APPENDIX C
AIR QUALITY AND GREENHOUSE GAS EMISSIONS

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AIR QUALITY AND GREENHOUSE GAS IMPACT ASSESSMENT

Omya White Knob and White Ridge Quarries Expansion
County of San Bernardino

November 5, 2013

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1.0 INTRODUCTION

This Air Quality and Greenhouse Gas Impact Assessment report (AQIA) has been prepared for the Omya White Knob and White Ridge Quarries Expansion project ("Project"). The Project is located adjacent to the San Bernardino National Forest (SBNF) 6.5 miles southwest of the intersection of State Route 18 and State Route 247 in the Lucerne Valley. The Project is 4.2 miles west-southwest of the existing Omya processing plant located near the intersection of Crystal Creek Road and Powerline Road. An existing access haul road connects the Project to the processing plant.

The Project involves the expansion of two quarries and three fill areas. Specifically, the existing White Knob Quarry and Overburden Site #1 would be expanded. The White Ridge Quarry and White Knob Annex Quarry do not currently exist but are already approved and would be expanded. Overburden Sites #2 and #3 would be added to the existing plan. Primary crushing occurs near the quarries and ore is hauled north down the mountain and then east along the foothills to the processing plant.

Omya operates two other quarries in the area. The Sentinel and Butterfield Quarries are located approximately 3 miles south of the processing plant on Crystal Creek Road. The Sentinel and Butterfield Quarries are currently undergoing a separate CEQA evaluation for proposed expansion. Cloudy and Claudia Quarries are inactive and in the process of being reclaimed. Cloudy and Claudia Quarries are located approximately 5 miles south of the processing plant at the terminus of Crystal Creek Road.

The combined production from all the operating quarries (Butterfield, Sentinel, and White Knob) is limited by the processing plant maximum production rate. The Project would allow up to the maximum production rate of 680,000 tons per year of finished ore to be extracted exclusively from the White Knob and White Ridge quarries. This would result in no material being quarried at Sentinel and Butterfield which is an indirect effect of the Project that necessitates calculation of Sentinel and Butterfield emissions in the air quality baseline. Moreover the available vehicular activity data does not distinguish which units operate in each quarry. Thus, the emissions from vehicles are calculated for the fleet and apportioned to quarries based on throughput amount and to units operating on roads by vehicle miles traveled (VMT).

Impacts from alternatives to the Project are assessed in this report and described in Section 8.0. The two alternatives include: No Action and Mixed Production with Sentinel and Butterfield.

2.0 ENVIRONMENTAL SETTING

Air pollutants are regulated in order to protect public health and welfare. Health effects of common air pollutants are presented in Appendix B. Effects of pollutants on public welfare include visibility impairment; and impacts to animals, crops, vegetation, and buildings.

2.1 Existing Sources and Receptors

The Omya processing plant receives ore from the Butterfield, Sentinel and White Knob Quarries. Omya provided information on historical activity levels and equipment that was used to develop a baseline for the Project. In general, the quarries and processing plant consist of operations and equipment that emit fugitive dust and diesel exhaust. Detailed discussion of how the baseline emissions were quantified is presented in Section 5.0.

2.2 Meteorology and Topography

The MDAQMD Guidelines state:

> *The Mojave Desert Air Basin (MDAB) is an assemblage of mountain ranges interspersed with long broad valleys that often contain dry lakes. Many of the lower mountains which dot the vast terrain rise from 1,000 to 4,000 feet above the valley floor. Prevailing winds in the MDAB are out of the west and southwest. These prevailing winds are due to the proximity of the MDAB to coastal and central regions and the blocking nature of the Sierra Nevada mountains to the north; air masses pushed onshore in southern California by differential heating are channeled through the MDAB. The MDAB is separated from the southern California coastal and central California valley regions by mountains (highest elevation approximately 10,000 feet), whose passes form the main channels for these air masses. The Antelope Valley is bordered in the northwest by the Tehachapi Mountains, separated from the Sierra Nevadas in the north by the Tehachapi Pass (3,800 ft elevation). The Antelope Valley is bordered in the south by the San Gabriel Mountains, bisected by Soledad Canyon (3,300 ft). The Mojave Desert is bordered in the southwest by the San Bernardino Mountains, separated from the San Gabriels by the Cajon Pass (4,200 ft). A lesser channel lies between the San Bernardino Mountains and the Little San Bernardino Mountains (the Morongo Valley).*
>
> *During the summer the MDAB is generally influenced by a Pacific Subtropical High cell that sits off the coast, inhibiting cloud formation and encouraging daytime solar heating. The MDAB is rarely influenced by cold air masses moving south from Canada and Alaska, as these frontal systems are weak and diffuse by the time the reach the desert. Most desert moisture arrives from infrequent warm, moist and unstable air masses from the south. The MDAB averages between three and seven inches of precipitation per year (from 16 to 30 days with at least 0.01 inches of precipitation). The MDAB is classified as a dry-hot desert climate (BWh), with portions classified as dry-very hot desert (BWhh), to indicate at least three months have maximum average temperatures over 100.4° F.*

2.3 Ambient Air Quality

Appendix C contains the airborne pollutant concentration data and number of days exceeding each Ambient Air Quality Standard (AAQS) monitored by local air districts. The Project is located near the Lucerne Valley monitoring station which measures PM_{10}. Concentrations at this station were less than the federal standard in all but one year (2007) of the decade reviewed (i.e. 2002 to 2011, see Appendix C). Concentrations are estimated to have exceeded the California PM_{10} standard six or less days each year except 2007 when the estimate is 37 days exceeding.

The Hesperia monitoring station is the closest location where ozone is monitored. Ozone levels exceed the 2008 federal 8-hour standard between 40 and 73 days per year between 2002 and 2011 (Appendix C). The California 1-hour standard is exceeded between 15 and 46 days per year.

The Victorville monitoring station collects a full suite of pollutants and is the closest station to monitor CO and NO_2 which are both attainment pollutants.

The South Coast AQMD operates a $PM_{2.5}$ monitoring station in the City of Big Bear Lake. $PM_{2.5}$ concentrations at this station exceeded the federal standard on a handful of days in each year 2005 through 2009. 2010 and 2011 did not have exceedences (Appendix C).

Table 1: Ambient Pollutant Concentrations

Pollutant	Averaging Time	2007	2008	2009	2010	2011
Ozone (ppm)	1-hr	0.132	0.132	0.123	0.119	0.132
	8-hr	0.109	0.106	0.101	0.101	0.113
Carbon Monoxide (ppm)	1-hr (Max.)	2.1	1.4	1.8	8.7	1.9
	8-hr (Max.)	1.6	1.0	1.1	2.3	1.5
Nitrogen Dioxide (ppm)	1-hr (98^{th} %ile)	0.063	0.064	0.059	0.065	0.060
	Annual	0.018	0.016	0.015	0.015	0.015
Respirable Particulate Matter (PM_{10}) ($\mu g/m^3$)	24-hr (Max.)	229	67	93	43	33
	Annual	31	20.7	17.3	14.6	13.8
Fine Particulate Matter ($PM_{2.5}$) ($\mu g/m^3$)	24-hr (98^{th} %ile)	34.0	33.2	29.4	27.5	30.6
	Annual	10.3	9.1	9.9	8.4	8.4

Ozone is from Hesperia Monitoring Station operated by MDAQMD.
NO_2 & CO concentrations are from Victorville Monitoring Station operated by MDAQMD.
PM_{10} concentrations are from Lucerne Valley Middle School Monitoring Station operated by MDAQMD.
$PM_{2.5}$ concentrations are from Big Bear City Monitoring Station operated by South Coast AQMD.

