



Regulatory Announcement

Summary of EPA's Proposed Program for Low Emission Nonroad Diesel Engines and Fuel

The U.S. Environmental Protection Agency (EPA) is proposing a comprehensive national program to reduce emissions from nonroad diesel engines by integrating engine and fuel controls as a system to gain the greatest emission reductions. To meet the proposed emission standards, engine manufacturers will produce new engines with advanced emission control technologies. The proposed exhaust emission standards would apply to diesel engines used in most kinds of construction, agricultural, and industrial equipment. (The proposed standards do not apply to diesel engines used in locomotives or marine vessels. EPA has previously established standards for these categories.) The proposed standards would take effect for new engines starting as early as 2008 and be fully phased in by 2014. The proposed standards are phased in over several years to provide adequate lead time to the engine and equipment manufacturers. The proposed exhaust emission standards will reduce emissions by more than 90 percent, and are similar to the requirements for engines used in highway trucks and buses.

EPA estimates that nonroad diesel engines that would be affected by the proposal currently account for about 44 percent of total mobile source diesel particulate matter (PM) emissions and about 12 percent of total nitrogen oxide (NOx) emissions from mobile sources nationwide. These proportions are even higher in some urban areas. Because the

emission control devices can be damaged by sulfur, EPA is also proposing to reduce the allowable level of sulfur in nonroad diesel fuel by more than 99 percent. Reducing nonroad emissions is essential to the efforts of federal, state, local, and tribal governments to improve air quality in all areas of the country and reduce the adverse health impacts.

Why We Need To Reduce Emissions From Nonroad Diesel Engines

Nonroad diesel engines contribute greatly to air pollution in many of our nation's cities and towns. Over the next several years, nonroad diesel engines will produce an even greater share of overall emissions as other emission control programs take effect for cars and trucks and other nonroad emissions sources.

Nonroad engines being produced today must meet relatively modest emission requirements and, therefore, continue to emit large amounts of NO_x and PM, both of which contribute to serious public health problems. Recent air quality data show that about 111 million people live in areas that violate air quality standards for ground-level ozone, also called smog. About 70 million people live in areas that violate air quality standards for PM. In addition, PM, NO_x, and ozone adversely affect the environment in various ways including visibility impairment, crop damage, and acid rain.

Exhaust from diesel engines, which contributes to unhealthy concentrations of fine particles and ozone, is a public health concern. Children, people with heart and lung disease, and the elderly are most at risk.

Exhaust Emission Standards

Nonroad diesel engines built since 1996 have had to comply with modest emission standards, with the focus on reducing NO_x emissions. Emission standards have generally not addressed PM emissions. Under the new proposed emission standards manufacturers are expected to use high-efficiency control systems to substantially reduce both NO_x and PM emissions. This will achieve a level of control that compares with automobiles being built today. Table 1 shows the proposed emission standards (in grams per horsepower-hour) and when these standards would apply for different sizes of engines. These standards are similar in stringency to the final standards adopted for 2007 and later diesel-powered trucks and buses.

Table 1: Proposed Tier 4 Emission Standards (g/hp-hr)

Rated Power	First Year that Standards Apply	PM	NOx
less than 25 hp	2008	0.30	—
equal to or more than 25, but less than 75 hp	2013	0.02	3.5*
equal to or more than 75, but less than 175 hp	2012-2014	0.02	0.30
equal to or more than 175, but less than 750 hp	2011-2013	0.01	0.30
greater than or equal to 750 hp	2011-2014	0.01	0.30

* The 3.5 g/hp-hr standard includes both NOx and nonmethane hydrocarbons.

The proposal includes new provisions to help ensure that emission control systems perform as well when operating in actual service conditions as in the laboratory. These procedures will allow for testing an engine's emission levels while the machinery operates in normal service.

