OHVT WEEKEND/WEEKDAY OZONE STUDY IN THE SOUTH COAST AIR BASIN

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Many urban locations in the United States experience higher ozone on weekends than on weekdays, despite lower ozone precursor emissions of hydrocarbons, carbon monoxide, and nitrogen oxides. This presentation summarizes preliminary results from a study designed to test hypotheses regarding the cause(s) of high weekend ozone levels in the South Coast (Los Angeles) Air Basin. In Phase 1 we analyzed existing ambient and meteorological data for the South Coast Air Basin to refine our working hypotheses. We performed time-resolved measurements during Phase 2 to test the hypothesized relationship between emissions sources and the weekend ozone effect.

We conducted the field program during September and October 2000. The measurements involved two approaches: supplemental measurements at existing South Coast Air Quality Management District monitoring sites and mobile sampling during periods that coincide with overnight carryover of ozone precursors, ozone inhibition, and ozone accumulation. We measured speciated volatile organic compounds continuously at Azusa by gas chromatography with mass spectrometry, and semi-volatile hydrocarbons and particle light absorption at both Azusa and Pico Rivera. We used a mobile van to measure carbon monoxide, nitric oxide, and particle light absorption simultaneously along several freeway loops and two fixed locations with averaging times of 1, 1, and 5 minutes, respectively. Canister and Tenax cartridge samples were also collected in the van with a time integration of 45 minutes per sample. We analyzed canisters in the laboratory for CO, CO_2, methane, MTBE, and C_2-C_{11} hydrocarbons, and C_8-C_{18} hydrocarbons were quantified from Tenax samples.

We used the field measurements to attribute weekday-weekend changes in the temporal and spatial patterns of VOC and NO concentrations to major sources of ozone precursor emissions. While exhaust emissions from on-road gasoline and diesel vehicles are the primary sources of interest, detailed speciation of VOC also allow for attribution of other sources of volatile organic compounds.

As part of the field study, we also collected on-road mobile source emissions activity data in close proximity to each ambient air quality-monitoring site. These emissions activity data include daily diurnal vehicle count figures for selected surface streets and Caltrans Weigh-in- Motion (WIM) data collected on major freeways. We also present a preliminary summary of the mobile source emissions activity data collected during the field study.