TRANSPORT -- THE NATURE OF THE PROBLEM

Transport: The movement of pollutants from an upwind area to a downwind area.

The CARB has identified 3 regions as upwind areas contributing pollutants to the Mountain Counties Air Basin (MCAB): the Broader Sacramento Area (BSA), the San Joaquin Valley Air Basin (SJVAB) and the San Francisco Bay Area Air Basin. The SJVAB contributes little if any to the NSAQMD portion of the MCAB. The CARB has classified the MCAB as non-attainment by virtue of overwhelming transport from the BSA and SJVAB for the pollutant ozone. Overwhelming transport means that violations of the CAAQS occurred in the downwind area that would not occur in the absence of transport.

There are three techniques used to assess the transport of air pollutants based upon the available data: photochemical grid modeling, meteorological data analysis, and air quality data analysis.

Photochemical Grid Modeling uses mathematical models to simulate the physical and chemical mechanisms that produce ozone in the atmosphere. Because of the expense and difficulty associated with topography, no model currently exists. Therefore, the NSAQMD does not have this tool.

Meteorological Data Analysis uses 9 different variables to determine and support a transport conclusion. These variables are:

1. Analysis of surface winds - the use of hourly surface wind speed and direction data to establish whether the surface airflow could transport pollutants from upwind to downwind areas;
2. Analysis of winds aloft - the use of winds aloft data to establish whether the surface air flow could transport pollutants from upwind to downwind areas;
3. Calculation of estimated transport time - computed by dividing the distance between the upwind and downwind areas by the mean wind speed;
4. Review of daily streamline analysis - use of wind data to generate lines drawn parallel to plotted wind directions, which depict airflows of differing scales throughout most of California;
5. Review of surface airflow types - analysis of streamline patterns that have been classified into surface airflow patterns by wind direction;
6. Trajectory analysis - a pictorial technique that estimates the path an air parcel took over a specified period of time;
7. Surface pressure gradient analysis - method used to estimate the strength and direction of the wind over an area when wind data is missing. A pressure gradient is the difference in surface atmospheric pressure at two sites divided by the horizontal distance between the two sites;
8. Presence of the marine layer - the marine layer is confined to coastal settings, therefore, this variable is not considered in the MCAB;
9. Review of the daily maximum temperature - this technique is used to estimate how far inland the marine air may have penetrated during the day, again, not applicable in the MCAB.

Air Quality Data Analysis uses 7 different variables to determine and support a transport conclusion. These variables are:

1. Analysis of the geographic extent of exceedances - analysis of the size and shape of the area(s) exceeding the state ozone standard to obtain some information about the source of the ozone and precursors contributing to the exceedances;
2. Analysis of the exceedances as extreme concentrations - analysis of all exceedances in the downwind area to determine if the concentrations were extreme as defined in the

CCR, Title 17, §70300. An extreme concentration is a concentration that is statistically expected to recur less frequently than once every year;

3. Estimating the source of emissions based on time of daily maximum ozone concentration - if maximum ozone concentrations occur between 11 A.M. and 2 P.M. transport is less likely, maximum concentrations outside those hours make transport more likely;

4. Similarity of daily maximum ozone concentrations - similar daily maximum concentrations may indicate that the same air mass had affected both upwind and downwind areas;

5. Review of the hour of the daily maximum ozone concentration - a review of the progression of the daily maximum ozone concentration along a potential transport path to identify the potential transport of ozone from an upwind area to a downwind area;

6. Time series analysis - involves plotting the hourly concentrations of ozone for a three day period centered on the exceedance day to determine similarities between the upwind and downwind areas;

7. Comparison of ozone precursor emissions in the upwind and downwind areas - analysis done using the ARB emission inventory to determine the magnitude of ozone precursor emissions in the upwind and downwind areas.

There are many factors that must be considered when trying to make a determination of transport. In summation, meteorology and the amounts of pollutants emitted in the upwind area govern the amounts of pollutants transported to downwind areas.

In an ARB staff report from June, 1993, titled “Assessment and Mitigation of the Impacts of Transported Pollutants on Ozone Concentrations in California”, staff determined that the contribution from the BSA emissions to all exceedances of the state ozone standard in the NSAQMD was overwhelming. This conclusion was based on a thorough analysis of 39 exceedance days during the period of 1989 through 1991.

On November 21, 1996, ARB amended its transport mitigation regulation, which has identified the Sacramento area as overwhelmingly causing exceedances of the CAAQS in the NSAQMD. Transport of pollution from the BSA into the NSAQMD portion of the MCAB continues to be the primary reason for exceedances of the CAAQS and NAAQS within the NSAQMD. However, as population, industry, and motor vehicle travel grows in the NSAQMD, the transport excuse becomes less viable if emissions are allowed to grow unmitigated.