2.4 Ambient Health Risk

The MDAQMD does not publish health risk estimates for areas within its jurisdiction. The Project is near the boundary of Mojave Desert and South Coast Air Basins. Thus, the SCAQMD Multiple Air Toxics Exposure Study (MATES) III risk maps which show total cancer risk of approximately 85 excess cancer cases per one million people exposed in the Big Bear Lake area is considered representative of conditions in the area of the Project as documented on Figure 3 (Appendix A).

It should be noted that the SCAQMD's MATES study is based on ambient air quality monitoring data from several monitoring stations in the South Coast Air Basin. The MATES III study includes fixed monitoring sites (where data is collected over multiple years) and microscale or temporary sites where monitoring occurred for a limited time period (six to ten weeks). The nearest fixed air monitoring site to the Project vicinity is the Inland Valley San Bernardino station located at 14360 Arrow Highway in Fontana, CA which is over sixty (60) miles southwest of the Project. The MATES III study did include a temporary site that appears to be located closer to the Project but no address is provided in the MATES III documentation. The MATES III study acknowledges that "Since the sampling periods for the microscale sites are limited, annual averages for measured substances cannot be calculated." (Page 2-4, MATES III). The ambient health risk identified in Figure 3 (Appendix A) includes projection of risk levels from locations that were monitored to those that were not. This report overlooks these details and considers the risk map published by SCAQMD at face value such that it represents existing conditions at the project site.

Diesel particulate matter (DPM) is identified as a TAC and accounts for roughly 70% of the cancer risk from air pollution in urban areas where on-road sources dominate the inventory. Diesel engines are a ubiquitous source and thus it is not surprising that stationary source TAC effects "are generally much lower than region-wide risk levels, region-wide risks tend to overwhelm any potential local 'hot spots.'" (SCAQMD Mates II Study, Section 7.3).

2.5 Effects of Greenhouse Gases

The effect of greenhouse gas emission regulations are potentially far reaching. On December 7, 2009, United States Environmental Protection Agency (US EPA) Administrator Lisa Jackson signed a final action, under Section 202(a) of the Clean Air Act, finding that six key well-mixed greenhouse gases constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to the climate change problem. The "endangerment finding" allows the US EPA to begin regulating the six GHGs that are identified.

Key effects that US EPA claims support the determination that GHGs endanger public health include:

> *"**Temperature**. There is evidence that the number of extremely hot days is already increasing. Severe heat waves are projected to intensify, which can increase heat-related mortality and sickness. Fewer deaths from exposure to extreme cold is a possible benefit of moderate temperature increases. Recent evidence suggests, however, that the net impact on mortality is more likely to be a danger because heat is already the leading cause of weather-related deaths in the United States.*

***Air Quality**. Climate change is expected to worsen regional ground-level ozone pollution. Exposure to ground-level ozone has been linked to respiratory health problems ranging from decreased lung function and aggravated asthma to increased emergency department visits, hospital admissions, and even premature death. The impact on particulate matter remains less certain.*

***Climate-Sensitive Diseases and Aeroallergens**. • Potential ranges of certain diseases affected by temperature and precipitation changes, including tick-borne diseases and food and water-borne pathogens, are expected to increase. • Climate change could impact the production, distribution, dispersion and allergenicity of aeroallergens and the growth and distribution of weeds, grasses, and trees that produce them. These changes in aeroallergens and subsequent human exposures could affect the prevalence and severity of allergy symptoms.*

***Vulnerable Populations and Environmental Justice**. • Certain parts of the population may be especially vulnerable to climate impacts, including the poor, the elderly, those already in poor health, the disabled, those living alone, and/or indigenous populations dependent on one or a few resources. • Environmental justice issues are clearly raised through examples such as warmer temperatures in urban areas having a more direct impact on those without air-conditioning.*

***Extreme Events**. Storm impacts are likely to be more severe, especially along the Gulf and Atlantic coasts. Heavy rainfall events are expected to increase, increasing the risk of flooding, greater runoff and erosion, and thus the potential for adverse water quality effects. These projected trends can increase the number of people at risk from suffering disease and injury due to floods, storms, droughts and fires." (EPA's Endangerment Finding - Health Effects Fact Sheet, US EPA).*

2.6 Class I and Class II Wilderness Areas

Class I Wilderness Areas are areas designated in the Clean Air Act (42 USC 7472) including:

- International parks;
- National wilderness areas which exceed 5,000 acres in size;
- National memorial parks which exceed 5,000 acres in size; and
- National parks which exceed 6,000 acres in size.

The Project is within 100 kilometers of the following Class I Wilderness Areas:

- San Gorgonio 23 km.
- Cucamonga 50 km.
- San Jacinto 56 km.
- Joshua Tree National Park 59 km.
- San Gabriel 75 km.

Class I areas are protected from impacts on visibility, ozone phytotoxicity, and deposition of nitrates and sulfates which can acidify water bodies. In addition, the deposition of fugitive dust onto plants is a concern particularly for protected species, such as the carbonaceous plants found near the quarries. The remainder of the SBNF is considered Class II Wilderness.

Good visibility is essential to the enjoyment of national parks and scenic areas. Across the United States, regional haze has decreased the visual range in these pristine areas from 140 miles to 35-90 miles in the West, and from 90 miles to 15-25 miles in the East. This haze is composed of small particles that absorb and scatter light, affecting the clarity and color of what humans see in a vista. The pollutants that create haze (also called haze species) are measurable as sulfates, nitrates, organic carbon, elemental carbon, fine soil, sea salt, and coarse mass. Anthropogenic sources of haze include industry, motor vehicles, agricultural and forestry burning, and dust from soils disturbed by human activities. Pollutants from these sources, in concentrations much lower than those which affect public health, can impair visibility anywhere. Natural forest fires, biological emissions, sea salt and other natural events also contribute to haze species concentrations. Visibility-reducing particles can be transported long distances from where they are generated, thereby producing regional haze. When they are transported to and occur in national parks and wilderness areas, the reduced visibility impairs the quality and the value of the wilderness experience.

Conditions in the San Gorgonio Wilderness Area would be of primary concern for this Project because it is closest and other areas would experience less severe impacts. The environmental setting for each Class I Wilderness Area within California is found in the California Regional Haze Plan. The San Gorgonio Wilderness Area description from this Plan is provided in Appendix D.

The Project is bounded on the south, west, and east by mountainous undeveloped Forest Lands and to the north by a rural area of the Lucerne Valley. Other than mining, which has historically been active in the area, land use in the rugged mountainous area has been limited to occasional use by hikers and hunters. Off highway vehicle use and fuel wood cutting have increased as more access roads were built.

The “Land Management Plan, Part 2 San Bernardino National Forest Strategy” (USDA September 2005) defines the project area as the “Desert Rim.” The Desert Rim is described as “a high desert, remote, rugged landscape formed by complex geological faulting. Today, the majority of the land is valued in the production of large quantities of high quality, limestone mineral deposits used in the production of pharmaceuticals and cement. These carbonate deposits are also valuable habitat supporting four species of threatened and endangered plants found nowhere else in the world.” An intensive collaborative effort led to the development of the Carbonate Habitat Management Strategy (CHMS) in 2003. The CHMS is designed to provide long-term protection for the carbonate endemic plants and also provide for continued long-term mining. Portions of the carbonate habitats are protected from mining impacts in perpetuity within the carbonate habitat reserves dedicated and managed as described in the CHMS.

