



Environmental Fact Sheet

Environmental Benefits of Proposed Emission Standards for Locomotives

The Environmental Protection Agency (EPA) is proposing emission standards for oxides of nitrogen (NO_x), hydrocarbons (HC), carbon monoxide (CO), particulate matter (PM) and smoke for newly manufactured and remanufactured locomotives and locomotive engines. The proposed standards will achieve approximately a two-third reduction in NO_x emissions and will reduce HC and PM emissions by half.

Overview of Rulemaking

EPA is proposing emission standards for locomotives that will provide significant emission reductions to help states comply with National Ambient Air Quality Standards (NAAQS) for ozone and PM. The proposed rule is expected to be finalized by the end of 1997 and take effect in 2000. Since locomotive emissions have not been regulated before, it was necessary for EPA to create a comprehensive program, including not only emission standards, but also test procedures and a full compliance program. Three separate sets of emission standards are proposed, with applicability of the standards dependent on the date a locomotive is first manufactured. The first set of standards (Tier 0) are proposed to apply to locomotives and locomotive engines originally manufactured from 1973 through 1999, any time they are remanufactured in calendar year 2000 or later. The second and third sets of standards (Tier I and Tier II) will apply to locomotives and locomotive engines originally manufactured on or after January 1, 2000 (Tier II stan-

dards will take effect on January 1, 2005). These locomotives and locomotive engines will also be required to meet the same standards at each subsequent remanufacture. The Agency is also proposing a rigorous emission testing program to make sure that locomotives comply with these standards for the life of the locomotive.

Health and Environmental Concerns

Most locomotives in the U.S. are powered by diesel engines. Thus locomotives have significant NOx emissions, as well as HC and PM emissions, all of which have significant health and environmental effects. NOx is a major component of smog and acid rain. NOx emissions combine with HC in the atmosphere to form ground-level ozone, the primary constituent of smog. Ozone is a highly reactive pollutant that damages lung tissue, causes congestion, and reduces vital lung capacity, in addition to damaging vegetation. Acid rain damages buildings and crops, and degrades lakes and streams. NOx also contributes to the formation of secondary PM. PM causes headaches, eye and nasal irritation, chest pain, and lung inflammation. Environmental impacts of PM include reduced visibility and deterioration of buildings.

Locomotive Emission Inventories

Locomotive NOx emissions are estimated to represent about 4.7 percent of NOx emissions from all mobile and stationary sources in the U.S. Locomotive PM and HC emissions are both estimated to represent less than one-quarter of one percent of total national emissions. Thus, the focus of the proposed regulation is on NOx emission reductions. It should be noted that in some urban areas that have very high rail traffic, such as Chicago or El Paso, NOx emissions can represent nearly one-tenth of the total NOx inventory.

Current National Locomotive Emission Inventories

	Metric Tons Per Year	Percent of Total Inventory (All Sources)
NOx	980,000	4.7
PM-10	24,000	0.1
HC	38,000	0.2

What Are the Environmental Benefits?

When fully phased-in, the proposed emission standards will reduce NO_x emissions from locomotives by nearly two-thirds, and HC and PM emissions by half. However, they will also achieve very significant emission reductions in the near term. These reductions, which are shown below, are being heavily relied upon by those areas that have very high rail traffic, as well as Southern California, which has moderately high rail traffic and very significant air quality needs. To put these national NO_x emission reductions into context, the 348,000 ton per year reduction expected in 2005 would be equivalent to removing about 20 million passenger cars from the road. In addition, NO_x emission reductions will also lead to reductions in ambient concentrations of secondary PM. It has been estimated that about 4 tons of nitrate particulate is formed from every 100 tons of NO_x emitted. Thus, the secondary PM reduction expected in 2005 is about 14,000 tons per year.

Projected National Emission Reductions (Metric Tons Per Year)

Year	2005	2010	2015	2020
NO _x	348,000	382,000	417,000	451,000
PM	300	1,700	3,200	4,700
HC	400	2,500	4,500	6,600
Secondary PM*	14,000	15,000	17,000	18,000

* Assumes 4 tons of nitrate particulate formed for each 100 tons of NO_x emitted.

Reductions from Existing Locomotive Fleet

The fact that so much of the NO_x emission reduction will come early in the program is due to the Tier 0 standards that apply to existing locomotives when they are remanufactured. These standards are a unique feature of this proposed regulation, and would represent the first time that EPA has regulated the remanufacturing of an existing fleet on such a large scale. Such regulation of the remanufacturing process is critical because locomotives are generally remanufactured five to ten times during their total service lives (typically 40 years or more). Standards that would only apply to locomotives originally manufactured after the effective date of the rule would not achieve significant emissions reductions until those future locomotives replaced a significant number locomotives in the existing fleet. For the first 13 years of the program, the majority of projected NO_x emission reductions will be the result of the Tier 0 emission standards that apply to existing locomotives.

Projected NOx Emission Reductions From Locomotives Manufactured Before and After January 1, 2000 (Metric Tons Per Year)

Year	2005	2010	2015	2020
Tier 0 (Pre-2000 Locomotives)	275,000	234,000	194,000	153,000
Tier I & II (Later Locomotives)	73,000	148,000	223,000	298,000

For More Information

Information on the proposed rule is available electronically via the EPA Internet server via the dial-up modem on the Technology Transfer Network (TTN), an electronic bulletin board system (BBS).

World Wide Web:<http://www.epa.gov/OMSWWW>

TTN BBS: 919-541-5384 (1200-1440 bps, no parity, 8 data bits, 1 stop bit); voice helpline 919-541-5384.

For further information on the proposed rule, please write to:

U.S. Environmental Protection Agency
Engine Programs and Compliance Division
2565 Plymouth Road
Ann Arbor, MI 48105

or call: (313) 668-4333.