CHAPTER 1

TRANSPORTATION AND AIR QUALITY

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CHAPTER 1

TRANSPORTATION AND AIR QUALITY

1. GENERAL.

a. Problem. California's major urban areas have some of the worst air quality issues in the nation.

(1) A combination of climate, topography, and population contribute to California's significant air pollution.

(2) Some Californians are regularly exposed to levels of air pollution that cause nausea, headaches, dizziness, and eye irritation.

(3) Research has established air pollution can contribute to the development of diseases such as asthma, bronchitis, emphysema, and cancer.

b. Mobile Sources. Mobile sources are a major contributor to air pollution because they emit smog-forming pollutants. There are a number of different mobile sources of air pollution and are divided into two categories:

(1) On-road vehicles: motorcycles, passenger cars and trucks, and commercial trucks and buses.

(2) Nonroad vehicles and engines: aircraft, heavy equipment, locomotives, motorboats, construction equipment, small engine and tools, etc.

c. Pollutants. Air pollutants affect everyone. The elderly are more susceptible to developing permanent health issues from environmental threats due to their poor immune response. Children are more vulnerable due to their developing organ systems. Carbon dioxide (CO_2) and methane gas emissions from human activity significantly increase the atmospheric levels of greenhouse gases. National Ambient Air Quality Standards (NAAQS) have been set for six principal pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide. California regularly exceeds NAAQS for the following:

(1) Ozone. Ozone is a gas composed of three atoms of oxygen. Ozone occurs both in the Earth's upper atmosphere and at ground level. The ground level ozone is a harmful air pollutant, affects people and the environment negatively, and is the main ingredient in smog. Ground level ozone is formed when pollutants emitted by cars, power plants, and other sources react chemically in the presence of sunlight. Ozone at ground level can irritate the respiratory system, causing coughing, throat irritation, and chest pain. Ozone

can reduce lung function and make it more difficult to breathe deeply and vigorously. Ozone can aggravate asthma, increase susceptibility to respiratory infections, and inflames and damages the lining of the lungs.

(2) Carbon Monoxide. Carbon monoxide (CO), an odorless, colorless gas, is the product of incomplete combustion. Exposure to CO causes dizziness, fatigue, headaches, and irritability which may also reduce a person's ability to drive defensively. The highest levels of CO usually occur along traffic corridors, but CO is also hazardous at low concentrations.

(3) Particulate Matter. Particulate matter, also called particle pollution, is the term used to describe a mixture of solid particles and liquid droplets found in the air. Airborne particulate matter is a product of gasoline-powered engines, diesel exhaust, pesticides, dust spewed from lawn blowers, lead from brake linings, and many other particles in the air we breathe. Scientific studies have linked exposure to particulate matter with an increase in respiratory illness.

d. Air Quality Index. Daily air pollution forecasts are presented in the form of an Air Quality Index (AQI).

(1) The AQI is a uniform, simplified method of expressing air quality conditions. It is based on a numerical scale of 0 – 500.

(2) The scale uses a simplified reference for smog conditions: the greater the amount of smog, the higher the number on the scale.

(3) A violation of federal air quality standards in any pollutant category occurs when the AQI exceeds 100.

The AQI is divided into six categories as shown in Figure A:

Figure A. Air Quality Index

Air Quality Index Values	Levels of Health Concern	Colors
When the AQI is in this range:	*…air quality conditions are:*	*…as symbolized by this color:*
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

2. TRANSPORTATION CONTROL MEASURES.

a. Transportation control measures are strategies that reduce transportation-related air pollution, greenhouse gas emissions, and fuel use by reducing vehicle miles traveled and improving roadway operations. Improving air quality and reducing traffic congestion requires effective transportation management to reduce the number of vehicles on California highways. Federal, state, and local air quality regulations encourage or require measures to control transportation, including:

(1) Employer-based trip reduction plans.

(2) Management of parking supply and pricing.

(3) High-occupancy vehicle systems.

(4) Transit improvement programs.

(5) Land development policies for motor vehicle trip reduction.

(6) Rideshare services.

b. Ridesharing is a highly recognized and utilized transportation control measure.

(1) Rideshare programs are designed to encourage the use of transportation alternatives and increase employee average vehicle ridership.

(2) Ridesharing involves commuting by a mode other than the single-occupant vehicle, including carpools, vanpools, and public transit.

(3) Transportation control measures can include bicycling, walking, alternate work weeks, and telecommuting.

(4) Commute alternatives and incentives available to CHP employees are identified in Chapter 6, Employee Commute Alternatives and Incentives to Rideshare, of this manual.