ARB Diesel Particulate Characterization Studies

- **“Determination of the Contributions of Light and Heavy Duty Vehicle Emissions to Ambient Particles in California,”** Prof. Kimberly Prather, UCSD. Aerosol Time of Flight Mass Spectrometry (ATOFMS) and single particle classification methods. Chassis dynamometer source studies of diesel and gasoline vehicles; characterization of fuel and oil samples; a near-road study is planned for spring 2004.
- **“Oxygenated Organics in Gas and Fine Particle Diesel Emissions for Source Apportionment,”** Prof. Judith Charles, UCD. Identification of carbonyls and multifunctional carbonyls (dicarbonyls, hydroxy carbonyls, oxo-acids, etc.) as possible markers for diesel emissions.

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- **“Source Apportionment of Fine and Ultrafine Particles in California,”** Prof. Michael Kleeman, UCD. Source apportionment of fine and ultrafine particles for several major ambient field monitoring and source sampling studies; will participate in a near-road study in spring 2004.
- **“Origins of Fine Aerosol Mass Using PMF,”** Prof. Phil Hopke, Clarkson University. The objectives of this project are to apply positive matrix factorization method to the IMPROVE data to determine the contributions of aerosol sources to the observed fine airborne particulate matter. (Final Report due in January 2004.)

In-House ARB Work Related to Diesel PM Characterization

- **Diesel PM Chemical Marker Studies**: MLD analysis of diesel exhaust particulate samples collected at a truck stop. A pattern of peaks in the C12-C16 molecular weight range was identified as a possible indicator of diesel produced PM.
- **Elemental Carbon Sampling:** Elemental carbon was investigated as a surrogate for diesel PM. PM10 samples from 10 SB25 sites were analyzed for EC using the EPA EC methodology; few measurements produced above detection limit values (even for Boyle Heights and Wilmington sites).
- **Continuous Elemental Carbon, Black Carbon, and COH Measurements:** ARB staff investigated the use of aethelometers and coefficient of haze (COH) measurements as potential indicators of diesel particulate. Initial work showed that other combustion sources (e.g. wood smoke) interfered. A new study will look at the correlation between normalized BC and COH (normalized by carbon monoxide concentrations) and diesel source strength and activity.

Related Diesel PM Characterization Efforts

- CRC sponsored project E55/59: **"Heavy-Duty Vehicle Chassis Dynamometer Testing for Emissions Inventory, Air Quality Modeling, Source Apportionment, and Air Toxics Emissions Inventory."** Characterization of current California diesel truck fleet (~75 vehicles). Extensive chemical speciation of exhaust will be done for a limited number of vehicles (DRI organic & inorganic analysis).
- DOE/NREL funded: **"Gasoline-Diesel PM Split Study."** DRI (E. Fujita) and University of Wisconsin, Madison (J. Schauer) will conduct a study of the relative contributions of emissions from diesel and gasoline vehicles to PM2.5 in the urbanized region of the South Coast Air Basin. (A Final Report is expected soon.)