Updated Informative Digest
PUBLIC TRANSIT BUS FLEET RULE AND EMISSION STANDARDS
FOR NEW URBAN BUSES

Sections Affected

Adoption of new sections 1956.1, 1956.2, 1956.3, and 1956.4, Title 13, California Code of Regulations (CCR). Adoption of "California Certification Procedures for PM Retrofit Devices for On-Road Heavy-Duty Diesel Engines" incorporated by reference in section 1956.2. Amendments to section 1956.8, Title 13, CCR, and the incorporated "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Engines and Vehicles," and section 1965, Title 13, CCR, and the incorporated "California Motor Vehicle Emission Control and Smog Index Label Specifications."

Background

Pursuant to Health and Safety Code section 43806, the Air Resources Board (the "Board" or "ARB") adopted amendments to the emission standards and test procedures for urban transit buses and engines and other heavy-duty vehicles and engines in June 1993 and June 1995, respectively. The ensuing regulations set the California particulate matter (PM) emission standard at 0.05 grams per brake horsepower-hour (g/bhp-hr) and the oxides of nitrogen (NOx) emission standard at 4.0 g/bhp-hr for all 1996 and later California urban bus engines. For other heavy-duty engines (exclusive of engines used in urban buses), the PM and NOx emission standards for all 1998 and later California heavy-duty engines and vehicles were set at 0.10 g/bhp-hr and 4.0 g/bhp-hr, respectively. Since 1998, California and United States Environmental Protection Agency (U.S. EPA) emission standards have been consistent for heavy-duty vehicles and urban buses.

To further reduce emissions, however, the U.S. EPA adopted regulations in October 1997 that specified more stringent emission standards for all 2004 and subsequent model year heavy-duty diesel engines, including urban bus engines (Federal Register, Vol. 62, No. 203, October 21, 1997, pp. 54694-54730). In April 1998, the ARB adopted more stringent emission standards for all 2004 and subsequent model year heavy-duty diesel engines that aligned with those already adopted by the U.S. EPA. Like the federal standards, the California standards included a NOx plus non-methane hydrocarbon (NMHC) emission standard of 2.4 g/bhp-hr, or 2.5 g/bhp-hr with a 0.5 g/bhp-hr NMHC cap.

Subsequent to the adoption of those regulations, the U.S. EPA, the ARB, and seven manufacturers of heavy-duty engines signed the Heavy-Duty Diesel Engine Settlement Agreements in 1998. The Settlement Agreements, applicable to engines produced for sale in California, are a result of engine manufacturers using alternative emission control devices that increased NOx emissions beyond what would be expected on the

Federal Test Procedure. The Settlement Agreements require a variety of mitigating measures, including requiring most engine manufacturers to produce engines meeting the 2004 standards beginning October 1, 2002. Similar agreements, referred to collectively as the federal Consent Decree, are applicable to engines produced for sale outside of California.

Description of Regulatory Action

At a public hearing held on January 27, 2000, the ARB considered the adoption of a regulation for a public transit bus fleet rule and emission standards for new urban buses. After extensive public testimony, the Chairman closed the public record for the proposed regulation and continued the hearing until February 24, 2000. At the January hearing, the staff presented modifications to the regulation as originally proposed in the Staff Report released and made available to the public on December 10, 1999. At the February hearing, the staff presented additional modifications to the regulation as originally proposed in response to public testimony and Board direction at the January hearing. On February 24, 2000, the Board approved the staff's proposal with the modifications presented at both the January and February hearings, with minor changes.

The regulation approved by the Board contains two complementary elements to reduce emissions from urban buses: 1) a multi-component transit bus fleet rule applicable to transit agencies; and 2) more stringent emission standards for engines used in urban buses, applicable to engine manufacturers. The fleet rule is designed to achieve near-term emission benefits, while the engine standards are designed to achieve long-term emission benefits resulting from new bus engines with ultra-low, near-zero, and zero-emissions.

