9 AIR QUALITY

INTRODUCTION

The Sacramento metropolitan area is currently designated as a non-attainment area for both federal and state ozone and particulate matter air quality standards, and is one of the top ten worst air quality areas in the nation. In Sacramento County, pollutants of greatest concern are ozone precursors [reactive organic gases (ROG) and nitrogen oxides (NO_X)], carbon monoxide (CO), particulate matter (PM), and other visibility reducing matter.

As discussed in the project description chapter, the existing aggregate mine was the subject of two Environmental Impacts Reports which have been incorporated by reference in this EIR. They are as follows:

- Sacramento Aggregates – East Vineyard Community Plan Amendment, Rezone and Use Permit – Revised Final Environmental Impact Report - Control Number 94-CZB-UPB-0715 – State Clearinghouse 95052078 (October 1996).

- Triangle Rock Products, Inc. – Zoning Agreement and Use Permit Amendments – Final Supplemental Environmental Impact Report – Control Number 01-ZGB-UPB-0107 – State Clearinghouse 1995052078 (November 2002).

These documents identified significant and unavoidable air quality impacts from the existing mining and plant operations to related NO_X and PM_{10}.

This chapter will provide the current setting and independently evaluate the air quality impacts of mining on the expansion site. This will include impacts from the operation of the mobile equipment necessary to excavate the site and place the mined material onto the electric conveyor that will take the material to the existing plant and processing facility. This analysis will also focus on the air quality effects of soil disturbance on the expansion site and from fugitive dust from trucks and equipment traveling on unpaved surfaces. This analysis will not revisit the air quality impacts of the continued operation of the plant or processing facility since this was previously analyzed and no extension in the permitted timeline of the plant nor processing capacity is requested. Similarly this analysis will not focus on the air quality impacts of the aggregate haul trucks visiting the facility because such impacts were previously analyzed and no increase in haul traffic is expected (see the Traffic and Circulation chapter).

SETTING

ATMOSPHERIC CONDITIONS

The geography and weather patterns of the Sacramento Valley are conducive to high air pollution levels. The mountain ranges surrounding the valley are natural air current barriers, which restrict most of the circulating winds of lower elevations from mixing and dispersing air pollutants of the valley. Sacramento is also subject to thermal air inversions, especially during the summer and fall months, wherein a layer of cool air is overlain by warmer air. Also, solar radiation from the abundant sunshine in Sacramento acts as a catalyst to drive chemical reactions between atmospheric pollutants such as reactive hydrocarbons and nitrogen oxides; the result is photochemical smog. Thus, the combination of surrounding mountains, abundant sunshine, thermal air inversions and wind patterns make the Sacramento area susceptible to high levels of air pollution.

The amount of pollutants released and the atmosphere's ability to transport and dilute the pollutants affect a given pollutant's concentration in the atmosphere. Factors affecting transport and dilution include terrain, wind, atmospheric stability, and, for photochemical pollutants, sunlight. Sacramento's poor air quality can largely be attributed to emissions, geography, and meteorology.

IMPORTANT AIR POLLUTANTS

In Sacramento, air pollutants of greatest concern are ozone precursors [reactive organic gases (ROG) and nitrogen oxides (NO_X)], carbon monoxide (CO), and particulate matter (PM_{10} and $PM_{2.5}$). The largest single source of air pollutants in the Sacramento area is automobile exhaust; ozone and carbon monoxide pollution are largely attributable to automobile use. Other sources, such as agriculture and construction/demolition activities (including mining), also contribute to high levels of suspended particulates.

OZONE

Ozone is not a directly emitted pollutant, but is formed by a chemical reaction between oxides of nitrogen (NO_X) and reactive organic gases (ROG) in the presence of heat and sunlight over time. Ozone is primarily a summer air pollution problem. The time required for ozone formation allows the reacting compounds to spread over a large area, producing a regional pollution concern. The principal sources of ozone precursors (ROG and NO_X) are the combustion of fuels and the evaporation of solvents, paints, and fuels.

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections. Even at very low levels, ground-level ozone can trigger a variety of health problems including aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis. Children and others who are physically active outdoors in the summertime are particularly susceptible to the effects of ozone.

CARBON MONOXIDE

Carbon Monoxide (CO) is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. Individuals with cardiovascular limitations are sensitive to CO at low levels. At higher concentration levels anyone can experience visual problems, dizziness, and difficulty learning or performing complex tasks.

In the Sacramento area, high CO levels develop primarily during winter when winds are calm and a ground level temperature inversion is in place, resulting in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures. CO is a directly emitted pollutant, with concentrations typically highest near major thoroughfares and heavily congested urban streets.

