AIR QUALITY AND LAND USE HANDBOOK: A COMMUNITY HEALTH PERSPECTIVE

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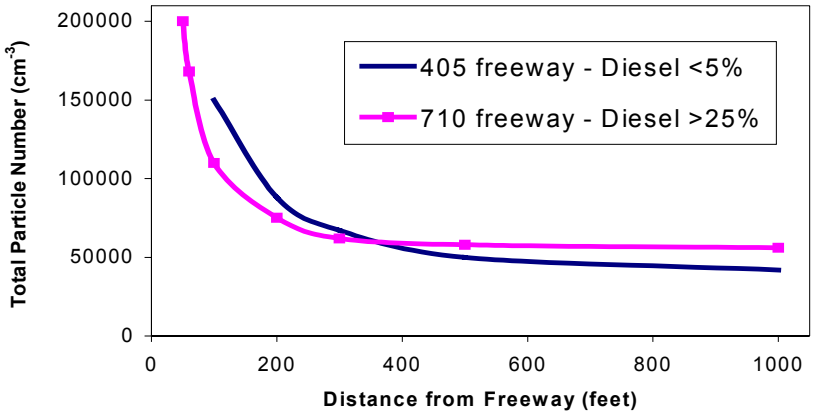
strongest within 300 feet. This demonstrates that the adverse effects diminished with distance.

In addition to the respiratory health effects in children, proximity to freeways increases potential cancer risk and contributes to total particulate matter exposure. There are three carcinogenic toxic air contaminants that constitute the majority of the known health risk from motor vehicle traffic – diesel particulate matter (diesel PM) from trucks, and benzene and 1,3-butadiene from passenger vehicles. On a typical urban freeway (truck traffic of 10,000-20,000/day), diesel PM represents about 70 percent of the potential cancer risk from the vehicle traffic. Diesel particulate emissions are also of special concern because health studies show an association between particulate matter and premature mortality in those with existing cardiovascular disease.

Distance Related Findings

A southern California study (Zhu, 2002) showed measured concentrations of vehicle-related pollutants, including ultra-fine particles, decreased dramatically within approximately 300 feet of the 710 and 405 freeways. Another study looked at the validity of using distance from a roadway as a measure of exposure

Figure 1-1
Decrease In Concentration of Freeway Diesel PM Emissions With Distance



to traffic related air pollution (Knape, 1999). This study showed that concentrations of traffic related pollutants declined with distance from the road, primarily in the first 500 feet.

These findings are consistent with air quality modeling and risk analyses done by ARB staff that show an estimated range of potential cancer risk that decreases with distance from freeways. The estimated risk varies with the local meteorology, including wind pattern. As an example, at 300 feet downwind from a freeway (Interstate 80) with truck traffic of 10,000 trucks per day, the potential cancer risk was as high as 100 in one million (ARB Roseville Rail Yard Study). The cancer health risk at 300 feet on the upwind side of the freeway was much