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7.15 AIR QUALITY AFFECTED ENVIRONMENT

This section describes air quality in the vicinity of the Middle Fork American River Project (MFP or Project) including: an overview of the regulatory setting; a description of the Project area; identification of federal and state ambient air quality standards; and federal and state ambient air standard attainment status.

7.15.1 Information Sources

This section was developed using information available from various federal, state, and local agencies responsible for air quality regulation. These include:

- United States Environmental Protection Agency (EPA);
- California Air Resources Board (CARB); and
- Placer County Air Pollution Control District (PCAPCD).

7.15.2 Regulatory Setting

This section summarizes key federal, state, and county statutes, regulations, and policies that apply to the MFP. At the federal level, the EPA administers the federal Clean Air Act (CAA). The California Clean Air Act (CAA) is administered by the CARB at the state level and by the PCAPCD at the local level.

7.15.2.1 Federal

At the federal level, EPA is responsible for implementing national air quality programs. EPA's air quality mandates are primarily derived from the federal CAA, which was enacted in 1970. The most recent major amendments made by Congress were in 1990. The CAA required EPA to establish national ambient air quality standards (NAAQS) as shown on Table 7.15-1. The federal CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The federal CAA Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution (EPA 2010).

7.15.2.2 State

CARB, which is part of the California Environmental Protection Agency, is responsible for meeting the state requirements of the federal CAA, administering the California CAA, and establishing the California ambient air quality standards (CAAQS). The California CAA, as amended in 1992, requires all air districts in the state to endeavor to achieve and maintain the CAAQS. While pollutants regulated under the California CAA are similar to those regulated under the federal CAA, the CAAQS are more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. CARB also oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional level (CARB 2010b).

7.15.2.3 Local

The PCAPCD is the local agency responsible for air quality regulation within Placer County. The role of PCAPCD is to achieve clean air to protect public health and the environment. PCAPCD's primary responsibility is for attaining and maintaining NAAQS and CAAQS. PCAPCD is responsible for: adopting and enforcing rules and regulations concerning air pollutant sources; issuing permits for stationary sources of air pollutants; inspecting stationary sources of air pollutants; responding to citizen complaints; and monitoring ambient air quality and meteorological conditions (PCAPCD 2010b).

All projects in Placer County are subject to PCAPCD rules and regulations in effect at the time of construction (PCAPCD 2010a). Specific rules applicable to the MFP may include the following:

- Rule 202 – limits the amount of visible emissions from any single source.
- Rule 217 – sets restrictions for the use of cutback and emulsified asphalt paving materials.
- Rule 218 – limits the quantity of volatile organic compounds in architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured for use within the District.
- Rule 228 – requires implementation of dust suppression techniques to reduce the amount of particulate matter entrained in the ambient air, or discharged into the ambient air, as a result of anthropogenic (man-made) fugitive dust sources.
- Rule 501 – sets requirements for any person operating equipment or machinery that may result in the issuance of air contaminants to obtain a permit form the PCAPCD.

7.15.2.4 Greenhouse Gas Statutes and Programs

Summaries of principal state and federal greenhouse gas (GHG) statutes and programs are presented below.

Federal Programs

There are currently no federal regulations applicable to the MFP that limit GHG emissions of carbon dioxide (CO₂) and methane (CH₄); however, emissions of nitrous oxide (N₂O) are regulated indirectly through limitation of nitrogen (NO_x) emissions as a criteria pollutant under New Source Performance Standards (NSPS) and federal, state, and local operating permits. EPA and other federal agencies have established voluntary programs with state and local agencies and businesses intended to increase energy conservation and thus reduce GHG emissions.

State Programs

GLOBAL WARMING SOLUTIONS ACT

The Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) codifies California's goal of reducing statewide emissions of greenhouse gases to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on global warming emissions that will be phased in starting in 2012 to achieve maximum technologically feasible and cost-effective greenhouse gas emission reductions. In order to effectively implement the cap, AB 32 directs the CARB to develop appropriate regulations and establish a mandatory reporting system to track and monitor global warming emissions levels.