The regulation approved by the Board is structured to encourage transit agencies to voluntarily purchase cleaner alternative-fuel buses in order to reduce emissions of NOx and PM. To provide transit agencies with flexibility in determining their optimal fleet mix, the regulation allows transit agencies to choose between two compliance paths – the diesel path or the alternative-fuel path. Although the two paths have been designed to provide approximately equivalent NOx emission benefits over the life of the fleet rule requirements, the alternative-fuel path provides immediate NOx and PM benefits. Additionally, the alternative-fuel path provides greater PM emission benefits than the diesel path due to inherently low in-use PM emissions from alternative-fuel buses. While the alternative-fuel path achieves emission reductions sooner, the diesel path is the first to utilize advanced technology for low-emission and zero-emission buses.

The key components of the urban bus regulation are:

In-Use NOx Fleet Average Requirement

To reduce NOx emissions from the in-use urban bus fleet, the regulation requires transit agencies on both the diesel and alternative-fuel paths to meet and maintain a minimum fleet average NOx standard of 4.8 g/bhp-hr by October 1, 2002.

PM Retrofit Requirements

The regulation will reduce PM emissions from in-use diesel-fueled, dual-fuel, bi-fuel and diesel hybrid-electric urban buses by 85 percent by requiring them to be retrofitted with ARB-certified particulate traps. The retrofit requirements apply to existing and future urban buses with engines through the 2002 model year produced before October 1, 2002. The regulation includes a phased-in retrofit schedule from 2003 through 2009, with an emphasis on requiring retrofits for the oldest, dirtiest buses first. The retrofit requirements are applicable to transit agencies on both the diesel and alternative-fuel paths, but transit agencies on the diesel path must adhere to an accelerated phase-in schedule and must complete all retrofits two years sooner than transit agencies on the alternative-fuel path.

Low-Sulfur Diesel Fuel Requirement

Low-sulfur diesel fuel is necessary for many aftertreatment technologies to function efficiently and reliably. Beginning July 1, 2002, the regulation requires most transit agencies with diesel buses to purchase diesel fuel with a cap of 15 parts per million sulfur by weight. This requirement is timed to coincide with the PM retrofit requirements.

Stringent Emission Standards for New Urban Bus Engines

This regulation implements several new stringent emission standards for urban bus engines. First, 2002 and subsequent model year diesel-fueled, dual-fuel, and bi-fuel bus engines produced on or after October 1, 2002, must meet a 0.01 g/bhp-hr PM standard. This represents an 80 percent reduction from the existing PM standard for urban bus engines. Next, beginning with the 2004 model year, diesel-fueled, dual-fuel, and bi-fuel urban bus engines must also meet stringent new standards for NMHC, carbon monoxide (CO), formaldehyde, and NOx. The new required NOx standard, 0.5 g/bhp-hr, represents a 75 percent reduction from the existing NOx standard. The regulation also includes a provision to allow transit fleets to implement an alternative emission reduction strategy in lieu of purchasing diesel-fueled, dual-fuel, or bi-fuel buses meeting the 2004 standards when making new bus purchases. Finally, beginning with the 2007 model year, all urban bus engines (regardless of fuel type)

must meet new emission standards for NOx, PM, NMHC, CO, and formaldehyde. These emission standards include a 0.2 g/bhp-hr NOx standard and a 0.01 g/bhp-hr PM standard.

Zero-Emission Bus Demonstration Projects

The regulation requires large transit agencies (transit agencies with an active fleet of more than 200 buses) on the diesel path to participate in zero-emission bus demonstration projects. Beginning in July 2003, each participating transit agency is required to place at least three urban buses producing zero exhaust emissions in revenue service. Bus technologies qualifying as zero-emission include battery-electric, fuel cell, and electric trolley.

Zero-Emission Bus Purchase Requirements

The regulation also includes zero-emission bus purchase requirements for large transit agencies on both the diesel and alternative-fuel paths. For large transit agencies on the diesel path, a minimum 15 percent of all new urban bus purchases must be zero-emission buses beginning in 2008. For large transit agencies on the alternative-fuel path, this same purchase requirement applies beginning in 2010.