PARTICULATE MATTER

Health concerns associated with suspended particulate matter focus on particulate matter that is less than 10 microns in diameter (PM_{10}), since those particulates are small enough to reach the lungs when inhaled. Scientific studies have linked these particles with aggravated asthma, increases in respiratory symptoms like coughing and difficult or painful breathing, chronic bronchitis, decreased lung function, and premature death.

Particulate matter conditions in Sacramento County are a result of a mix of urban and rural sources, including vehicle exhaust emissions, dust suspended by vehicle traffic and construction activities, wood burning fireplaces, agricultural activities, industrial emissions, and secondary aerosols formed by reactions in the atmosphere.

REGULATORY SETTING

Air quality in Sacramento County is regulated by several agencies, which include the U.S. Environmental Protection Agency (EPA), California Air Resources Board (CARB), and Sacramento Metropolitan Air Quality Management District (SMAQMD). Each of these agencies develops rules and/or regulations to attain the goals or directives imposed upon them through legislation. Although EPA regulations may not be superseded, both state and local regulations may be more stringent. In general, air quality is evaluated based upon standards developed by federal and state agencies. Mobile sources of air pollutants are largely controlled by federal and state agencies, while local air pollution control districts (APCD) or air quality management districts (AQMD) regulate stationary sources.

The EPA is responsible for establishing NAAQS, enforcing the federal Clean Air Act, and regulating aircraft, shipping, and certain locomotive emission sources.

The CARB is responsible for establishing CAAQS and implementing the California Clean Air Act, meeting state requirements of the federal Clean Air Act, and setting California vehicle emission standards.

The federal and state AAQS establish the concentration above which a pollutant is known to cause adverse health effects to sensitive groups within the population, such as children and the elderly. Because AAQS have been established for specific pollutants using health-based criteria, the pollutants for which standards have been set are known as "criteria" pollutants. For some of the criteria pollutants, the state standards are more stringent than the federal standards. The differences in the standards are due to variations in health studies and interpretations involved in the standard-setting process.

Table AQ-1 summarizes the federal (NAAQS) and state (CAAQS) ambient air quality standards.

State standards for ozone have been set for a 1-hour averaging time and an 8-hour averaging time. The state 1-hour and 8-hour ozone standards are 0.09 parts per million (ppm) and 0.07 ppm, respectively, and are not to be exceeded. Federal standards have been set for the 8-hour averaging time and are 0.08 ppm. These standards are not to be met or exceeded more than three times during a 3-year period.

State and federal carbon monoxide (CO) standards have been set for both 1-hour and 8-hour averaging times. The state 1-hour standard is 20 ppm by volume, and the federal 1-hour standard is 35 ppm. Both state and federal standards are 9 ppm for the 8-hour averaging period.

There are both state and federal standards that apply to PM_{10} (particulate matter that is less than 10 microns in diameter) and $PM_{2.5}$ (particulate matter that is less than 2.5 microns in diameter. The state PM_{10} standards are 50 micrograms per cubic meter as a 24-hour average and 20 micrograms per cubic meter as an annual arithmetic mean. The federal PM_{10} standards are 150 micrograms per cubic meter as a 24-hour average. The federal $PM_{2.5}$ standards are 35 micrograms per cubic meter as a 24-hour average and 15 micrograms per cubic meter as an annual arithmetic mean. The state $PM_{2.5}$ standard is 12 micrograms per cubic meter as an annual arithmetic mean; there is no separate state 24-hour average standard.

The EPA and the CARB classify air basins as "attainment" or "non-attainment" for each criteria pollutant depending on the basin's compliance status with the federal and state AAQS.

Table AQ-2 provides the current attainment status in Sacramento County.

As shown, Sacramento County is currently designated as "non-attainment" for the federal and state ozone standards, the federal and state PM_{10} standards, and the state $PM_{2.5}$ standard. Sacramento County is currently designated as "attainment" for the federal and state CO standards, and the federal $PM_{2.5}$ standards.