SENATE BILL 1368

California Senate Bill (SB) 1368 adds sections 8340 and 8341 to the Public Utilities Code (effective January 1, 2007) with the intent "to prevent long-term investments in power plants with greenhouse gas emissions in excess of those produced by a combined-cycle natural gas power plant" with the aim of "reducing emissions of greenhouse gases from the state's electricity consumption, not just the state's electricity production." The bill provides a mechanism for reducing the greenhouse gas emissions of electricity providers, both in-state and out-of-state, thereby assisting CARB in meeting its mandate under AB 32, the Global Warming Solutions Act of 2006.

SENATE BILLS 1078 AND 10

California Senate Bill 1078 (SB 1078) was signed into legislation in 2002 and required California load serving entities (LSEs) to procure 20% of their retail customer load with renewable energy by the year 2017. Four years later (2006), Senate Bill 10 accelerated the 20% renewable deadline to 2010.

EXECUTIVE ORDER S-3-05

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05 which established greenhouse gas emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80% below 1990 levels.

7.15.3 Project Area

To better manage common and local air quality problems, California is divided into 15 air basins, each of which is associated with one or more Air Pollution Control District (APCD) or Air Quality Management District (AQMD) (also called air districts). The PCAPCD is one of 35 local air districts established pursuant to Section 40002 of the California Health & Safety Code (CHSC). The District is a "county" district with its jurisdiction being the County of Placer extending from Lake Tahoe in the East, over the crest of the Sierra Nevada, to the Sacramento Valley in the West.

Placer is unique among California counties in that it crosses three distinct air basins: Sacramento Valley Air Basin (SVAB), Mountain Counties Air Basin (MCAB), and the Lake Tahoe Air Basin (LTAB). The SVAB, MCAB, and LTAB vary in the types and levels of air pollution trapped within their air basins. Each air basin is impacted not only by locally generated air pollution, but also by both naturally occurring and human generated air pollution from the San Francisco Bay Area and the Central Valley.

The MFP facilities are situated in the foothills and mountainous uplands of the western slope of the central Sierra Nevada, entirely within the MCAB. The MFP area is heavily forested, rural in nature, and sparsely populated. There are no residential or commercial developments in the immediate vicinity of the MFP. The nearest population center is Foresthill located approximately four miles west-northwest of Ralston Afterbay.

7.15.3.1 Climate and Meteorology

The general climate of the MFP area varies considerably depending on elevation and proximity to the Sierra Nevada ridge. The terrain features of this area make it possible for various climates to exist in relatively close proximity. The pattern of mountains and hills causes a wide variation in rainfall, air temperature, and localized winds across the western slope. Air temperature variations have an important influence on wind flow, dispersion along mountain ridges, vertical mixing, and photochemistry.

The Sierra Nevada receives large amounts of precipitation from storms moving in from the Pacific Ocean in the winter, with lighter amounts from intermittent “monsoonal” moisture flows from the south and cumulus buildup in the summer. Precipitation levels are greatest in the highest mountain elevations, but decline rapidly toward the western portion of the basin. Winter air temperatures in the western foothills usually dip below freezing only at night and precipitation is mixed as rain or light snow. In the summer, air temperatures in the western end of the county can routinely exceed 100°F (degrees Fahrenheit).

From an air quality perspective, the topography and meteorology of the MCAB combine such that local conditions predominate in determining the effect of emissions in the basin. Regional air flows are affected by the mountains and hills, which direct surface air flows, cause shallow vertical mixing, and create areas of high pollutant concentrations by hindering dispersion.

Inversion layers, where warm air overlays cooler air, frequently occur and trap pollutants close to the ground. In the winter, these conditions can lead to carbon monoxide (CO) “hotspots” along heavily traveled roads and at busy intersections. The longer daylight hours, stagnant air, high air temperatures, and plentiful sunshine of summer provide the conditions and energy for the photochemical reaction between volatile organic compounds (VOC) and oxides of nitrogen (NO_x) that results in the formation of ozone (O₃).

