

to reduce the ambient levels of particulate matter (PM) in urban areas and is limited to 1993 and earlier model year (MY) urban buses operating in metropolitan areas with 1980 populations of 750,000 or more, whose engines are rebuilt or replaced after January 1, 1995. Operators of the affected buses are required to choose between two compliance options: Program 1 establishes PM emissions requirements for each urban bus engine in an operator's fleet which is rebuilt or replaced. Program 2 is a fleet averaging program that establishes specific annual target levels for average PM emissions from urban buses in an operator's fleet.

A key aspect of the program is the certification of retrofit/rebuild equipment. To meet either of the two compliance options, operators of the affected buses must use equipment which has been certified by the Agency. Emissions requirements under either of the two compliance programs depend on the availability of retrofit/rebuild equipment certified for each engine model. To be used for program 1, equipment must be certified as meeting a 0.10 g/bhp-hr PM standard or as achieving a 25 percent reduction in PM. Equipment used for Program 2 must be certified as providing some level of PM reduction that would in turn be claimed by urban bus operators when calculating their average fleet PM levels attained under the program. For program 1, information on life cycle costs must be submitted in the notification of intent to certify in order for certification of the equipment to initiate (or trigger) program requirements. To trigger program requirements, the certifier must guarantee that the equipment will be available to all affected operators for a life cycle cost of \$7,940 or less at the 0.10 g/bhp-hr PM level, or for a life cycle cost of \$2,000 or less for the 25 percent or greater reduction in PM. Both of these values are based on 1992 dollars.

As noted above, operators of affected buses must use equipment which has been certified by EPA. An important element of the certification process is input from the public based on review of notifications of intent to certify. It is expected that engine manufacturers, bus manufacturers, transit operators, and industry associations will be able to provide valuable information related to the installation and use of particular equipment by transit operators. Such information will be useful to the Engine Programs and Compliance Division in its role of determining whether any specific equipment can be certified.

II. Notification Of Intent To Certify

By a notification of intent to certify signed August 18, 1995, and subsequently modified by letter dated October 5, 1995, Twin Rivers Technologies, Limited Partnership (TRT), with principal place of business at 780 Washington Street, Quincy, Massachusetts 02169, applied for certification of equipment applicable to certain urban bus engines manufactured by Detroit Diesel Corporation (DDC). The notification states that the candidate equipment will provide reductions in exhaust PM, as discussed below, dependent upon the configuration used, from petroleum-fueled diesel engines that have been properly calibrated or rebuilt to the original engine manufacturer's specifications.

TRT requests certification for the following two configurations of equipment: (1) Biodiesel fuel additive blended with diesel fuel (the blend is referred to as "B20") in combination with a particular exhaust system oxidation catalyst; and, (2) B20 and the catalyst, plus retarded fuel injection timing. Certification, if approved by the Agency, would apply to the combination of catalyst and biofuel supplied by TRT or its licensed distributors. The fuel B20 (alone) is not candidate for certification under this notification.

One configuration of the candidate equipment, as applied to some engines, provides PM reductions greater than 25 percent and the other configuration does not. This is discussed further below. TRT has not provided life cycle cost information with the notification and has not requested to be certified as being available for less than the life cycle cost ceiling.

A key component of both configurations of the candidate equipment is use of biodiesel as an additive at a 20 percent by volume blend ratio with diesel fuel. Biodiesel is an ester-based fuel oxygenate derived from biological sources for use in compression-ignition (that is "diesel") engines. Biodiesel is the alkyl ester product of the transesterification reaction of biological triglycerides, or biologically-derived oils. Any biological oil source, such as vegetable oils, animal fats or used cooking oils and fats, can produce esters through this reaction. TRT has registered biodiesel under the Agency's Fuel/Fuel Additive Registration Program, which defines Twin Rivers biodiesel (marketed as "EnviroDiesel™" and "EnviroDiesel Plus™") as an alkyl ester containing C1-C4 alcohols and C6-C24 acids. The

fuel handling procedure differs from that for diesel fuel only in that it requires mixing by the fuel distributor or bus operator of 20 percent by volume biodiesel with low-sulfur diesel fuel. TRT is a company created specifically for the production of biodiesel.

A key component of both configurations of the candidate equipment is a particular oxidation catalyst-muffler unit (discussed further below) designed to replace the typical noise muffler in the exhaust system of applicable recipient engines. In a report included as an attachment to TRT's notification, it is indicated that the combination of B20 and the catalyst achieve greater PM reductions than with the catalyst alone. Improved PM reduction associated with that combination may be due to an apparent shift in the composition of total exhaust particulates, when using B20, toward a lower soot fraction and higher soluble organic fraction (SOF). It is the SOF portion of the exhaust particulates that an oxidation catalyst is most effective in reducing.

The exhaust catalysts are to be matched to specific urban bus and engine configurations. Further, the maximum allowable exhaust pipe length between engine and catalyst is 108 inches. Exhaust system backpressure is designed to remain within the engine manufacturer's specified limits. The catalyst unit has no additional maintenance requirements for the life of the catalyst.

The second configuration of the candidate equipment includes the retard of fuel injection timing in combination with B20 and the above-described exhaust catalyst. All applicable engines using this second configuration and equipped with mechanical unit injection (MUI) would use a timing retard of four (4) degrees. All applicable engines using this configuration and equipped with electronically-controlled fuel injection would use a timing retard of one (1) degree. The notification states that timing is retarded by a shift of the timing sensor. The Agency requests comment and information concerning the reasonability of these timing specifications.

For its certification testing, TRT used catalytic muffler units that were manufactured by Engelhard Corporation and are the same formulation and configuration that is certified by the Agency for use in the urban bus program (see 60 FR 28402, dated May 31, 1995, for that certification). While an agreement is in place for Engelhard to supply TRT with catalysts, the physical specifications of the catalyst to be used in production are neither part of the