Table AQ-1

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		Federal Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m³)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m³)		0.08 ppm (157 µg/m³)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m³	Gravimetric or Beta Attenuation	150 µg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m³		—		
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard		35 µg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m³	Gravimetric or Beta Attenuation	15 µg/m³		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m³)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m³)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m³)		35 ppm (40 mg/m³)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m³)		—	—	—
Nitrogen Dioxide (NO_2) *	Annual Arithmetic Mean	0.030 ppm (56 µg/m3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m³)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (338 µg/m³)		—		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m³)	—	Spectrophotometry (Pararosaniline Method)
	24 Hour	0.04 ppm (105 µg/m³)		0.14 ppm (365 µg/m³)	—	
	3 Hour	—		—	0.5 ppm (1300 µg/m³)	
	1 Hour	0.25 ppm (655 µg/m³)		—	—	—
Lead[8]	30 Day Average	1.5 µg/m³	Atomic Absorption	—	—	—
	Calendar Quarter	—		1.5 µg/m³	Same as Primary Standard	High Volume Sampler and Atomic Absorption
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24 Hour	25 µg/m³	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m³)	Ultraviolet Fluorescence			
Vinyl Chloride[8]	24 Hour	0.01 ppm (26 µg/m³)	Gas Chromatography			

* The Nitrogen Dioxide ambient air quality standard was amended on February 22, 2007, to lower the 1-hr standard to 0.18 ppm and establish a new annual standard of 0.030 ppm. These changes become effective after regulatory changes are submitted and approved by the Office of Administrative Law, expected later this year.

See footnotes on next page …

For more information please call ARB-PIO at (916) 322-2990 California Air Resources Board (02/22/07)

Ambient Air Quality Standards Footnotes

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 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent 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. 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. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

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

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

7. Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.

8. 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.

Table AQ-2

AIR QUALITY STANDARDS ATTAINMENT STATUS CHART for Sacramento County		
Parameter	**California Standard**	**Federal Standard**
Ozone	Non-Attainment Classification = Serious (1 hour and 8 hour Standards)	Non-Attainment Classification = Serious (8 hour Standard)
Particulate Matter-10 Micron	Non-Attainment (24 hour Standard and Annual Mean)	Non-Attainment*, Classification = Moderate (24 hr std)
Particulate Matter-2.5 Micron	Non-Attainment (Annual Standard)	Attainment/Unclassified (24 hour Standard and Annual Mean)
Carbon Monoxide	Attainment (1 hour and 8 hour Standards)	Attainment (1 hour and 8 hour Standards)
Nitrogen Dioxide	Attainment (1 hour Standard)	Attainment (Annual Standard)
Sulfur Dioxide	Attainment (1 hour and 24 hour Standards)	Attainment (3 hour, 24 hour, and Annual Standards)
Lead	Attainment (30 Day Standard)	Attainment (Calendar Quarter)
Visibility Reducing Particles	Unclassified (8 hour Standard)	No Federal Standard
Sulfates	Attainment (24 hour Standard)	No Federal Standard
Hydrogen Sulfide	Unclassified (1 hour Standard)	No Federal Standard

Notes:

* Air Quality meets Federal PM-10 Standards. The SMAQMD must request re-designation to attainment and submit a maintenance plan to be formally designated to attainment.

California Area Designations based upon AQ Data collected during 2001-2003.

Source: Sacramento Metropolitan Air Quality Management District:
http://www.airquality.org/aqdata/attainmentstat.shtml

The federal Clean Air Act requires states that exceed the NAAQS to prepare air quality plans (State Implementation Plans or SIPs) that show how the federal standards will be met. The California Clean Air Act generally requires regions that exceed the CAAQS to reduce harmful pollutants by five percent or more per year, or implement all feasible measures to meet the state air quality standards as expeditiously as possible. Regional air quality management districts are required to prepare air quality plans specifying how the federal and state AAQS will be met.

The CARB requires local air quality management districts to develop their own strategies for achieving compliance with the state and federal air quality standards, but maintains regulatory authority over those strategies. The SMAQMD is responsible for administering federal and state air quality laws, regulations, and policies within Sacramento County. SMAQMD monitors regional air quality conditions; prepares regional air quality plans and programs for the attainment of federal and state ambient air quality standards; and adopts and enforces Rules and Regulations for the management of stationary and area source emissions. SMAQMD also sets thresholds to determine when a proposed project may have a significant adverse effect on air quality.

The federal Clean Air Act required states exceeding NAAQS to prepare air quality plans showing how the standards would be met by 1987. Sacramento is one of many urban areas that failed to attain the NAAQS by 1987 and, as a result, the EPA disapproved the Sacramento Air Quality Plan in 1988. The Clean Air Act was amended in 1990 to extend the deadline for compliance with the NAAQS, and to require states to prepare revised SIPs for attainment of standards.

The 1990 federal Clean Air Act amendments established new requirements for many areas, like Sacramento, that had not attained the NAAQS. Non-attainment area classifications were set according to the severity of an area's air pollution problem. The EPA classified the Sacramento metropolitan area, which includes all of Sacramento and Yolo Counties and parts of El Dorado, Placer, Solano and Sutter Counties, as a "severe" non-attainment area for ozone. All of Sacramento County was classified as a "moderate" non-attainment area for PM_{10}. The Sacramento urbanized area was classified as a "moderate" non-attainment area for carbon monoxide.