3.0 REGULATORY SETTING

Regulations that affect air quality consist primarily of those promulgated under federal and state clean air acts as discussed in Section 3.1. Other regulations that affect air quality include those related to federal conformity (Section 3.2), impacts on Class I and Class II Wilderness Areas (Section 3.3), impacts on health risk (Section 3.4), and greenhouse gases (Section 3.5).

3.1 Air Quality Regulatory Framework

The Federal Clean Air Act and the California Clean Air Act each contain comprehensive frameworks for air quality planning and regulation. Title 40 of the Code of Federal Regulations and Title 17 of the California Code of Regulations contain requirements that have been promulgated under authority granted to US EPA and California Air Resource Board (CARB) by the Acts.

Criteria air pollutants include sulfur oxides (SOx), nitrogen oxides (NOx), particulate matter (PM), carbon monoxide (CO), lead (Pb), and ground-level ozone (O_3). AAQS are developed by US EPA and CARB for each of the criteria pollutants. Primary AAQS are designed to protect human health, with an adequate margin of safety, including sensitive populations such as children, the elderly, and individuals suffering from respiratory disease. Secondary AAQS are designed to protect public welfare from any known or anticipated adverse effects of a pollutant (e.g. building facade degradation, reduced visibility, and damage to crops and domestic animals).

AAQS and related monitoring programs are among the many devices established by air quality regulations (40 CFR 50 - 51). Geographic areas called “attainment areas” are classified by US EPA and CARB based on whether the ambient air in the area meets the AAQSs. An “attainment area” is an area in which pollutant concentrations are less than or equal to the AAQS while “non-attainment areas” have pollution levels above the AAQS. State and federal AAQS are shown in Table 2.

In order to make progress towards attainment with the AAQS, each state and air district containing federal non-attainment areas is required to develop a written plan for improving air quality in those areas. These plans are called State Implementation Plans (SIP) and Attainment Plans. California’s SIP contains mobile source and consumer product emission control strategies proposed by CARB and a compilation of stationary and area source strategies that have been developed by local air districts under CARB supervision. Through these plans, the state and local air districts outline efforts that they will take to reduce air pollutant concentrations to levels below the standards. Federal and State attainment status designations assigned by US EPA and CARB for the Project area are summarized in Table 3.

California Ambient Air Quality Standards (CAAQS) are more stringent than the National Ambient Air Quality Standard (NAAQS). Existing law requires district plans for attaining CAAQS to assess the cost-effectiveness of available and proposed emission control measures. Proposed emission control measures in the Attainment Plans are typically developed into air district rules.

The MDAQMD assists CARB in preparing the State Implementation Plan by preparing Attainment Plans that demonstrate how the Ambient Air Quality Standards will be achieved. The Attainment Plans describe the rules that will be developed and other means by which the MDAQMD will manage the emissions within the jurisdiction. MDAQMD Attainment Plans are listed in Table 4.

Table 2: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12 µg/m^3		
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[8]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[9]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[9]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[9]	—	
Lead[10,11]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[11]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[12]	8 Hour	See footnote 12	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[10]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes here: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf Last checked on June 24, 2013

Table 3: MDAQMD Attainment Status

Standard	MDAQMD Attainment Status
One-hour Ozone (Federal) – standard has been revoked, this is historical information only	Non-attainment; classified Severe-17 (portion of MDAQMD outside of Southeast Desert Modified Air Quality Management Area is unclassified/attainment)
Eight-hour Ozone (Federal 84 ppb)	Subpart 2 Non-attainment; classified Moderate (portion of MDAQMD outside of Western Mojave Desert Ozone Non- attainment Area is unclassified/attainment)
Eight-hour Ozone (Federal new standard, 75 ppb or lower)	Non-attainment; classified Severe-15
Ozone (State)	Non-attainment; classified Moderate
PM_{10} (Federal)	Non-attainment; classified Moderate (portion of MDAQMD in Riverside County is unclassified)
$PM_{2.5}$ (Federal)	Unclassified/attainment
$PM_{2.5}$ (State)	Non-attainment (portion of MDAQMD outside of Western Mojave Desert Ozone Non- attainment Area is unclassified/attainment)
PM_{10} (State)	Non-attainment
Carbon Monoxide (State and Federal)	Attainment
Nitrogen Dioxide (State and Federal)	Attainment/unclassified
Sulfur Dioxide (State and Federal)	Attainment/unclassified
Lead (State and Federal)	Attainment
Particulate Sulfate (State)	Attainment
Hydrogen Sulfide (State)	Unclassified (Searles Valley Planning Area is non-attainment)
Visibility Reducing Particles (State)	Unclassified
Source: MDAQMD CEQA Guidelines (August 2011).	

Table 4: MDAQMD Attainment Plans

Name of Plan	Date of Adoption	Standard(s) Targeted	Applicable Area	Pollutant(s) Targeted	Attainment Date*
Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Non-attainment Area)	9-Jun-08	Federal eight hour ozone (84 ppb)	Western Mojave Desert Non-attainment Area (MDAQMD portion)	NO_X and VOC	2021
2004 Ozone Attainment Plan (State and Federal)	26-Apr-04	Federal one hour ozone	Entire District	NO_X and VOC	2007
Triennial Revision to the 1991 Air Quality Attainment Plan	22-Jan-96	State one hour ozone	Entire District	NO_X and VOC	2005
Mojave Desert Planning Area Federal Particulate Matter Attainment Plan	31-Jul-95	Federal daily and annual PM_{10}	Mojave Desert Planning Area	PM_{10}	2000
1991 Air Quality Attainment Plan	26-Aug-91	State one hour ozone	San Bernardino County portion	NOx and VOC	1994

* Note: A historical attainment date given in an attainment plan does not necessarily mean that the affected area has been re-designated to attainment.

The MDAQMD Attainment Plans contain the rules proposed for adoption. As this document was being prepared the MDAQMD Rule Development Calendar had last been updated on January 9, 2012 (Appendix E). Current MDAQMD rules that apply to Project sources include:

- **Rule 201 – Permits to Construct** applies to the construction of air emissions sources that are not otherwise exempt under Rule 219.
- **Rule 203 – Permit to Operate** requires air emissions sources that are not exempted by Rule 219 to obtain operating permit.
- **Rule 204 – Requirements** contains rule language describing New Source Review including Best Available Control Technology (BACT) and emissions offset requirements for stationary sources.
- **Rule 401 – Visible Emissions** limits visibility of fugitive dust to less than No. 1 on the Ringlemann Chart (i.e. 20% opacity).
- **Rule 402 – Nuisance** applies when complaints from the public are received by the District.
- **Rule 403 – Fugitive Dust** prohibits visible dust beyond the property line of the emission source, requires "every reasonable precaution" to minimize fugitive dust emissions and prevent trackout of materials onto public roadways, and prohibits greater than 100 $\mu g/m^3$ difference between upwind and downwind particulate concentrations.
- **Rule 403.2 – Fugitive Dust Control for the Mojave Desert Planning Area** contains the following requirements applicable to limestone processing facilities:
  - a. Stabilize industrial unpaved roads carrying more than ten vehicle trips per day with the majority of those vehicles weighing 30 tons or more;
  - b. Enclose exterior belt conveyors sufficiently to cover the top and sides of the bulk material being transferred, or employ an alternate dust suppression system sufficient to prevent visible fugitive dust.
  - c. Manage or treat bulk material open storage piles sufficiently to prevent visible fugitive dust emissions. For purposes of this Rule, active watering during visible dusting episodes shall be sufficient to maintain compliance;
  - d. Cover loaded bulk material haul vehicles while traveling upon publicly maintained paved surfaces;
  - e. Employ a dust suppression system at bulk material transfer points sufficient to prevent visible fugitive dust;
  - f. Stabilize or eliminate bulk material open storage piles that have been or are expected to be inactive for at least one year;
  - g. Stabilize as much unpaved operations area as is feasible;
  - h. Vacuum sweep bulk material spills on paved surfaces weekly or more often, as needed;
  - i. Prevent facility-related bulk material trackout on publicly maintained paved surfaces;
  - j. Clean up facility-related bulk material trackout and spills on publicly maintained roads within twenty-four hours; and
  - k. Employ belt cleaners and/or conveyor return scrapers to minimize conveyor spillage.
- **Rule 404 – Particulate Matter Concentration** sets concentration limits based upon the flow rate

