

**Proposed Rule on “Diesel Particulate Matter Exposure of  
Underground Metal and Nonmetal Miners”**

**RIN: 1219-AB29**



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The National Biodiesel Board appreciates the opportunity to offer comments on the proposed rule entitled “*Diesel Particle Matter Exposure of Underground Metal and Nonmetal Miners*” (RIN: *1219-AB29*). Air quality is a critical issue for workers who use diesel engines in confined spaces, and using biodiesel fuel in mining equipment is one way to help protect their health.

We greatly appreciate the Administration’s inclusion of biodiesel as a feasible control technology, and wanted to take this opportunity to address some of the concerns raised about biodiesel in the proposed rule.

First, here is some background with respect to biodiesel’s benefits as a cleaner, alternative fuel.

## **BIODIESEL BACKGROUND**

Biodiesel is a domestically produced, renewable fuel that can be used in unmodified diesel engines with the current fueling infrastructure. It is commonly made from vegetable oils such as soybean oil. Biodiesel can be used immediately and seamlessly as a clean-burning, no-sulfur alternative fuel or lubricity additive. In addition, the use of biodiesel contributes to a longer equipment life, lower maintenance costs and less equipment downtime.

Biodiesel has enormous healthy emissions attributes, ultra low sulfur levels, and lubricity characteristics. Testing confirms that biodiesel is non-toxic, readily biodegradable, and reduces serious air pollutants such as carbon monoxide, carbon dioxide, unburned hydrocarbons, particulates, sulfate emissions and air toxics.

### **Emissions Benefits**

Biodiesel is the only alternative fuel to have completed the rigorous Tier I and Tier II Health Effects testing requirements of the Clean Air Act (section 211(b)). Biodiesel emissions show decreased levels of poly-cyclic aromatic hydrocarbons (PAHs) and nitrated PAH (nPAH) compounds which have been identified as potential cancer causing compounds.

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In this testing, PAH compounds were reduced by 75% to 85%, with the exception of benzo(a)anthracene, which was reduced by roughly 50%. Targeted nPAH compounds were also reduced dramatically with biodiesel fuel, with 2-nitrofluorene and 1-nitropyrene reduced by 90%, and the rest of the nPAH compounds were reduced to only trace levels.

The Environmental Protection Agency (EPA) has also surveyed the large body of biodiesel emissions studies and averaged the health effects testing results with other major studies. EPA found that B20 (20% by volume biodiesel blended with 80% by volume conventional diesel fuel) reduced total hydrocarbons by 20%, carbon monoxide by 12%, and total particulate matter by 12% while only slightly increasing NOx by 2%.

### **Environmental Benefits**

In addition to the Health Effects testing, the U.S. Department of Energy and the U.S. Department of Agriculture published the results of a Biodiesel Lifecycle Inventory Study in May, 1998. The study determined that for every unit of fossil energy needed to make neat biodiesel (B100), 3.2 units of energy are gained--contributing to its environmental benefits. In contrast, 1.2 units of fossil resources are used to produce 1 unit of petroleum diesel. This means that for every gallon of biodiesel used, almost 4 gallons of petroleum based diesel can remain in the ground for future use.

Moreover, the lifecycle emissions of carbon dioxide are 78% less than petroleum-based diesel fuel. Therefore, biodiesel offers the most effective lifecycle greenhouse gas mitigation technology currently available for heavy-duty applications.

### **Sulfur**

The ultra low-sulfur diesel rule requires that owners and operators that use diesel fuel will have to use 15 ppm sulfur diesel fuel.” Biodiesel has essentially no sulfur. Therefore, using a percentage of biodiesel in these engines will decrease SOx emissions in direct relation to the amount of biodiesel in the blend.

Furthermore, no additional labeling requirements related to sulfur content would be necessary when biodiesel is used as an additive to the 500 ppm and 15 ppm fuels because biodiesel is virtually free of sulfur.

### **Lubricity**

According to Stanadyne Automotive Corporation, the leading independent U.S. manufacturer of diesel fuel injection equipment, biodiesel significantly enhances engine lubricity – even at very low blends of one-half to two percent. In fact, blends of one percent biodiesel provide up to a 65% increase in lubricity of Number 2 diesel fuel. By incorporating or blending biodiesel with 15 ppm low-sulfur diesel fuel, EPA could alleviate lubricity concerns otherwise apparent with low sulfur diesel.