Prior to the 1990 amendments, non-attainment areas were only required to make "reasonable further progress" toward meeting the standards. The 1990 amendments were more stringent and defined each area's responsibilities in more detail. In the case of ozone, for example, non-attainment areas were to reduce volatile organic compound (VOC) emissions by 15 percent within six years. To ensure that an area would implement the necessary measures to achieve these emission reductions, the amendments established a number of specific requirements that were to be met over several years.

In response to the federal Clean Air Act Amendment requirements, the California Air Resources Board (CARB) submitted a State Implementation Plan (SIP) to the EPA in November 1994. The SIP strived for compliance with the federal ozone standard by

2005 through provisions that would (1) establish a buy-back program for older, polluting cars; (2) require minimum percentage requirements for low- and zero-emission vehicles in new car fleets; and (3) incorporate regional attainment plans from throughout the state into the SIP. In November 1994, the Sacramento Regional Ozone Attainment Plan (ROAP) was submitted to CARB for inclusion in the State Implementation Plan. The ROAP was cooperatively prepared by five APCDs or AQMDs: the Sacramento Metropolitan AQMD, the Yolo-Solano APCD, the Feather River AQMD, the El Dorado County APCD, and the Placer County APCD. The ROAP focuses on reducing emissions of ozone precursors through stationary source controls, motor vehicle emission controls, and transportation system improvement measures.

Sacramento County has been free of federal CO violations since 1993. The CARB found Sacramento to be in compliance with the state CO standards in November 1996 and forwarded a request to the EPA to be reclassified as an attainment area for federal standards. The EPA officially approved CO attainment status for the Sacramento region in March 1998.

Data from air monitoring stations in Sacramento County indicates that there have been no violations of the federal PM_{10} standards since 1995. Based on this, the SMAQMD has requested that the U.S. EPA amend the designation for PM_{10} to attainment. For the time being, however, Sacramento remains designated as a non-attainment area for the federal PM_{10} standards.

SMAQMD is currently awaiting implementation guidance from the EPA on the appropriate assessment of $PM_{2.5}$ impacts and mitigating measures.

Sacramento Metropolitan Air Quality Rules and Regulations

As indicated previously, SMAQMD regulates air quality in Sacramento County through its permit authority over stationary sources of emissions, through its vehicle and fuels management program, and through planning and review activities.

All projects are subject to SMAQMD Rules and Regulations in effect at the time of construction. Several SMAQMD Rules pertinent to the project include:

Rule 201: General Permit Requirements. Any project that includes the use of equipment capable of releasing emissions to the atmosphere may require permit(s) from SMAQMD prior to equipment operation. The applicant, developer or operator of a project that includes an emergency generator, boiler, or heater should contact the District early to determine if a permit is required, and to begin the permit application process. Portable construction equipment (e.g. generator, compressors, pile drives, lighting equipment, etc.) with an internal combustion engine over 50 horsepower are required to have a SMAQMD permit or a California Air Resources Board portable equipment registration.

Rule 201: Fugitive Dust. A person shall take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line,

from which the emission originates, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation. Reasonable precautions shall include, but are not limited to:

- Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the construction of roadways or the clearing of land.

- Application of asphalt, oil, water, or suitable chemicals on dirt roads, materials stockpiles, and other surfaces which can give rise to airborne dusts;

- Other means approved by the Air Pollution Control Officer.

General Plan Air Quality Element Policies

Several of the Sacramento County General Plan Air Quality Element policies are relevant to the proposed project and are listed below.

AQ-19. Identify the air quality impacts of development proposals to avoid significant adverse impacts and require appropriate mitigation measures or offset fees.

AQ-20. Submit development proposals to AQMD for review and comment in compliance with CEQA prior to consideration by the appropriate decision making body.

Zoning Code Policies

The Sacramento County Zoning Code contains the following regulations relevant to the project

> 235-48. Air Pollution Control Plan
>
> Applicant shall give proof of submission of an air pollution control plan to the Air Pollution Control District (APCD). The plan shall provide at least for dust control measure proposed for:
>
> (a) Moving aggregate from mine area(s) to processing plant(s) on the subject property.
>
> (b) Roads and other graded surfaces on the subject property.
>
> (c) Removal of aggregate from off-site public streets or roads used by trucks for a distance of 1500 feet along the public right-of-way from the point of ingress and egress to the subject property.
>
> The plan must be approved by the APCD before a work authorization is issued as provided in Section 235-75.