of the discharge. The concentration limits would apply to discharge from a stack (e.g. baghouse).

- **Rule 405 – Solid Particulate Matter Weight** limits emissions based upon the weight of material processed.
- **Rule 900 – New Source Performance Standards** incorporates Federal regulation (40 CFR 60) which affects the construction of emissions units. Requirements may or may not apply depending upon the size, construction and manufacture date of equipment that will be used. Specifically, NSPS OOO (40 CFR 60.670) applies to equipment in non-metallic mineral processing plants.
- **Regulation XIII – New Source Review** contains a number of rules that are applied to new and modified sources.
- **Rule 1520 – Control of Toxic Air Contaminants from Existing Sources** implements AB 2588 Air Toxics Hot Spots requirements.
- **Rule 2002 – General Federal Actions Conformity** requires federal actions to conform to the applicable implementation plan.

3.2 Conformity

A project is conforming if it complies with all applicable District rules and regulations, complies with all proposed control measures that are not yet adopted from the applicable plan(s), and is consistent with the growth forecasts in the applicable plan(s) (or is directly included in the applicable plan). A project is non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. Conformity with growth forecasts can be established by demonstrating that the project is consistent with the land use plan that was used to generate the growth forecast. An example of a non-conforming project would be one that increases the gross number of dwelling units, increases the number of trips, and/or increases the overall vehicle miles traveled in an affected area (relative to the applicable land use plan).

Federal Conformity regulation (40CFR93) and MDAQMD Rule 2002 which mirrors the federal regulation were adopted in order to ensure that federal actions conform to the applicable implementation plan. Federal actions where the total of direct and indirect emissions in a nonattainment or maintenance area is less than specified rates would screen out of conformity analysis. As presented in Table 3, the western area of the MDAQMD where the Project is located is severe non-attainment for federal ozone, and moderate non-attainment for federal PM_{10}. On the basis of those attainment designations, the Project would screen-out of conformity analysis if:

- NOx and VOC emissions are less than 25 tons per year each;
- PM_{10} emissions are less than 100 tons per year; and
- Emissions are less than 10% of the non-attainment area emissions inventory.

3.3 Federal Land Managers' Air Quality Related Values

The Federal Land Manager (FLM) and the Federal official with direct responsibility for management of Federal Class I parks and wilderness areas (i.e., Park Superintendent, Refuge Manager, Forest Supervisor) have an affirmative responsibility to protect the Air Quality Related Values (AQRVs) (including visibility) of such lands, and to consider whether a proposed project with emissions exceeding the "major" source thresholds will have an adverse impact on such values. The FLM's decision regarding whether there is an adverse impact is then conveyed to the permitting authority for consideration in its determinations regarding the permit. The permitting authority's determinations generally consider a wide range of factors, including the potential impact of the new source or major modification on the AQRVs of Class I areas, if applicable.

At the request of both State permitting agencies and permit applicants, the FLMs formed the Federal Land Managers' Air Quality Related Values Work Group (FLAG) to provide better consistency pertaining to their role in the review of new source permit applications near Federal Class I areas. The purpose of FLAG is twofold: (1) to develop a more consistent and objective approach for the FLMs to evaluate air pollution effects on public AQRVs in Class I areas, including a process to identify those resources and any potential adverse impacts, and (2) to provide state permitting authorities and potential permit applicants consistency on how to assess the impacts of new and existing sources on AQRVs in Class I areas.

The FLMs are also concerned about resources in Class II parks and wilderness areas because they have other mandates to protect those areas as well. The information and procedures outlined in the FLAG Report are generally applicable to evaluating the effect of new or modified sources on the AQRVs in both Class I and Class II areas, including the evaluation of effects as part of Environmental Assessments and/or Environmental Impact Statements under the National Environmental Policy Act (NEPA). However, FLAG does not preclude more refined or regional analyses being performed under NEPA or other programs.

The FLAG 2010 Phase I Report update recommends how to evaluate visibility, ozone phytotoxicity, and deposition impacts from new or modified sources. The FLAG Phase I Report recommends that an applicant apply the "Q/D test" for sources greater than 50 km from a Class I area to determine whether or not any further analysis is necessary. The Q/D test sums emissions of SO_2, NOx, PM_{10}, and H_2SO_4 (i.e. Q in tons per year) and then divides that total by the distance between the source and receptor (D in kilometers). Results equal to or less than 10 do not require further assessment (i.e. $Q/D \leq 10$).

3.4 Health Risk

Toxic air contaminants (TACs) are pollutants listed by the State of California that pose acute, chronic, and/or cancer health risks to exposed individuals. Hazardous air pollutants (HAP) are pollutants listed by US EPA that pose acute, chronic, and/or cancer health risks to exposed individuals.

The California Office of Environmental Health Hazard Assessment (OEHHA) is responsible for developing the scientific basis for listing and evaluation of health risk from TACs. CARB is responsible for quantifying TAC emissions and controlling TACs by promulgation and enforcement of air toxic control measures (ATCM). Assembly Bill 1807 (AB1807) passed in 1983 requires the state of California to identify and control TACs. TACs are formally identified through a detailed process which starts when a chemical's risk to human health and the environment is above certain criteria. Once TACs are identified, the emission sources, controls, technologies and costs are reviewed to determine if regulation is needed to reduce emissions. In 1993, AB 1807 was amended by passage of Assembly Bill 2728 (AB 2728) which requires the State to list the 189 federal HAPs in the TAC list.

In 1987, the AB 2588 air toxics "hot spots" program was established. This program requires subject facilities to report their air toxics emissions, determine localized health risks, and notify nearby residents for whom risk may exceed the notification level.[1] The program was amended in 1992 to require facilities to reduce high risks (e.g. greater than 100 in 1 million cancer risk; or 10 hazard index) through the development of a risk management plan. The Hotspots Analysis and Reporting Program (HARP) is a software program that calculates TAC emission inventories and performs health risk assessments (HRA) for use in the AB 2588 Program.

The Off-Road Vehicle Regulation (13 CCR 2449) was adopted by the CARB in 2007 to reduce diesel particulate matter (PM) and oxides of nitrogen (NOx) emissions from in-use off-road heavy-duty diesel vehicles in California. The regulation was amended by the CARB in December 2010. Prior to that time, the regulation phased in from 2010 to 2020; but the December 2010 rulemaking pushed the start date back to 2014 and the date of final implementation back to 2024. In addition, until CARB receives a waiver from US EPA to regulate in-use off-road engines, the provisions that require further control are not enforceable. Registering fleets through the Diesel Off-road On-line Reporting System (DOORS), labeling equipment, idling limits and sale notification are requirements of the Off-Road Regulation that are still in effect. Regulatory Advisory 10-414 describes the enforcement delay and was last updated in May 2011.

