

OHVT GASOLINE/DIESEL PM SPLIT STUDY

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Results from the recently completed 1996/97 Northern Front Range Air Quality Study (NFRAQS) suggest a much higher contribution of directly-emitted $PM_{2.5}$ from spark ignition (SI) engines to ambient air quality in Denver wintertime conditions than suggested by the area's $PM_{2.5}$ emission inventory. The NFRAQS program tested a large number of in-use vehicles (including high emitters and smokers) under ambient temperatures at Denver's altitude, using different phases of the Federal Test Procedure. In contrast, a series of studies conducted in the South Coast (Los Angeles) Air Basin (SoCAB) suggest that directly emitted particles from compression ignition (CI) engines are more important to the inventory than are directly emitted particles from SI engines. The work conducted in Los Angeles was conducted over a several-year period, using different vehicles and fuels for source testing and with different fuels than are presently available in the SoCAB.

We will describe the OHVT's Gasoline/Diesel PM Split Study, whose overall objective is to quantify the relative contributions of tailpipe emissions from gasoline-powered motor vehicles and diesel-powered motor vehicles to the ambient concentrations of fine particulate matter ($PM_{2.5}$) in the urbanized region of Southern California using an organic compound-based chemical mass balance model (CMB). A fundamental goal of this study is to obtain a better understanding of the uncertainties associated with the CMB receptor modeling approach. This study is necessary, particularly in light of conclusions regarding the relative contributions of diesel and gasoline combustion to ambient concentrations of fine particles from studies in the Los Angeles area and the Northern Front Range of Colorado.

This study will involve several groups working cooperatively on sample collection and quality assurance aspects of the study, but working independently, at least initially, on chemical analysis and data analysis. One group will use sample collection analysis methods and CMB procedures that are consistent with those employed in previous Los Angeles studies, and the second group will adhere to methods and procedures used in the NFRAQS. Source and ambient samples will be collected in a manner that can support these independent receptor-modeling calculations. The final result of the following tasks is to separately quantify the primary source contributions of both gasoline- and diesel-powered vehicles and uncertainties associated with these apportionments.

Groups participating in the Study include California's Bureau of Automotive Repair, South Coast Air Quality Management District, U.S. Environmental Protection Agency, Ralph's Groceries, Clean Air Vehicle Technology Center, West Virginia University, the University of Wisconsin at Madison, and the Desert Research Institute. Source testing of 60 light-duty vehicles was completed in June 2001; ambient measurements were performed in July, and the testing of 32 heavy-duty vehicles is currently underway.