitigated are described below. The NOx mitigation requirements will sunset once NTDEs represent 95 percent of the heavy duty diesel engines in California.

NOx Significance Threshold

The NOx significance threshold depends upon the feedstock used to produce biodiesel. Staff currently proposes to identify biodiesel blends above one percent for soy-based biodiesel as the NOx significance threshold. Staff currently proposes to identify biodiesel blends above five volume percent for biodiesel produced from animal-based biodiesel as the NOx significance threshold. For all other biodiesel, staff proposes to set the significance threshold at the same level as for soy-based biodiesel.

NOx Mitigation

Based on staff's understanding of NOx impacts from biodiesel use, several viable NOx mitigation options have been identified. Descriptions of these options are contained in

the 2013 ISOR and in presentations made at public workshops, which can be found at <http://www.arb.ca.gov/fuels/diesel/altdiesel/biodiesel.htm> and <http://www.arb.ca.gov/fuels/diesel/altdiesel/meetings/meetings.htm>.

1. Blends using biodiesel produced from soy or other non-animal based feedstocks:

Biodiesel blends containing greater than one volume percent may be mitigated using one of the following options.

- (A) use of di-tert-butyl peroxide NOx reducing additive,
- (B) use of co-blended renewable diesel,
- (C) certification of biodiesel blends or additives,
- (D) contractual arrangements to ensure commensurate use of biodiesel and renewable diesel in the same area and timeframe.

According to the data presented both earlier in this paper and in the 2013 ISOR, preliminary analysis shows mitigation levels needed for full NOx mitigation are:

Option 1: One percent by volume di-tert-butyl peroxide NOx reducing additive for B20 and

Options 2 and 4: 2.75 gallons of renewable diesel for every gallon of soy-based biodiesel.

2. Blends using biodiesel produced from animal tallow feedstocks:

Biodiesel blends containing greater than five volume percent biodiesel may be mitigated by one of the following options.

- (A) use of di-tert-butyl peroxide NOx reducing additive,
- (B) use of co-blended renewable diesel,
- (C) certification of biodiesel blends,
- (D) contractual arrangements to ensure commensurate use of biodiesel and renewable diesel in the same area and timeframe.

Staff's preliminary assessment is that mitigation levels will be approximately half of those mentioned for soy-based biodiesel for the same blend level.

In addition to the options above, staff is proposing exemptions for biodiesel sold to fleets that are 95 percent light duty or NTDEs.

Sampling and Recordkeeping

Staff proposes to require appropriate sampling and recordkeeping requirements as described in the proposed regulation order contained in the 2013 ISOR.