The On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation (13 CCR 2025) was adopted in December 2010. The regulation requires diesel trucks and buses that operate in California to be upgraded to reduce emissions. Heavier trucks must be retrofitted with PM filters beginning January 1, 2012, and older trucks must be replaced starting January 1, 2015. By January 1, 2023, nearly all trucks and buses will need to have 2010 model year engines or equivalent. The regulation applies to nearly all privately and federally owned diesel fueled trucks and buses and to privately and publicly owned school buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds.

Portable engines are regulated by an air toxic control measure (17 CCR 93116) that limits diesel particulate matter and may also be regulated by the Portable Equipment Registration Program (PERP) or local air district permit. In-use portable engines regulated by the ATCM begin phasing in controls to meet emissions reductions criteria on January 1 of 2013, 2017, and 2020. By 2020, in-use portable engines will have Tier 4 particulate emissions characteristics. The PERP program requires applications for new registrations are accepted only for engines that emit less than the interim Tier 4 standards.

3.5 Greenhouse Gas Regulations

On May 13, 2010 US EPA finalized the GHG Tailoring Rule (75 FR 31514, June 3, 2010). The Tailoring Rule sets major source emissions thresholds that define when federal operating permits under Prevention Significant Deterioration (PSD) or Title V are required. The Tailoring Rule establishes a threshold of 100,000 tpy of GHGs from new sources above which sources are considered major sources requiring a federal operating permit. Modification of an existing source that increases GHG emissions by an amount greater than 75,000 tpy is considered a major modification.

CARB approved the AB 32 Scoping Plan at the Board hearing on December 12, 2008. The Scoping Plan contains the main strategies that California will use to reduce GHGs as required by AB 32. On August 24, 2011, the CARB Board approved the Final Supplement to the AB 32 Scoping Plan Functionally Equivalent

[1] http://www.arb.ca.gov/ab2588/district_levels.htm

Document which accounted for progress already made towards reducing statewide GHG emissions and the effect of the severe and prolonged economic downturn that occurred after 2006.

Control measures contained in the Scoping Plan that may affect Project emissions include, but are not limited to:

- **Transportation Measures**. These measures propose to reduce GHG's from vehicles by making vehicles more efficient, reducing the carbon content of the fuels, and reducing the vehicle miles traveled. Thus, vehicles would emit less GHG emissions in the future.
    a. Light Duty Vehicle GHG Standard (T-1). This measure implements AB 1493 (Pavley) standards and planned second phase of the program. Align zero-emission vehicle, and alternative and renewable fuel and vehicle technology programs with long-term climate change goals.
    b. Low Carbon Fuel Standard (T-2). This measure will reduce the carbon intensity of California's transportation fuels by at least ten percent (10%) by 2020. CARB had previously identified this measure as a Discrete Early Action item which will be implemented through a rulemaking by 2010.
    c. Vehicle Efficiency Measures (T-4). This includes measures such as sustainable tire practices, properly inflating vehicle's tires, and possibly fuel-efficient tire standards.
- **Energy Measures**. These measures propose that utility operators replace some fossil fuel electricity generation capacity with renewable sources and reinforces incentives that are offered by local governments to encourage the placement of solar panels on new and existing structures. The Renewables Portfolio Standard (RPS) increases renewables from 12% in the baseline year(s) to 20% in 2020. The Renewable Electricity Standard (RES) is a separate measure that requires 33% renewables by 2020. The RES is implemented by the California Energy and Public Utilities Commissions under SBX1-2, signed by Governor Brown in April 2011.

Senate Bill 375 (SB 375) "Transportation planning: travel demand models: sustainable communities strategy: environmental review" was signed by the Governor on September 30, 2008. SB 375 is most concerned with automobile and light truck traffic, but the goal of reducing GHGs covers all transportation sources based on the need for sustainable communities.

> *"each transportation planning agency … shall prepare and adopt a regional transportation plan directed at achieving a coordinated and balanced regional transportation system, including, but not limited to, mass transportation, highway, railroad, maritime, bicycle, pedestrian, <u>goods movement</u>, and aviation facilities and services." (Section 65080(a), underline added.)*

The regional transportation plan is to be an internally consistent document and include a sustainable communities strategy (SCS).

> *"The sustainable communities strategy shall …(v) gather and consider the best practically available scientific information regarding <u>resource areas</u> and farmland in the region …." (Section 65080(b)(2)(B)(v), underline added.)*

> *Resource areas include: "areas of the state designated by the State Mining and Geology Board as areas of statewide or regional significance pursuant to Section 2790 of the Public Resources Code, and lands under Williamson Act contracts." (Section 65080.01(a)(4).)*

Thus, SB 375 recognizes the limestone deposits as a regionally significant resource that requires special consideration in transportation and land use planning efforts.

County of San Bernardino Climate Action Plan (CAP, September 2011) may affect sources that would be considered part of the Project. The CAP assesses "GHG emissions in two distinct ways: (1) through the exercise of its land use authority it can affect community/external emissions; (2) through its management of County government and facilities it can affect municipal/internal emissions. The External Inventory includes GHG emissions from land uses within the County's unincorporated areas where the County has jurisdictional land use authority." (CAP, Page 2-1). The Project is a land use within the unincorporated County area.

The CAP Appendix F includes draft development review processes (DRP) that are presumably being implemented. The DRP procedures for evaluating GHG impacts and determining significance for CEQA purposes are streamlined by (1) applying a uniform set of performance standards to all development projects, and (2) utilizing Screening Tables to mitigate project GHG emissions. Projects have the option of preparing a project-specific technical analysis to quantify and mitigate GHG emissions. A review standard of 3,000 $MTCO_2e$ per year is used to identify projects that require the use of Screening Tables or a project-specific technical analysis to quantify and mitigate project emissions. The complete Development Review Process, including the use of performance standards, for assessing and mitigating GHG emissions is paraphrased from CAP Appendix F in the text below.

a) *<u>County Performance Standards</u>. All development projects, including those otherwise determined to be exempt from CEQA are subject to applicable Development Code provisions, including the GHG performance standards, and state requirements, such as the California Building Code requirements for energy efficiency. With the application of the GHG performance standards, projects that are exempt from CEQA and small projects that do not exceed 3,000 $MTCO_2e$ per year are considered to be consistent with the Plan and determined to have a less than significant individual and cumulative impact for GHG emissions.*

b) *<u>Regulatory Agency Performance Standards</u>. When, and if, South Coast Air Quality Management District or Mojave Basin Air Quality Management District adopts standards, the County will consider such guidance and incorporate all applicable standards.*

c) *<u>Projects Using Screening Table</u>. For projects exceeding 3,000 $MTCO_2e$ per year of GHG emissions, the County uses Screening Tables as a tool to assist with calculating GHG reduction measures and the determination of a significance finding. Projects that garner a 100 or greater points would not require quantification of project specific GHG emissions. The point system was devised to ensure to Project compliance with the reduction measures in the GHG Plan such that the GHG emissions from new development, when considered together with those existing development, allow the County to meet its 2020 target and support reductions in GHG emissions beyond 2020. Consistent with the CEQA Guidelines, such projects are consistent with the Plan and therefore have a less than significant individual and cumulative impact for GHG emissions.*

d) *Projects Not Using Screening Tables. Projects exceeding 3,000 MTY of GHG emissions that do not use the Screening Tables, are required to quantify project-specific GHG emissions and achieve the equivalent level of GHG emissions efficiency as a 100-point project. Consistent with the CEQA Guidelines, such projects are consistent with the Plan and therefore are determined to have a less than significant individual and cumulative impact for GHG emissions.*

With respect to Item b), an interim GHG significance threshold for projects where the SCAQMD is lead agency was adopted by that governing board December 5, 2008. Since the CAP was published in September 2011 it would appear that the 10,000 $MTCO_2e$ per year screening criteria used for SCAQMD projects would have informed the CAP and therefore would not be considered applicable under Item b).