CRITERIA FOR DETERMINING SIGNIFICANCE

A project may be deemed to have a significant effect on the environment if it will violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. SMAQMD has adopted significance thresholds for CEQA projects within the District. These thresholds are used to determine the significance of project-related air quality impacts. The thresholds are defined as:

- 85 pounds per day (ppd) of NO_X for short-term construction emissions
- 65 ppd of NOx and 65 ppd of ROG for long-term operational emissions
- CO, PM_{10}, and other pollutants that cause exceedance of the applicable state ambient air quality standard (CAAQS), or contribute substantially to an existing or projected exceedance of the applicable CAAQS. A contribution is considered substantial if it equals or exceeds 5% of the CAAQS. The CAAQS are shown in Table AQ-1.

IMPACTS AND ANALYSIS

METHODOLOGY

The applicant has provided an Air Quality Impact Analysis for the proposed project prepared by Impact Sciences, Inc (see Appendix A)

The Air Quality Impact Analysis evaluated the air quality impacts of NO_X and nitrogen dioxide (NO_2), ROG, and respirable particulate matter less than 10 microns (PM_{10}). The analysis was conducted in accordance with the SMAQMD *Guide to Air Quality Assessment in Sacramento County* and emissions from mobile equipment were calculated using the emission factors from the ARB OFFROAD emissions inventory model. Dispersion modeling was conducted using the U.S. Environmental Protection Agency approved AMS/EPA Regulatory Model (AEROMOD).

The SMAQMD thresholds identify both short term construction and long term operational air quality emissions standards of significance. The type of emissions produced by the expansion site are similar to construction emissions due to the operation of heavy equipment and soil disturbance; however they are long-term duration. Therefore, the expansion site's emissions will be compared to the more restrictive operational thresholds identified by SMAQMD.

Based on the mine equipment fleet and operating hours provided in Table AQ-3, the Air Quality Analysis calculated air pollutant emissions of the expansion site. These are presented in Table AQ-4.

Table AQ-3Mine Equipment and Operating Hours

Equipment	Model	Hours/Day	Hours/Year
Dozer	Caterpillar D9R	4	1,248
Motorgrader	Caterpillar 140H	2	312
Excavator	Hitachi EX1200	8	2,496
Loader	Caterpillar 988F	8	2,496
Loader	Caterpillar 988F	8	2,496
Water Truck	Peterbilt 357	2	624
Service Truck	Peterbilt 384	1	312
Haul Truck	Euclid R40-C	8	2,496
Haul Truck	Euclid R40-C	8	2,496

Source: Triangle Rock Products, Inc.

Table AQ-4

	Pounds/Day			Pounds/Year		
Source	ROG	NO_X	PM_{10}	ROG	NO_X	PM_{10}
Project Emissions (2013):						
Off-road Mobile Equipment	13.93	214.75	9.03	4,297	66,531	2,789
On-road Trucks	0.11	1.33	0.06	34.54	416.45	19.02
Unpaved Surfaces	—	—	273.41	—	—	81,864
Loading/Handling	—	—	3.81	—	—	1,189
Subtotal	14.04	216.08	286.31	4,332	66,947	85,861
Baseline Emissions (2007):						
Off-road Mobile Equipment	10.64	181.10	6.41	3,275	56,042	1,974
On-road Trucks	0.09	1.31	0.06	29.34	409.58	18.77
Unpaved Surfaces	—	—	273.41	—	—	81,864
Loading/Handling	—	—	3.81	—	—	1,189
Subtotal	10.73	182.41	283.69	3,304	56,452	85,046
Net Change (Project less Baseline)	**3.31**	**33.67**	**2.62**	**1,028**	**10,495**	**815**
SMAQMD Thresholds:	65	65	—	—	—	—
Exceeds Threshold?	No	No	—	—	—	—

OPERATIONAL EMISSIONS IMPACT ANALYSIS

Based on Table AQ-4, project ROG will not approach the 65 lb/day significance threshold and therefore for the rest of this section only NO_X will be considered. The 2013 project NO_x emissions will exceed the 65 lb/day threshold at over 216 lbs/day. The approach taken in the Air Quality Analysis prepared by the applicant's consultant was to model the existing fleet's emissions at the existing mining site and to consider those emissions as the existing baseline (182.41 lbs/day NO_X). Then, the Air Quality Analysis applied an engine deterioration rate to the equipment fleet to account for the increase in emissions from the fleet as it ages. The Air Quality Analysis then concluded

that the impacts of the expansion project would be only the difference between the baseline emissions and the emissions after the engine deterioration is accounted for (216.08 minus 182.41 equals 33.67). This resulted in a less than significant conclusion by the applicant's consultant, claiming that 33.67 is less than the 65 lbs per day significance threshold.