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EPA has also acknowledged the potential role of the use of biodiesel to alleviate lubricity concerns (*68 Fed. Reg. 28429*) and agree that a market-based approach to address lubricity concerns of low sulfur diesel is the most effective approach. Biodiesel has an important role in addressing these lubricity concerns and is poised to provide a solution to the widely held concern about low sulfur fuel’s lack of lubricity.

### **Biodiesel is a Readily Available Home Grown Energy Source**

Since biodiesel is made from domestically-produced renewable products, its usage can help America reduce its dependence on foreign oil. The U.S. imports more than 53% of its petroleum, and the Department of Energy expects that number to increase to 75% by 2010. Based on U.S. Department of Energy projections, AUS Consultants completed a study on renewable fuels usage. The study found that by increasing renewable fuel use from its current 2% to 4% by 2016, 302 million barrels of crude oil would be displaced by 2016.

### **Operating Performance**

One of the major advantages of biodiesel is the fact that it can be used in existing engines and fuel injection equipment without negative impacts to operating performance. Biodiesel has a higher cetane number than conventional diesel fuel and its use in previous in-field demonstrations showed similar fuel consumption, horsepower, torque, and mileage as conventional diesel fuel.

With respect to usage in underground mines, we offer the following facts:

- ***Biodiesel is safer to use than petroleum diesel.*** The flash point for biodiesel in its pure form is a minimum 260 degrees Fahrenheit versus about 125 degrees Fahrenheit for regular #2 diesel fuel. Although fires are not a frequent occurrence in mines, they can be devastating and diesel equipment is often involved. Biodiesel can help eliminate that concern.
- ***Biodiesel exhaust is less offensive.*** The use of biodiesel and biodiesel blends results in a noticeable, less offensive change in exhaust odor, which can be a real benefit in confined spaces. In fact, equipment operators have compared it to the smell of French fries. Users also report having no eye irritation. Since biodiesel is oxygenated, diesel engines have more complete combustion than petroleum.
- ***Biodiesel does not require special storage.*** In fact, in its pure form or in blends, biodiesel can be stored wherever petroleum diesel is stored, except in concrete-lined tanks. Biodiesel also handles like diesel and is safe to transport.
- ***Biodiesel operates in conventional engines.*** Since engine changes are not necessary, neither are alterations in mining vehicles or spare parts inventories.

Therefore, the utilization of biodiesel fuels in underground mine environments offer substantial opportunities to reduce particulate matter emission from diesel-powered equipment.

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**SPECIFIC CONCERNS RAISED IN RULE**

**Questions Regarding Emissions Reductions**

MSHA conducted sampling at 31 mines to evaluate the effectiveness of several different control technologies for diesel particulate matter. These control technologies included, among others, using biodiesel fuel.

Results indicate that significant reductions in emissions and worker exposure were obtained for all biodiesel mixtures. These reductions were in terms of both elemental and total carbon. Preliminary results for the 20% and 50% recycled vegetable oil (RCO) indicated 30% and 50% reductions in diesel particulate matter (DPM) and exposures, respectively. Preliminary results for the tests on the 50% blend of new soy biodiesel fuel showed about a 30% reduction in DPM emissions and exposures.

In the original final rule published on June 6, 2005, MSHA detailed the results of the tests done in mines using various biodiesel blends. The results were as follows:

**Maysville Mine:** Results for 20% and 50% RVO indicated 33% and 69% reduction in DPM emissions, respectively. Results for the tests on the 50% blend of new soy biodiesel fuel showed about a 37% reduction in DPM emissions. It further showed that DPM concentrations continue to decrease as the percentage of biodiesel fuel increased.

**Maysville Mine:** A second two-part survey was done on the Maysville Mine. The tests were run two months apart, during different outside weather conditions. Results indicated about a 45% reduction in total carbon for the 50% soybean biodiesel fuel blend.

**Black River Mine:** Results for the 35% RVO showed a 31% reduction in DPM emissions in the mine exhaust airflow. Results of the 35% blend of new soy biodiesel fuel showed about a 16% reduction in DPM emissions.

**Testimonial:**

Finally, we would like to point out that the Hutchinson Salt Company in Kansas is the first mine of any kind to use B100. According to the mine’s Vice President of Manufacturing Max Liby, “The main benefit (of using biodiesel) is we have cleaned up soot in the air and have cut particulates. Workers, particularly the operators of the loaders, like the soy biodiesel much better because they say particulates do not get in their nostrils and the air is noticeably cleaner. Also, lubricity is much greater than if we used regular diesel fuel, so the injector pumps and injectors work more efficiently. The soy biodiesel actually cleans the injectors.”<sup>1</sup>

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<sup>1</sup> December 22, 2004 National Biodiesel Board Press Release, “Kansas Salt Mine Becomes First to Use B100 Biodiesel.”