In the summer, the strong upwind valley air flowing into the basin from the Central Valley to the west is an effective transport medium for ozone precursors and ozone

generated in the San Francisco Bay Area, Sacramento Valley, and San Joaquin Valley. These transported pollutants contribute to the sources of ambient ozone levels in the MCAB and are partly responsible for the exceedances of the state and federal ozone AAQS (EDCAPCD 2002).

7.15.4 Ambient Air Quality Standards

Both the EPA and the CARB have established AAQS for common pollutants (Table 7.15-1). The AAQS for each contaminant represent safe levels that avoid specific adverse health effects. Pollutants for which air quality standards have been established are called “criteria” pollutants. Criteria pollutants include ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), respirable particulate matter (PM₁₀), and fine particulate matter (PM_{2.5}).

The federal and state AAQS differ in some cases. In general, California’s AAQS are more stringent, particularly for ozone and particulate matter (PM₁₀ and PM_{2.5}), than the federal AAQS (CARB 2009a).

7.15.4.1 Attainment Status

The federal CAA and the California CAA require all areas of California to be classified as attainment, nonattainment, or unclassified as to their status with regard to the federal and/or state AAQS. The State and air districts in California monitor air pollutant levels to assure that federal and state AAQS are met and, in the event that they are not, to develop strategies to meet these standards. Depending on whether the standards are met or exceeded, the local air basin is classified as being in “attainment” or “nonattainment”, respectively. Where insufficient data exists to make a determination, an area is deemed “unclassified”. Where a nonattainment area has achieved attainment or where an attainment area is at risk of becoming nonattainment, it can be classified as a “maintenance” area in order to implement preventive measures.

As identified on Table 7.15-2, the portion of Placer County within the MCAB is designated nonattainment for the ozone 8-hour standard, and unclassified for other federal AAQS. In addition, the portion of Placer County within the MCAB is designated nonattainment for the state AAQS for ozone and PM₁₀, and attainment or unclassified for other pollutants. The entire state is currently designated unclassified for PM_{2.5} until sufficient monitoring data has been collected (CARB 2009a).

7.15.5 Greenhouse Gas Emissions

Gases that trap heat in the atmosphere, GHGs, regulate the earth’s temperature. This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable climate. The most common GHGs are carbon dioxide (CO₂) and water vapor, but there are also several others, including: methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). GHGs are released into the earth’s atmosphere through a variety of natural processes and human activities, including:

- Carbon dioxide and nitrous oxide are byproducts of fossil fuel combustion;
- Nitrous oxide is associated with agricultural operations such as fertilization of crops;
- Methane is commonly created by off-gassing from agricultural practices and landfill operation;
- Chlorofluorocarbons were widely used as refrigerants, propellants, and cleaning solvents, but their production has been stopped by international treaty;
- Hydrofluorocarbons are now used as a substitute for chlorofluorocarbons in refrigeration and cooling; and
- Perfluorocarbons and sulfur hexafluoride emissions are commonly created by industries such as aluminum production and semi-conductor manufacturing.

Each GHG has its own potency and effect upon the earth's energy balance. This is expressed in terms of a global warming potential (GWP), with carbon dioxide being assigned a value of 1 and sulfur hexafluoride being several orders of magnitude stronger with a GWP of 23,900. In GHG emission inventories, the weight of each gas is multiplied by its GWP and is measured in units of carbon dioxide equivalents (CO₂e).

Table 7.15-3 show aggregated California emissions of CO₂e for all fossil fuel combustion, respectively. In 2007 California emitted 461 million tons CO₂e. The estimated United States GHG emissions from total fuel combustion in 2007 was 6,382 million tons which means California accounts for approximately 7.2% of fossil fuel CO₂e emissions in the United States annually (EPA 2009).

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TABLES

Table 7.15-1. Federal and State Ambient Air Quality Standards.