This above conclusion may not adequately represent the actual environmental impacts of the expansion project. The modeling and emissions numbers are acceptable for use in this analysis; however this EIR makes a different interpretation and conclusion as follows.

The previous EIR for the existing mining site found the operational air quality impacts of the mine to be significant and unavoidable with NO_X emissions of over 250 lbs per day from mining equipment. Mitigation was applied to the project requiring that replacement equipment meet certain emissions reductions; however impacts were determined to remain significant and unavoidable, even with mitigation. This project will allow a continuation of mining on the expansion site using the same fleet from the original site. While it is acknowledged that the prior 250 lbs/day estimate represented this fleet and was already found significant and unavoidable, the approval of this project would allow the fleet to continue to operate but on a different site. That fleet would not produce 33.67 lbs/day NO_X but 216.08 lbs/day NO_X and this would be a significant and unavoidable environmental impact.

It is acknowledged that there is a less than significant increase in emission from the fleet as it ages and operates at the expansion site (33.67 lbs/day NO_X) but approval of this project will allow the continued operation of the mining fleet which will exceed emissions thresholds on a site not previously analyzed or approved for mining.

The SMAQMD has suggested mitigation that would help to reduce the NO_X impacts of the project. The mitigation differs from the air quality mitigation for the existing mining site only in that it requires upgrades to the fleet as a whole as it exists at time of operation not just when replacement vehicles for the fleet are put into service. The mitigation is interrelated with visible emissions which relate to particulate matter. Therefore, all mitigation measure will be provided in a separate section at the end of this chapter. With mitigation, the NO_X impacts of the project remain significant and unavoidable.

