Metropolitan
Transportation
Authority

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TO: **BOARD OF DIRECTORS**

THROUGH: **ROGER SNOBLE**
CHIEF EXECUTIVE OFFICER

FROM: **JOHN B. CATOE, JR.**
DEPUTY CHIEF EXECUTIVE OFFICER

SUBJECT: **STATUS OF EC DIESEL TEST PROGRAM**

ISSUE

This report (Quarterly Report #6) provides a status update to a motion approved by the Board at the May 25, 2000 meeting, which directed that:

a) Within 30 days, staff initiates an expansion of the existing ultra low sulfur diesel fuel (EC Diesel) test program to evaluate the installation of continuously regenerating traps (CRT's) or other similar particulate filters on ten methanol conversion buses.
b) That upon successful completion in February 2001 of the low sulfur diesel fuel (EC Diesel) test program currently underway at the Arthur Winston Division, staff be directed to initiate a program to install CRT's or other similar particulate filters by February 2002 on the entire remaining diesel fleet projected to remain in service after January 2003.
c) Staff provides status reports to the Board on a quarterly basis on the ultra low sulfur diesel test program.

DISCUSSION

In February 2000, the MTA began a one-year test to identify emissions benefits and reliability issues of using low sulfur fuel in diesel transit buses. The test was conducted at the Arthur Winston Division on twenty 1998 New Flyer diesel buses. Of these buses, twelve buses operated on EC Diesel and a control group of eight buses operated on standard #2 diesel fuel. Two buses operating on EC Diesel were also equipped with exhaust after-treatment devices called continuously regenerating traps (CRT's).

Results from the EC Diesel program have been favorable. The vehicle reliability evaluation phase of the program was completed in December 2000 with maintenance data revealing no discernable difference between the reliability of buses operating on low sulfur diesel fuel and buses operating on standard diesel fuel. The results from

Emissions tests conducted about 2 - 3 weeks after installation of the particulate filters on the EC Diesel buses revealed an 80 percent or greater reduction in particulate matter (PM) emissions. The costs associated with the EC Diesel program include bus retrofit costs of about $8,000 per bus and higher fuel costs running about nine cents per gallon greater than conventional diesel fuel (Week of 12/3/01).

The California Air Resources Board (CARB) has mandated use of low sulfur diesel fuel for transit buses in 2002 and will require transit agencies to begin retrofitting older diesel buses with CRT's or other similar after-treatment devices by 2003 to lower particulate matter (PM) emissions.

At the May 2000 Board meeting, a motion was approved to initiate an expansion of the existing EC Diesel test program to evaluate the installation of CRT's or other similar particulate filters on ten methanol conversion buses. In response to the Board's direction, staff developed and implemented a comprehensive test program to evaluate the performance and reliability of particulate filters on the 2-cycle, Detroit Diesel 6V-92 engines used in the methanol conversion buses.

STATUS OF EXPANDED TEST PROGRAM

The following status update will discuss the performance of the particulate filters installed on the 1998 New Flyer buses with 4-cycle engines and the installation of particulate filters on older buses with 2-cycle engines.

1998 New Flyer Buses – The original EC Diesel program that evaluated the use of particulate filters on newer buses with 4-cycle engines is complete. The final emissions tests at the CARB Emissions Test Facility confirmed earlier tests that revealed an 80 percent or greater reduction in particulate matter emissions. Due to the success of particulate filters on the buses with 4-cycle engines:

- Staff has initiated a procurement to install particulate filters on all twenty 1998 New Flyer buses with Series 50 (4-cycle) engines. Bids for the particulate filters are to be received on January 18, 2002.
- Since the initial procurement of ultra low sulfur fuel was for a small fleet of test buses, staff initiated a larger procurement of ultra low sulfur diesel fuel for the expanded fleet of buses with particulate filters. The Board approved the procurement of low sulfur diesel fuel for Division 6 in October and delivery of the ultra low sulfur diesel fuel began in November. Division 6 is now a 100 percent ultra low sulfur diesel fuel division.

Buses with 2-Cycle Engines – The use of particulate filters on buses with 2-cycle engines met with mixed results during the past quarter. The first Johnson Matthey prototype particulate filter that was installed on a methanol conversion bus in late June continued to operate without incident during this quarter. Johnson Matthey (currently one of two manufacturers producing particulate filters) is in the process of manufacturing additional particulate filters for installation on four other methanol conversion buses.

Engelhard (the other manufacturer of particulate filters) installed their first prototype particulate filter on a methanol conversion bus during the third week of November. Unfortunately, Engelhard did not achieve the same level of success as Johnson Matthey. The Engelhard prototype particulate filter (same substrate as used successfully on 4-cycle diesel engines) failed within two weeks of installation. Engelhard has removed the failed unit and will complete an analysis of the failure. Preliminarily, it appears that the particulate filter was not able to "burn off" the particulate matter at the same rate as being generated by the engine. Engelhard has replaced the prototype particulate filter with a current production catalytic muffler while they prepare a new particulate filter with a newly developed substrate. The new particulate filter is expected to be received in mid-January 2002.

NEXT STEPS

During the next quarter, all buses with particulate filters will be transferred to Division 6 to make use of the ultra low sulfur diesel fuel that is now being delivered to that location. The particulate filter bids for the remainder of the 1998 New Flyer buses should be received and installed.

Staff will continue working with both CRT manufacturers to test and evaluate the effectiveness of the CRT technology applied to MTA's 2-cycle diesel engines. Tests are projected to be completed by October 2002 and particulate traps installed soon thereafter on the remaining diesel fleet in accordance with both the CARB deadline and the Board's directive.