However, Item b) is triggered by publication of the CEQA and Federal Conformity Guidelines (MDAQMD, August 2011). The MDAQMD Guidelines were being prepared at the same time as the CAP and therefore could not have been considered in the CAP. The CEQA and Federal Conformity Guidelines contain a GHG significance threshold of 100,000 tons CO_2e per year. Item b) states "the County will consider such guidance and incorporate all applicable standards." Clearly the MDAQMD standard is applicable since it is meant to be used for CEQA GHG impact analyses and therefore it should be incorporated.

The Project is not of a type that could use the screening tables to avoid further analysis under Item c). If such a project were to exceed the 3,000 $MTCO_2e$ per year review standard, then it would need to "achieve the equivalent level of GHG emissions efficiency as a 100-point project…. Where a project does not use the screening tables, the project is required to quantify its unmitigated emissions and provide a 31 percent reduction of those emissions in order to be considered less than significant." It appears that the CAP does not take into account the AB-32 Scoping Plan Functionally Equivalent Document (CARB, 2011) that reduces the amount of reductions needed to 16% below business as usual by 2020.

4.0 SIGNIFICANCE THRESHOLDS

Significance thresholds for evaluating potential air quality impacts associated with the Project were developed from Environmental Checklist Form (State CEQA Guidelines, Appendix G) and the MDAQMD Guidelines.

The CEQA Checklist contains the following guidance for air quality impacts assessment:

> *Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:*
>
> *a) Conflict with or obstruct implementation of the applicable air quality plan?*
> *b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?*
> *c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?*
> *d) Expose sensitive receptors to substantial pollutant concentrations?*
> *e) Create objectionable odors affecting a substantial number of people?*

MDAQMD Guidelines provide the following text which describes the significance criteria that have been established by that agency:

> *Any project is significant if it triggers or exceeds the most appropriate evaluation criteria. The*

District will clarify upon request which threshold is most appropriate for a given project; in general, the emissions comparison (criteria number 1) is sufficient:

1. *Generates total emissions (direct and indirect) in excess of the thresholds given in [Table 5];*
2. *Generates a violation of any ambient air quality standard when added to the local background;*
3. *Does not conform with the applicable attainment or maintenance plan(s);*
4. *Exposes sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1.*

A significant project must incorporate mitigation sufficient to reduce its impact to a level that is not significant. A project that cannot be mitigated to a level that is not significant must incorporate all feasible mitigation. Note that the emission thresholds are given as a daily value and an annual value, so that multi-phased project (such as project with a construction phase and a separate operational phase) with phases shorter than one year can be compared to the daily value.

Table 5: Significant Emissions Thresholds

Criteria Pollutant	Annual Threshold (tons)
Greenhouse Gases (CO_2e)	100,000
Carbon Monoxide (CO)	100
Oxides of Nitrogen (NO_X)	25
Volatile Organic Compounds (VOC)	25
Oxides of Sulfur (SO_X)	25
Particulate Matter (PM_{10})	15
Particulate Matter ($PM_{2.5}$)	15
Hydrogen Sulfide (H_2S)	10
Lead (Pb)	0.6

Source: MDAQMD CEQA Guidelines (August 2011).

As discussed in Section 3.2, a project is non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. A project is conforming if it complies with all applicable District rules and regulations, complies with all proposed control measures that are not yet adopted from the applicable plan(s), and is consistent with the growth forecasts in the applicable plan(s) (or is directly included in the applicable plan). These criteria are used to assess Project impact and address the Environmental Checklist Form Item a) above.

The MDAQMD significance threshold for GHGs (100,000 tons/yr), while higher than other screening criteria (i.e. SCAQMD 10,000 $MTCO_2e$/yr; San Bernardino County Climate Action Plan 3,000 $MTCO_2e$/yr), is applied because it is supported by substantial evidence and most directly applicable to the Project. Specifically, 100,000 tons/year of GHG emissions from a single facility constitutes a major source that requires a federal operating permit. Similarly, the MDAQMD NOx significance threshold of 25 tons/year is equal to the major source threshold applicable to areas designated severe non-attainment for ozone.

MDAQMD states that, in general, emissions less than those listed in Table 5 will result in less than significant impact on air quality. Thus, regional impacts from a project that adds emissions to the air basin in quantities which are less than those listed in Table 5 would be less than cumulatively considerable. Consideration of thresholds in Table 5 addresses Items b) and c) from the Environmental Checklist Form.

Localized impacts from stationary sources are not addressed by the values in Table 5. The Project's modeled concentration of pollutants may not exceed the increment between the AAQS and background concentrations. For pollutants where background already exceeds the AAQS, Significant Impact Levels (SILs) published by SJVAPCD to the Dispersion and Risk Assessment Modelers Group list server (August 12, 2013) are used to evaluate the cumulative impact. Specifically, SJVAPCD guidance contains separate SILs for point and fugitive sources of PM_{10} and $PM_{2.5}$. SILs are normally used in the context of PSD permitting and represent a de minimis threshold in attainment areas.[2] For non-attainment areas any additional degradation would be significant and so this AQIA uses the SILs (i.e. de minimis level) as significance thresholds.

The increment and SIL methodologies address the Project impact as well as the cumulative impact on local concentrations satisfying Item b) and partially addressing Item d) in the Environmental Checklist Form. Health risk assessment is required to determine whether risk levels exceed the MDAQMD criteria (see Item 4 in the excerpt above) and address the remaining requirements of Item d) in the Environmental Checklist Form.

The Project does not emit objectionable odors and so no threshold has been chosen to address Item e) in the Environmental Checklist Form.

5.0 ASSESSMENT METHODOLOGY

Emissions were estimated using methods and parameters from the Mineral Industry Emissions Inventory Guidance (Appendix F), AP-42, EMFAC2011, OFFROAD2011, and CalEEMod. Air dispersion/deposition modeling and health risk assessment were then performed to determine the potential for the Project to result in significant localized impacts.

As discussed in Section 1.0, the Project is limited to expanding the White Knob and White Ridge Quarries areas but overall combined production from all quarries is limited by the processing plant maximum production rate. The Project would allow up to the maximum production rate to be extracted exclusively from the White Knob and White Ridge Quarries. This would result in no material being quarried at the Butterfield and Sentinel Quarries which is an indirect effect of the Project that necessitates calculation of Butterfield and Sentinel Quarries emissions in the baseline.