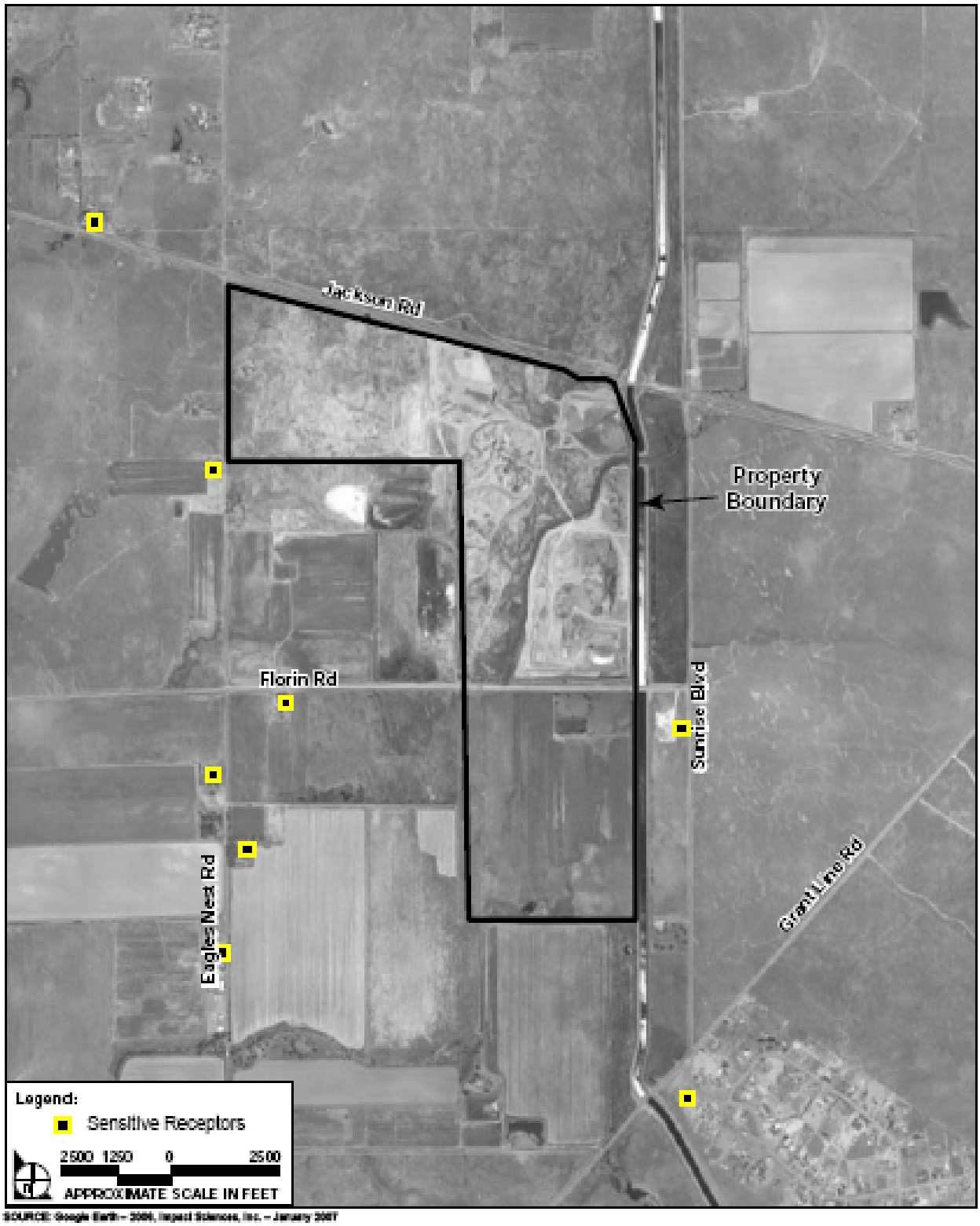
PARTICULATE MATTER IMPACTS

The approach taken in the Air Quality Analysis prepared by the applicant's consultant was to model the existing particulate matter sources at the existing mine and processing site and to consider those emissions as the existing baseline (85,046 lbs/yr). Then the Air Quality Analysis assumed that, because the processing rate was not changing, that PM impacts from loading and processing of materials would not change. It also assumed that, because the plant location was not changing, the travel distance for trucks on unpaved roads would not change. There was a small increase in PM generation due to off-road equipment operation and on-road trucks in the plus project

scenario. In total, the Air Quality analysis calculated a net increase in PM_{10} generation of 815 lbs/yr, with a total output of 85,861 lbs/yr.

The PM_{10} emissions were then modeled using a USEPA-approved model (AERMOD) to calculate the 24-hour and annual averages and their impacts at the nearest residences. The residences were considered sensitive receptors and are shown on Plate AQ-1 below which is from the Air Quality Study. Table AQ-5 and Table AQ-6 show the 24-hour and annual modeling results for the maximum impact and impacts at the two most impacted residences. According to the results, the project exceeds the 50 micrograms per cubic meter California ambient air quality standard for the 24-hour average by 187%, 77% and 37% for the maximum impact and impact at the nearest two residences respectively. This is a significant impact. The project also exceeds the 20 micrograms per cubic meter California ambient air quality standard for the annual average by 31%. This is a significant impact. These impacts would likely only occur very near the property line of the site and only under worst case conditions with the mine at maximum production.

Plate AQ -1 Location of Sensitive Receptors



SOURCE: Google Earth – 2006, Impact Sciences, Inc. – January 2007

Table AQ-5

Summary of Maximum Modeled Net PM_{10} Impacts due to the Proposed Operations (24-Hour Averaging Period)

Receptor	Background Concentration (µg/m³)	Modeled Net Impact (µg/m³)	Impact plus Background (µg/m³)	CAAQS (µg/m³)	Project Impact Percent of CAAQS
Maximum Impact (Cartesian Grid)	77.0	93.4	170.4	50	187%
Residential					
1st Maximum Impacted Residence	77.0	38.7	115.7	50	77%
2nd Maximum Impacted Residence	77.0	18.4	95.4	50	37%

Source: Impact Sciences, Inc.

[1] *The values in the* Impact plus Background *column are compared to the values in CAAQS column to assess if the emissions from the proposed project would contribute to exceedances of the CAAQS.*

Table AQ-6

Summary of Maximum Modeled Net PM_{10} Impacts due to the Proposed Operations (Annual Averaging Period)

Receptor	Background Concentration (µg/m³)	Modeled Net Impact (µg/m³)	Impact plus Background (µg/m³)	CAAQS (µg/m³)	Project Impact Percent of CAAQS
Maximum Impact (Cartesian Grid)	28.8	6.2	35.0	20	31%
Residential					
1st Maximum Impacted Residence	28.8	0.8	29.6	20	4%
2nd Maximum Impacted Residence	28.8	0.6	29.4	20	3%

Source: Impact Sciences, Inc.

[1] *The values in the* Impact plus Background *column are compared to the values in CAAQS column to assess if the emissions from the proposed project would contribute to exceedance of the CAAQS.*

The SMAQMD has suggested mitigation that would help to reduce the PM_{10} and NO_X impacts of the project. The mitigation differs from the air quality mitigation for the existing mining site only in that it applies to the fleet as a whole as it exists at time of operation, not just to replacement vehicles for the fleet.