Nonroad Diesel Fuel

Just as lead was phased out of gasoline because it damages catalytic converters in cars, sulfur can contaminate high-efficiency emission control systems used on diesel engines. Nonroad diesel fuel currently has sulfur levels of about 3,400 parts per million (ppm) on average. This proposal would reduce these levels by 99 percent, which is an essential step in achieving the emission reductions anticipated under the proposal.

Starting in 2007, fuel sulfur levels in nonroad diesel fuel would be limited to a maximum of 500 ppm, the same as for current highway diesel fuel. This limit also covers fuels used in locomotive and marine applications (though not to the marine residual fuel used by very large engines on ocean-going vessels). Reducing fuel sulfur levels to 500 ppm or lower will provide immediate public health benefits by reducing particulate emissions from engines in the existing fleet of nonroad equipment, with the added benefit of reducing the cost of maintaining engines.

The proposal includes a second step of fuel controls to a 15-ppm limit on sulfur content that would apply in 2010. This additional reduction in sulfur levels will further reduce PM emissions from existing engines. More importantly, the ultra-low sulfur levels will make it possible for engine manufacturers to use advanced emission control systems that will achieve dramatic reductions in both PM and NO_x emissions.

Estimated Cost and Benefits

The estimated costs related to low-sulfur fuel take into account all the necessary changes in both refining and distribution practices. EPA estimates the cost of producing 500 ppm fuel to be on average 2.5 cents per gallon. Average costs for 15 ppm fuel are estimated to be an additional 2.3 cents per gallon, for a combined cost of 4.8 cents per gallon.

The estimated costs vary widely for equipment of different sizes and for different applications. For the vast majority of equipment, the cost of meeting emission standards will be roughly one to two percent compared with the typical retail price. Costs could range higher for some types of equipment. As an example, EPA estimates that for a 175-horsepower bulldozer, it will cost an additional \$2,600 to add the advanced emission control systems to the engine and to design the bulldozer to accommodate the modified engine. A new 175-horsepower bulldozer costs approximately \$230,000, so the increased costs are about one percent of the total purchase price. In addition, engines running on low-sulfur fuel will have reduced maintenance expenses that we estimate will be equivalent to reducing the cost of the fuel by 3.3 cents per gallon.

The proposal includes six main provisions to reduce the economic impact of meeting new emission standards and requirements for low sulfur fuels:

- (1) The requirements provide sufficient lead time to develop and produce the necessary advanced emission control systems.

- (2) Engine manufacturers that qualify as small businesses will have extra time to meet the requirements.
- (3) Small refiners will have three to four years of additional lead time to reduce sulfur levels.
- (4) Incentives are proposed to encourage companies to meet requirements early if possible.
- (5) The proposal allows additional time for equipment manufacturers to use engines that do not yet meet the new standards.
- (6) Companies may petition EPA for relief if the burden of the regulations would cause severe economic hardship.

Reducing NO_x and PM emissions from nonroad diesel engines by more than 90 percent would provide a wide range of public health benefits. We have estimated that, by 2030, controlling these emissions would annually prevent 9,600 premature deaths, over 8,300 hospitalizations, and almost a million work days lost.

Public Participation Opportunities

The proposal and related documents are available at www.epa.gov/nonroad. EPA welcomes comments on this proposal. You can comment via e-mail by sending a message to nrt4@epa.gov. See EPA's Web site or the *Federal Register* notice for instructions on additional ways to send comments. You may submit written documents until August 20, 2003.

Public hearings will be held in New York on June 10, Chicago on June 12, and Los Angeles on June 17, 2003. Detailed information about the hearings will be published in the *Federal Register* and at www.epa.gov/nonroad/#hearings.

For Further Information

You can access documents on nonroad diesel engines on the Office of Transportation and Air Quality Web site at: www.epa.gov/otaq/equip-hd.htm.

You can also contact EPA at:

U.S. Environmental Protection Agency
Assessment and Standards Division
2000 Traverwood Drive
Ann Arbor, MI 48105
Information line: (734) 214-4636
E-mail: asdinfo@epa.gov