Pollutant	Averaging Time	California Standards ^{1,3}	Federal Standards ²	
			Primary ^{3,4}	Secondary ^{3,5}
Ozone (O ₃)	1-hour	0.09 ppm (180 µg/m ³)	--	Same as Primary Standard
	8-hour	0.070 ppm (137 µg/m ³)	0.075 ppm (147 µg/m ³)	
Respirable Particulate Matter (PM ₁₀)	24-hour	50 µg/m ³	150 µg/m ³	Same as Primary Standard
	Annual Mean	20 µg/m ³	--	
Fine Particulate Matter (PM _{2.5})	24-hour	--	35 µg/m ³	Same as Primary Standard
	Annual Mean	12 µg/m ³	15 µg/m ³	
Carbon Monoxide (CO)	8-hour	9 ppm (10 µg/m ³)	9 ppm (10 µg/m ³)	None
	1-hour	20 ppm (23 µg/m ³)	35 ppm (40 µg/m ³)	
Nitrogen Dioxide (NO ₂)	Annual Mean	0.03 ppm (57 µg/m ³)	0.053 ppm (100 µg/m ³)	Same as Primary Standard
	1-hour	0.18 ppm (339 µg/m ³)	0.100 ppm ⁶	None
Sulfur Dioxide(SO ₂)	Annual Mean	--	0.030 ppm (80 µg/m ³)	--
	24-hour	0.04 ppm (105 µg/m ³)	0.14 ppm (365 µg/m ³)	--
	3-hour	--	--	0.5 ppm (1300 µg/m ³)
	1-hour	0.25 ppm (655 µg/m ³)	--	--
Lead ⁷	30-Day Average	1.5 µg/m ³	--	--
	Calendar Quarter	--	1.5 µg/m ³	Same as Primary Standard
	Rolling 3-Month Average ⁸	--	0.15µg/m ³	
Visibility Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer – visibility of ten miles or more due to particles when relative humidity is less than 70%.	No Federal Standards	
Sulfates	24-Hour	25 µg/m ³		
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m ³)		
Vinyl Chloride ⁷	24-Hour	0.01 ppm (26 µg/m ³)		

Table 7.15-1. Federal and State Ambient Air Quality Standards (continued).Source:

California Air Resources Board, <http://www.arb.ca.gov/research/aaqs/aaqs2.pdf>, accessed July 2, 2010.

Notes:

¹ California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

² National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than one. For PM2.5, the 24-hour standard is attained when 98% of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

³ Concentration expressed first in units in which it was promulgated (i.e., ppm or µg/m³). Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

⁴ National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

⁵ National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

⁶ To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

⁷ The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

⁸ National lead standard, rolling 3-month average: final rule signed October 15, 2008.

Table 7.15-2. Attainment Status Designations for Portion of Placer County within the Mountain Counties Air Basin.

Pollutant	Federal Designation¹	State Designation²
Ozone (O ₃)	Nonattainment Severe	Nonattainment Severe
Carbon Monoxide (CO)	Unclassified/Attainment	Unclassified
Nitrogen Dioxide (NO ₂)	Unclassified/Attainment	Attainment
Sulfur Dioxide(SO ₂)	Unclassified/Attainment	Attainment
Respirable Particulate Matter (PM ₁₀)	Unclassified/Attainment	Nonattainment
Fine Particulate Matter (PM _{2.5})	Unclassified/Attainment	Unclassified

Notes:

¹ USEPA Green Book (<http://www.epa.gov/air/oaqps/greenbk>).

² California thresholds from CARB (<http://www.arb.ca.gov/design/adm/adm.htm>) with nonattainment status further defined by 40 CFR 81.305 *July 27, 2010).

Table 7.15-3. Estimated California GHG Emissions from Fuel Combustion.

Summary Year	CO ₂ Equivalents
	Million Tons
2000	443
2001	456
2002	452
2003	451
2004	464
2005	454
2006	456
2007	461

Source:

CARB 2009b (2007 value extrapolated)