Soil wetting, chemical dust suppressants, and other management practices can help reduce particulate matter impacts. The EIR for the existing mining site contains mitigation measures that require these practices and it is appropriate to apply them to this project. These measures are provided at the end of this chapter. Even with mitigation, the particulate matter impacts of the project remain significant and unavoidable.

TOXIC AIR POLLUTANTS

The applicant has provided a health risk assessment for the proposed project (See Appendix B). The Health Risk Assessment evaluated the heath impacts of diesel particulate matter (DPM) primarily from the heavy duty off-road mining equipment. The assessment was conducted using the AEROMOD model. The threshold of significance used by the assessment is from the SMAQMD Guide to Air Quality Assessment in Sacramento County which states that project impacts should be considered significant if the following condition holds:

> The project will result in construction or operational emissions of toxic air contaminants (TACs) which cause a lifetime cancer risk greater than 10 in one million (one in one million if "Best Available Control Technology", or BACT, is not applied), or ground-level concentrations of noncarcinogenic TACs with a Hazard Index greater than one.

The SMAQMD has advised that the above significance threshold is for stationary sources (stand-by generators, gas stations, etc.) and that no threshold has been adopted for mobile sources. This EIR references the standard to give the reader a basic understanding of the levels typically considered. The methodology used was the same as for the NO_X and PM_{10} analysis above; meaning that a net change approach was used. As noted above, the net change approach is somewhat misleading because it only represents the change in emissions from the existing mining site to the expansion site. However for PM_{10} and for this TAC analysis, because thresholds are compared to the ambient conditions, the net change approach is acceptable.

Based on the expected 10-year life of the expansion site, the health risk assessment calculated that the cancer risk from the expansion site would be 2.2 in one million. It should also be noted that the mitigation for NO_X and PM_{10} provided below may reduce this risk further by requiring the fleet of heavy equipment to achieve emissions reductions compared to the Air Resources Board fleet averages. The level of risk reported above is not considered significant.

MITIGATION MEASURES

AQ-1: Every effort shall be made to remove overburden during the period of the year when surface soils are moist. If overburden is removed when surface soils are dry, water spraying equipment shall be used to reduce dust emissions. Water spraying equipment shall likewise be used, as needed, when removing aggregate. Cover loads of all haul/dump trucks securely and/or maintain 2 feet of freeboard clearance.

AQ-2: The applicant shall ensure that the moisture content of the material being conveyed to the off-site processing plant is sufficient to avoid visible dust emissions from the conveyor loading and unloading points.

AQ-3: Unpaved access/haul roads shall regularly be watered or treated with chemical dust suppressants, as needed, to control wind erosion and dust created by vehicle travel.

AQ-4: Material stockpiles shall be watered or treated with chemical dust suppressants, as needed, to control wind erosion.

AQ-5: Public roads within at least 1,500 feet of project access points shall be regularly swept and/or watered, as needed, to remove dust and aggregate.

AQ-6:

Category 1: Reducing NOx emissions from off-road diesel powered equipment.

The proponent shall provide a plan, for approval of the lead agency and the Sacramento Metropolitan Air Quality Management District (SMAQMD), demonstrating that the heavy-duty (>50 horsepower) off-road vehicles to be used in the project, including owned or leased and subcontracted vehicles, will achieve a project wide fleet-average 20 percent NOx reduction and 45 percent particulate reduction[1] compared to the most recent CARB fleet average at time of each annual report; and

The proponent shall submit to the lead agency and SMAQMD a comprehensive inventory of all off-road equipment, equal to or greater than 50 horsepower, that will be used an aggregate of 40 or more hours per year during any portion of the project. The inventory shall include the horsepower rating, engine production year, and projected hours of use or fuel throughput for each piece of equipment. The inventory shall be updated and submitted annually throughout the duration of the project. The proponent shall provide SMAQMD with the name and phone number of the project manager and/or on-site foreman.

Due to the long term nature of this project, the requirement for the emission reduction plan referenced herein will sunset on Month/Year[2] due to existing SMAQMD and CARB rules that will affect CARB fleet averages at that time.

And:

Category 2: Controlling visible emissions from off-road diesel powered equipment.

[1] Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available.

[2] Project proponent should contact SMAQMD staff to determine appropriate sunset period.

Emissions from all off-road diesel powered equipment used on the project site shall not exceed 40 percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately, and the lead agency and SMAQMD shall be notified within 48 hours of identification of non-compliance equipment. The SMAQMD and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this section shall supersede other SMAQMD or state rules or regulations.