5.1 Baseline Activity Levels

Appendix F contains information that was provided by Omya. Table 6 presents baseline tonnages for

[2] http://www.epa.gov/NSR/fs20070912.html

the years 2004 through 2006 that were averaged in order to determine the annual baseline production and throughput. Daily and hourly ore fed to the primary crushers (i.e. Sentinel-Butterfied and White Knob) is based on the maximum throughput in each crusher system's permit to operate. Other daily and hourly throughputs are based upon ratio of annual tonnages (i.e. if 20% is waste annually, then 20% daily and hourly is assumed).

Table 6: Baseline Activity Levels

	2004	2005	2006	Baseline (tpy)	Baseline (tpd)	Baseline (tph)
Ore to Primary Crusher						
Sentinel-Butterfield	386,835	509,221	438,828	444,962	5,000	600
White Knob	309,168	311,999	350,895	324,021	4,000	400
Total	696,004	821,220	789,724	768,982	9,000	1,000
Ore Hauled to Plant						
Sentinel-Butterfield	328,810	432,838	373,004	378,217	4,250	510
White Knob	262,793	265,199	298,261	275,418	3,400	340
Total	591,603	698,037	671,265	653,635	7,650	850
Waste Total						
Sentinel-Butterfield	204,702	243,816	289,404	245,974	2,822	339
White Knob	151,860	281,698	130,590	188,049	2,258	226
Total	356,562	525,514	419,994	434,023	5,080	564
Waste Crusher Fines						
Sentinel-Butterfield	58,025	76,383	65,824	66,744	750	90
White Knob	46,375	46,800	52,634	48,603	600	60
Total	104,401	123,183	118,459	115,347	1,350	150
TOTAL EXCAVATED	948,165	1,223,551	1,091,259	1,087,658	12,730	1,414

Note: The Project baseline for White Knob Quarry is 275,418 tons per year as shown in this table. The indirect effect of the Project on the processing plant production is relative to the baseline year activity level for the processing plant of 653,635 tons per year shown in this table. The processing plant is physically limited to less than 680,000 tons per year which is the maximum that may be delivered from the Project and doing so would necessitate cessation of operation in the White Knob Quarry which is an indirect effect that is incorporated into this impact assessment.

5.1.1 Vehicles

Vehicle engine size, model year, and hours of operation are presented in Table 7. Some vehicles have no activity. This may be because the equipment was purchased after the baseline years or because the vehicle did not operate in the baseline. Other vehicles were active during the baseline years but have since been retired.

Table 7: Baseline Vehicle Activity

EQUIP #	DOORS #	Type	hp	Engine Year	2006 (hr)	2005 (hr)	2004 (hr)	Average (hr)	Avg. (hp-hr)
330600	3306	Bobcat	50	1983	184.0	109.0	110.0	134.3	6,717
330700	3307	Bobcat	50	1983	177.0	82.0	51.0	103.3	5,167
293301	retired	Bobcat	50	1987	0	0	0	0	0
299100	retired	Bobcat	50	2001	17.0	0	0	5.7	283
205300	retired	Crane	150	1977	0.0	55.0	46.0	33.7	5,050

EQUIP #	DOORS #	Type	hp	Engine Year	2006 (hr)	2005 (hr)	2004 (hr)	Average (hr)	Avg. (hp-hr)
333018	3418	Dozer	250	1977	31.0	14.0	23.0	22.7	5,667
333062	3462	Dozer	370	1990	30.0	66.0	218.0	104.7	38,727
333064	3464	Excavator	195	1995	278.0	342.0	261.0	293.7	57,265
825400	8254	Forklift	52	1992	129.0	73.0	129.0	110.3	5,737
826800	8268	Forklift	52	2000	1975.0	2279.0	2955.0	2403.0	124,956
826900	8269	Forklift	47	2001	3775.0	3294.0	3913.0	3660.7	172,051
827000	8270	Forklift	52	2003	4316.0	4138.0	4998.9	4484.3	233,184
827200	8272	Forklift	57	2004	2693.0	2192.0	1387.0	2090.7	119,168
208252	retired	Forklift	50	1986	0	124.0	91.0	71.7	3,583
213400	retired	Forklift	50	1989	78.0	55.0	105.0	79.3	3,967
825700	retired	Forklift	50	1990	0	0	126.0	42.0	2,100
825900	retired	Forklift	50	1992	0	0	0	0	0
826100	retired	Forklift	50	1993	0	15.0	244.0	86.3	4,317
826300	retired	Forklift	50	1994	348.0	351.0	650.0	449.7	22,483
826400	retired	Forklift	50	1994	564.0	242.0	207.0	337.7	16,883
826500	retired	Forklift	50	1996	1127.0	1337.0	1008.6	1157.5	57,877
826600	retired	Forklift	50	1997	1594.0	1010.0	225.6	943.2	47,160
826700	retired	Forklift	50	1998	1312.0	1683.0	1445.4	1480.1	74,007
6100 1102	retired	Generator	890	1992	499.0	470.0	1887.0	952.0	847,280
333410	3410	Grader	275	1987	537.0	725.0	575.0	612.3	168,392
330100	3301	Loader	375	1985	84.0	0.0	0	28.0	10,500
330200	3302	Loader	690	2004	998.0	870.0	554.0	807.3	557,060
298600	3303	Loader	235	1992	239.0	278.0	259.0	258.7	60,787
330500	3305	Loader	690	2004	796.0	715.0	612.0	707.7	488,290
330800	3308	Loader	690	1985	1535.0	834.0	639.0	1002.7	691,840
333046	3346	Loader	690	1995	1225.0	1450.0	1392.0	1355.7	935,410
333060	3360	Loader	690	1994	1107.0	1373.0	1300.0	1260.0	869,400
331200	retired	Loader	500	1985	0	7.0	1.0	2.7	1,333
207500	retired	Manlift	150	1999	87.0	0.0	0.0	29.0	4,350
299000	on-road	Dump Truck	300	1988	785.1	731.7	137.5	551.4	165,430
332102	on-road	Grease Truck	300	1969	25.0	27.0	31.7	27.9	8,370
332132	on-road	Lube Van	300	1987	199.0	330.0	320.0	283.0	84,900
332136	on-road	Fuel Truck	300	1973	82.0	108.0	65.0	85.0	25,500
293413	5134	Sweeper	150	1983	0.0	0.0	1.0	0.3	50
826000	retired	Sweeper	150	1992	0.0	6.0	67.0	24.3	3,650
827100	retired	Sweeper	150	2002	227.0	911.0	201.0	446.3	66,950
-	2202	Lube Truck	215	1985	0	0	0	0.0	0
-	2232	Lube Truck	322	1988	0	0	0	0.0	0

EQUIP #	DOORS #	Type	hp	Engine Year	2006 (hr)	2005 (hr)	2004 (hr)	Average (hr)	Avg. (hp-hr)
-	2237	Fuel Truck	370	1994	0	0	0	0.0	0
-	2271	Guzzler	322	2001	0	0	0	0.0	0
-	2290	Dump Truck	425	1989	0	0	0	0.0	0
-	5171	Sweeper	52	2003	0	0	0	0.0	0
330900	3209	Truck	1050	1991	1310.0	1220.0	1386.0	1305.3	1,370,600
333411	3211	Truck	635	2006	739.0	600.0	477.0	605.3	384,387
331600	3216	Truck	938	2000	0	0	0	0.0	0
333251	3251	Truck	1050	1982	2435.0	2472.0	2367.0	2424.7	2,545,900
333252	3252	Truck	1050	2002	2466.0	2914.0	2666.0	2682.0	2,816,100
333053	3253	Truck	635	2004	597.0	1123.0	471.0	730.3	463,762
333254	3254	Truck	1050	2004	2380.0	2837.0	2059.0	2425.3	2,546,600
333255	3255	Truck	1050	2004	2549.0	3281.0	2357.0	2729.0	2,865,450
333256	3256	Truck	1050	1997	2768.0	1715.0	1334.0	1939.0	2,035,950
333257	3257	Truck	760	2000	1143.0	629.0	510.8	760.9	578,309
333091	3291	Truck	635	1992	984.0	1186.0	904.0	1024.7	650,663
333098	3298	Truck	635	1990	638.0	1063.0	418.0	706.3	448,522

5.1.2 Crushing

Primary crushing systems are operated in the Sentinel and Butterfield Quarries area (electrified) and in the White Knob Quarry area (diesel generator, see Table 7). Table 8 presents baseline throughputs for each crushing system and the processing plant. Maximum daily and hourly rates are limited by MDAQMD permits to operate (Appendix G). It is assumed that the crushing systems and processing plant were operated at the maximum permitted daily and hourly rates during the baseline.

