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TO: BOARD OF DIRECTORS

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SUBJECT: STATUS OF EC DIESEL TEST PROGRAM

ISSUE

The California Air Resources Board (CARB) will require use of low sulfur diesel fuel for transit buses beginning July 1, 2002. To evaluate emissions benefits and reliability issues with use of low sulfur fuels, the MTA began testing ARCO EC Diesel in twelve transit buses in February 2000. Data from initial tests at the Emissions Test Facility show a significant reduction in vehicle emissions using low sulfur diesel fuel and a continuously regenerating trap.

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 is being conducted at the Arthur Winston Division on twenty 1998 New Flyer diesel buses. Of these buses, twelve buses are operating on EC Diesel and a control group of eight buses is operating on standard #2 diesel fuel.

The CARB has mandated use of low sulfur diesel fuel for transit buses in 2002. The low sulfur fuel is beneficial in that it allows use of exhaust after treatment devices designed to significantly reduce particulate matter (PM). CARB will require transit agencies to begin retrofitting older diesel buses with these devices by 2003 to lower PM emissions by at least 85 percent. Two buses in the test program that are operating on EC Diesel are also equipped with exhaust after treatment devices called continuously regenerating traps (CRT).

After several weeks of operation, three buses in the test program were tested for emissions at the CARB Emissions Test Facility located in the MTA's Regional Rebuild Center. The three buses undergoing the dynamometer testing included one bus from the control group that operated on standard #2 diesel fuel and one bus that operated on EC-Diesel fuel with the CRT trap. The third bus was dynamometer tested using three fueling configurations in succession: EC-Diesel with the trap

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device, EC-Diesel without the trap device, and standard #2 diesel fuel without the trap device. The first two test buses and each configuration of the third bus were tested on four different test cycles - CBD (Central Business District), Arterial (city and higher speed freeway driving conditions), UDDS (EPA Urban Dynamometer Driving Schedule), and the New York City Test Cycle (simulates New York City driving conditions).

Data from initial tests at the Emissions Test Facility show a significant reduction in vehicle emissions using EC Diesel with a CRT trap. As shown in the table below, particulate matter (PM) emissions were reduced by 78.7 percent, hydrocarbon (HC) emissions were reduced by 93.9 percent, and carbon monoxide (CO) emissions were reduced by 95.9 percent in tests comparing EC Diesel with a CRT to a bus operating on standard #2 diesel fuel.

Emissions Reductions (EC Diesel with CRT compared to standard #2 diesel fuel)

Test Cycles	PM	HC	CO	NOx	CO2
CBD	77%	N/A	93%	14%	1%
NYBC	85%	100%	96%	-16%	-9%
Arterial	79%	85%	96%	18%	1%
UDDS	74%	96%	99%	9%	3%
Average of Tests	79%	94%	96%	6%	-1%

Note: Comparison of the second test bus (EC Diesel) to the first test bus (standard #2 diesel).

The oxides of nitrate (NOx) and carbon dioxide (CO₂) emissions were not significantly changed from the EC Diesel to the standard #2 diesel fuel. NOx emissions were reduced by 6.3 percent, and carbon dioxide (CO₂) emissions increased by 0.6 percent. The emissions results from these initial tests are consistent with tests conducted by the manufacturer of the CRT (Johnson Matthey) and ARCO. Johnson Matthey and ARCO have reported PM, HC, and CO emissions reductions of up to 90 percent for diesel vehicles operating on low sulfur diesel fuel in conjunction with a CRT trap.

To validate the initial emissions tests, a third bus in the test program is being tested in three different configurations: EC-Diesel with the trap device, EC-Diesel without the trap device, and standard #2 diesel fuel without the trap device. The data from these tests will be compiled and included in a final report from the ARB in June 2000.

NEXT STEPS

The buses operating on EC-Diesel and CRT's will continue to be tested for one year to identify any reliability issues with low sulfur diesel and the CRT. Further emissions testing will also be conducted to evaluate the performance of the CRT after one year of operation.