

In addition to ADEQ's program of monitoring statewide for regulatory purposes, four special projects were undertaken by the Air Assessment Section of the Air Quality Division during 1999 and the spring of 2000.

Douglas/Agua Prieta

The Douglas/Agua Prieta study was conducted to assess the temporal and spatial distribution of carbon monoxide and PM in the region. A dense monitoring network also collected meteorological data, including vertical wind distribution using a wind profiler. The study began in January of 1999 and ended in March of 2000. Several monitoring scales were investigated with a north-south transect of instrumentation crossing the border for the length of the study period and a shorter-term (about six weeks) study of a smaller sample area with closely spaced particulate monitors. The study has provided an enormous amount of data that is undergoing quality control checks and analysis. Reports will be available in the near future.

Greenwood

In the Phoenix metropolitan area, a short term study to assess PM distribution in a west Phoenix neighborhood was conducted in the spring of 2000. The reason for this study was that in all of metropolitan Phoenix, only one neighborhood (residential area) monitor has consistently violated the annual standard for PM₁₀. Other sites that violate this standard are classified as industrial or agricultural. Called "Greenwood," this monitoring site is about 100 yards south of Interstate 10 and just 30 feet west of 27th Avenue in west-central Phoenix. In the 1999 Maricopa Association of Governments' PM₁₀ SIP, the concentration of PM₁₀ at Greenwood was the critical value that exceeded the standard and had to be shown to meet the standard through additional controls by 2006.

The study was designed to determine (1) which general sources are responsible for the exceedances of the annual PM₁₀ standard (50 µg/m³) and (2) the contribution that vehicular traffic, both nearby and regional, makes to the ambient concentrations of PM₁₀. Conducted by ADEQ, this study was funded by both ADEQ and by the Arizona Department of Transportation's Highway Research Council.

Three sites were selected for the study: the Greenwood Site (the primary site, located near the intersection of Interstate 10 and 27th Avenue), the West Phoenix Site (39th Avenue and Earll) and the Auto Yard Site (33rd Avenue and Washington). With the Greenwood Site as the primary site, the other two sites served as background sites. The West Phoenix Site is about one mile northwest of the primary site and the Auto Yard Site is located about one mile southwest of the primary site.

The study consisted of intensive sampling of ambient fine (0-2.5 microns) and coarse particulates (2.5-10.0 microns), ambient PM₁₀ (0-10.0 microns), measurement of carbon monoxide (CO) and measurements of wind speed, wind direction, and delta temperature. 24-hour particulate samples (both quartz and Teflon filters) were taken on an every sixth day cycle beginning March 19, 2000, and four six-hour samples (both quartz and Teflon filters) were taken on an every sixth day cycle beginning

March 22, 2000. All filter samples were sent to the Desert Research Institute, Reno, NV for analysis. The fine and coarse quartz sample filters will be analyzed for carbon and for ions (Cl^- , NO_3^- and SO_4^{--}). The fine and coarse Teflon sample filters will be analyzed by x ray fluorescence analysis to determine their elemental constituents.

The analytical results will be used for Chemical Mass Balance (CMB) modeling in order to attribute the fine, coarse, and PM_{10} particulates collected into general source categories – i.e., vegetative burning (only during March), combustion, primary geological, secondary aerosols, etc. If possible, the combustion portion will be broken into two subcategories, on-road and off-road motor vehicles. The profiles that will be used in the CMB modeling are: (1) geological profiles developed from the 1989-90 Phoenix Brown Cloud Study, and (2) motor vehicle and combustion profiles from the Northern Front Range Air Quality Study.

An emission inventory for the area will be created by ADEQ and used for dispersion analysis. The dispersion analysis will be used to determine the relative magnitudes of the various contributing sources.

Class I Area Visibility Program Update

Visibility monitoring in the national parks and wilderness areas of Arizona continued during 1999 with the expansion to 12 aerosol (particulate) sampler sites and the expansion to 14 nephelometer sites. The expanded network is described in Chapter 1 of this report. Plans were developed for monitoring the incoming amounts and sources of visibility impairment at Organ Pipe Cactus National Monument, Hillside and Meadview to capture transport from the west.

Photochemical Assessment Monitoring Stations Program Implementation

The 1990 federal Clean Air Act amendments (CAAA) include a provision requiring more comprehensive and representative data on ozone air pollution, described in detail in Chapter 1. The CAAA called for new regulations for enhanced monitoring of ozone, its photochemical precursors (oxides of nitrogen and volatile organic compounds) and meteorology. The revised regulations call for the establishment of Photochemical Assessment Monitoring Stations (PAMS) in those ozone nonattainment areas classified as serious, severe or extreme. In 1997, EPA redesignated the Phoenix metropolitan area from the “moderate” to the “serious” category for ozone nonattainment.

As a result of this redesignation, a PAMS site was established and more intensive monitoring of ozone and its precursors began in 1999 at the JLG Supersite in Phoenix. The supersite serves as a Type 2 PAMS site, which is designed to monitor the magnitude and type of precursor emissions in the area where the maximum precursor emissions are expected to impact (typically near the downwind boundary of the central business district). Volatile organic compound (VOC) samples were collected every other day, three samples per day from May 15 through Sept. 29, 1999, in both canisters and cartridges (carbonyl compounds). Instruments that measure concentrations of NO_x and trace level NO_y are operated on a continuous basis at the

site, as are instruments that measure ozone and total non-methane hydrocarbons. Meteorological data (wind speed and direction, temperature and relative humidity) are also collected at the supersite.

Two additional PAMS sites were scheduled for operation in 2000. A Type 3 PAMS site was added, which is designed to characterize ozone precursor concentrations occurring downwind from the area of maximum emissions (typically 10 to 30 miles from the fringe of the urban area). This site is the Goldfield Ranger Station, on the Salt River near the edge of Tonto National Forest and north of the Utery Mountain Recreation Area. VOCs and nitrogen oxides will be measured at this site. The other new PAMS site is the Vehicle Emissions Inspection station, where a radar wind profiler will collect upper air meteorological data for determination of mixing heights. This site will also be used to measure solar radiation.