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### **Availability and Price**

Questions have been raised about the availability and price of biodiesel. Consider the following facts:

- Biodiesel has become America’s fastest growing alternative fuel, according to the Department of Energy. There are presently more than fifty-five companies in 26 states that have invested millions of dollars into the development of biodiesel manufacturing plants and are actively marketing biodiesel. Current dedicated production capacity (which relates to the capacity of US plants that produce nothing but biodiesel) is estimated to be 180 million gallons per year. It is estimated that an additional 110 million gallons of excess capacity exists within the oleochemical industry.
- Further fifty-four companies have reported their plans to construct dedicated biodiesel plants in the near future. Proposed plants are those companies that are in permitting, equity drive or construction phase of the project, but are not yet actively producing biodiesel. Their combined capacity, if realized, would result in another 570 million gallons per year of biodiesel production. Conservatively speaking, production capacity is expected to increase by at least 100 million gallons between May 2005 and May 2006.
- More than 600 filling stations make biodiesel available to the public, and 1,500 petroleum distributors carry it nationwide. More than 600 fleets use biodiesel, including government and military, commercial and school bus fleets.
- As for price, upon the enactment of the biodiesel tax incentive, the price of biodiesel is now comparable to regular diesel fuel. Averaging out to about 1 penny per percentage of biodiesel in the fuel, B20 which historically has been about 20 cents above the price of diesel should now be basically equal in price when this tax incentive gets passed down to the consumer.

### **Cold Weather Performance**

All biodiesels are not created equal in cold weather operability. As with diesel fuels, biodiesel and biodiesel blends can gel as the ambient temperatures drop. The higher the percentage of biodiesel in the blend, the poorer the low-temperature properties can be.

But here are results of some tests recently conducted on biodiesel in cold weather situations. First, B2 does not measurably impact cold-weather performance. According to a recent study by Williams Laboratory Services, there is no real difference in cold-flow properties between B2 and #2 diesel.<sup>2</sup> Nor is there a difference in cold flow properties regardless of whether B2 is added to a 50/50 blend of #1 and #2 diesel.

Oil chemical researchers at the USDA laboratory in Peoria found that even at a B10 blend, the cold-flow properties of biodiesel are barely distinguishable from the diesel fuel in which it is blended.

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<sup>2</sup> “Low-Temperature Properties of Triglyceride-Based Diesel Fuels: Transesterified Methyl Esters and Petroleum Middle Distillate/Ester Blends,” *Journal of the American Oil Chemists Society*, Vol. 72, No. 8 (1995).

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Further, twenty-percent blends have been used in the upper Wisconsin area and in Iowa during -25 degree Fahrenheit weather without any problems. Successful winter tests in Hennepin County, MN and Montana further confirm the winter operability of soy biodiesel.

However, when problems do occur, there are solutions. These solutions are the same ones that are used with conventional #2 petrodiesel, including: using insulation, agitation or heating systems for above-ground storage tanks and pumping equipment; splash-blend warm biodiesel with petroleum diesel fuel; blend biodiesel with #1 diesel in a 50/50 mix before blending with cold petroleum diesel fuel; use cold-flow enhancing additives; turn on the fuel filter or fuel line heaters; add xylene, Heavy Aromatic Naptha (HAN) or kerosene before mixing with cold petroleum diesel fuel; or store the fuel near a building.

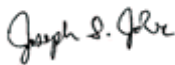
### **Engine Manufacturers’ Warranties**

Most major diesel engine manufacturers have affirmed that use of B20 in their equipment will not void their warranties and are actively working with industry on research and development activities. Moreover, fuel injection equipment manufacturers have identified biodiesel as a renewable lubricity additive. In fact, Stanadyne Automotive submitted comments to the EPA which stated that biodiesel is a superior solution to lubricity loss in low and ultra low-sulfur diesel fuel because of its effective lubricity enhancement and because it eliminates the inherent variability of using additives.

### **Conclusion**

Again, we appreciate the opportunity to address the concerns raised about biodiesel by MSHA in their proposed rule. We hope there is now no reluctance to use biodiesel in these underground mines where air quality is so essential to the health and well-being of our nation’s miners. We stand ready to work with MSHA as it finalizes this important rule.

Sincerely,



Joe Jobe, Executive Director  
National Biodiesel Board