

# **CONCENTRATIONS AND SIZE DISTRIBUTIONS OF PARTICULATE MATTER EMISSIONS FROM CATALYZED TRAP-EQUIPPED HEAVY-DUTY DIESEL VEHICLES OPERATING ON ULTRA-LOW SULFUR EC-D FUEL**

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This paper will present particulate matter (PM) concentration and size distribution results from heavy-duty vehicles equipped with catalyzed filters and operating on EC-Diesel (ECD), produced by BP-ARCO. The test vehicles were also operated on EC-D 1 (with and without catalyzed traps), CARB diesel, and natural gas. These vehicles had undergone a year-long investigation in Southern California. EC-D fuel, produced by BP/ARCO, has less than 15 ppm sulfur.

As part of this comprehensive program, concentrations and size distributions of the PM emissions were measured to determine the effect of catalyzed filters on the number count of PM emissions. It was observed that an order of magnitude reduction of total PM mass emissions with the EC-D fueled vehicles equipped with traps over CARB-certified diesel-fueled vehicles (without any exhaust aftertreatment systems) was accompanied by drastic reductions in concentrations of particulate matter emissions.

The natural gas-fueled vehicles also showed very low concentrations of particulate matter compared to the Cummins L10G vehicles that were tested in Dallas in 1999 by West Virginia University. Nanoparticle emissions from natural gas-fueled heavy-duty vehicles are linked to lube oil control and very likely to the age of the vehicles.

Measurement of PM concentrations and size distributions from the filter-equipped vehicles and natural gas-fueled vehicles is rather challenging. A dedicated mini-dilution system with an accurate dilution ratio control scheme was employed to measure PM-size distributions. Utmost care was taken to ensure that particle losses in the sampling system were minimal.