unpaved roads within the county (CARB, 1998). The emission reflects particulate matter stirred up by vehicles traveling along dirt and gravel roads including city and county roads, and farm roads.

Fine Particulate Fraction of PM_{10} Emissions

$PM_{2.5}$, known as fine particulate matter, comprises a fraction of PM_{10}. Primary and secondary $PM_{2.5}$ emissions could be generated from existing dairy operations. Primary sources include equipment exhaust, fugitive dust from unpaved dairy corrals, agricultural land preparation, and windblown dust. A discussion of the potential PM_{10} emissions associated with these primary sources is presented earlier in this section and summarized in Table 4.2-5a. The potential $PM_{2.5}$ emissions from these sources make up a fraction of the estimated potential PM_{10} emissions. Based on recent studies conducted by CARB, approximately 92 percent of PM_{10} emissions from exhaust (combustion) is expected to be in the $PM_{2.5}$ range. In addition to exhaust sources, fugitive dust from the unpaved dairy corrals, unpaved roadways, agricultural land preparation, and windblown dust from the proposed project would also generate primary $PM_{2.5}$ emissions. Based on recent studies conducted by CARB, the percentages of PM_{10} emissions that are in the $PM_{2.5}$ range are approximately 12 percent for cattle feedlots and 22 percent for windblown dust, agricultural tilling, and unpaved roadways (CARB, undated, Speciation Profiles and Size Fractions). Table 4.2-5a currently provides the potential PM_{10} emissions that could result from the above-mentioned sources.

Secondary sources of $PM_{2.5}$ would result mainly from the formation of ammonium nitrate from the reaction between ammonia and nitrates. Ammonium nitrate emissions in the $PM_{2.5}$ range result from reactions between ammonia emissions and nitrates available in the environment. For dairy operations, ammonia emissions are generated as the organic nitrogen contained in cattle fecal manure decomposes and when the urea manure hydrolyzes.

Limited information about $PM_{2.5}$ secondary particulate emissions from ammonia reactions is currently available. In the San Joaquin Valley, ammonia is believed to be more abundant than nitrates, indicating that the generation of ammonium nitrate is dependent on the availability of nitrates in the environment rather than the availability of ammonia (Gaffney, 2001). The SJVUAPCD is currently working with CARB and other parties (i.e., industry) on the development of the California Regional $PM_{10}/PM_{2.5}$ Air Quality Study (CRPAQS), a comprehensive program of monitoring, emissions inventory development, data analysis, and modeling of particulate matter, specifically PM_{10} and $PM_{2.5}$. The purposes of the study are to provide an improved understanding of PM_{10} and $PM_{2.5}$, establish a strong scientific foundation for informed decision making, and prepare efficient and cost-effective emission control strategies to achieve the PM_{10} and $PM_{2.5}$ standards in central California. The study is also expected to provide some scientific basis for determining ammonia's effect on $PM_{2.5}$.