Table 8: Baseline Stationary Source Throughputs

Source	kW-hr / ton	Tons / Year	Tons / Day	Tons / Hour
Sentinel Crushing System	0.33	444,962	5,000	600
White Knob Crushing System	0.0	324,021	4,000	400
Processing Plant	40.0	653,635	7,650	850

Note: Daily and hourly rates for the crushing systems are based upon permit condition limitations. Processing plant daily and hourly rates assume the fraction of waste rock produced annually applies on a daily and hourly basis.

5.1.3 Roads

Dust entrained from paved roads occurs only off-site because on-site roads are unpaved. The average distance traveled from the processing plant to Omya's customers is 110 miles. However, 60% of the trips are estimated to travel west from the Mojave Desert Air Basin to the South Coast Air Basin; a distance of 47.4 miles. The average distance of off-site truck travel within the Mojave Desert Air Basin is 72.44 miles. The baseline production amount (653,635 tons/year) is assumed to be placed in 25 ton capacity trucks.

Dust entrained from unpaved roads occurs only on-site because off-site roads are paved. The amount of travel on each unpaved road segment presented in Table 9 is calculated based upon the average truck capacity of 75 tons and the tonnages moved on each road segment in the baseline. Figure 2 shows the location of each road segment.

Table 9: Baseline Activity on Roads

Road Segment	Length (ft)	VMT/yr	Annual	VMT/day	Daily	VMT/hr	Hourly
A - Butterfield Pit	3,360	1,618	1.2%	15	0.99%	1.8	1.1%
B - Waste Pile	775	963	0.72%	11	0.71%	1.3	0.8%
C - West Road	1,015	1,355	1.0%	16	1.1%	2.0	1.1%
D – Not Used	0	0	0.0%	0	0.00%	0	0.00%
E - Sentinel Pit	3,000	8,013	6.0%	93	6.0%	11	6.4%
F – Not Used	0	0	0.0%	0	0.00%	0	0.00%
G - Sentinel/Butterfield to Plant	38,000	72,587	54%	816	52%	98	56%
H - White Ridge to Plant	24,260	33,746	25%	417	27%	42	24%
I - Plant Feed	365	1,205	0.90%	14	0.91%	1.6	0.9%
J - White Knob Pit	3,725	8,719	6.5%	106	6.8%	11	6.1%
K - On-Road Trucks*	6,186	20,421	*	239	*	27	*
L - Crusher to White Ridge	2,300	5,384	4.0%	66	4.2%	6.6	3.8%
M - White Ridge Pit	1,300	0	0.0%	0	0.00%	0	0.00%
TOTAL*		154,011	100%	1,794	100%	201	100%

* Segment K is used for purposes of modeling only and is not included in the total length of roads on-site.

5.1.4 Mining Activities

Mining emissions consist mainly of dust emissions from various sources (e.g. blasting, bulldozing, wind, etc.) and other criteria pollutant emissions from explosives used in blasting (i.e. NOx and CO). Excavated tons from each quarry that were reported in 2008 (Appendix G) to the MDAQMD and were used in the baseline to create scale factors. Emissions from the 2008 report were then scaled to determine the baseline. The following changes to the 2008 report and assumptions were used in the process of calculating emissions for mining sources:

- Bulldozing reported for the White Knob Quarry was used to scale Sentinel Quarry bulldozing activity because the Sentinel Quarry reported unusually low bulldozing emissions in 2008 and the White Knob bulldozing was judged to be more reflective of typical conditions. The higher activity level is assessed in both the baseline and project scenarios so that the baseline is not inflated for this source.
- Vehicular exhaust and road dust emissions are calculated from scratch except for road dust in the processing plant area which is scaled based on the 2008 emissions.
- Surface areas used for calculation of windblown dust emissions are assigned a scale factor of 1.0 because the size of active areas does not change.

- Control efficiency assigned for chemical dust suppressants on windblown dust from roads was increased from 75% to 90% because the suppressants should be at least as effective as watering which is assigned 90% in the 2008 report.

5.2 Baseline Emissions

Emissions factors presented in Table 10 were calculated for each diesel engine using the methods described in Appendix H. On-road engines were quantified using offroad factors because there are few on-road vehicles and offroad methods result in greater emissions for the same model year engine (i.e. new on-road engines were controlled by regulation before offroad engines). Vehicles that retired before 2012 were excluded so that the emissions characteristics represent the fleet as it existed at the time the Notice of Preparation for the Project was published.

Table 10: Vehicle Emissions Factors

EQUIP #	DOORS #	Type	hp	Engine Year	HC EF (g/hp-hr)	NOx EF (g/hp-hr)	PM EF (g/hp-hr)	CO EF (g/hp-hr)	SO2 EF (g/hp-hr)	Load Factor
330600	3306	Bobcat	50	1983	2.39	7.13	0.81	8.23	0.00028	0.3685
330700	3307	Bobcat	50	1983	2.39	7.13	0.81	8.23	0.00028	0.3685
293301	Retired	Bobcat	50	1987	-	-	-	-	-	-
299100	Retired	Bobcat	50	2001	-	-	-	-	-	-
205300	Retired	Crane	150	1977	-	-	-	-	-	-
333018	Retired	Dozer	250	1977	-	-	-	-	-	-
333062	3462	Dozer	370	1990	0.67	8.95	0.43	12.78	0.00028	0.4288
333064	3464	Excavator	195	1995	0.71	9.28	0.46	3.38	0.00028	0.3819
825400	8254	Forklift	52	1992	1.11	10.39	0.93	6.32	0.00028	0.201
826800	8268	Forklift	52	2000	1.01	7.90	0.91	4.32	0.00028	0.201
826900	8269	Forklift	47	2001	2.15	6.07	0.79	4.25	0.00028	0.201
827000	8270	Forklift	52	2003	0.94	7.59	0.83	4.13	0.00028	0.201
827200	8272	Forklift	57	2004	0.48	5.95	0.45	4.06	0.00028	0.201
208252	Retired	Forklift	50	1986	-	-	-	-	-	-
213400	Retired	Forklift	50	1989	-	-	-	-	-	-
825700	Retired	Forklift	50	1990	-	-	-	-	-	-
825900	Retired	Forklift	50	1992	-	-	-	-	-	-
826100	Retired	Forklift	50	1993	-	-	-	-	-	-
826300	Retired	Forklift	50	1994	-	-	-	-	-	-
826400	Retired	Forklift	50	1994	-	-	-	-	-	-
826500	Retired	Forklift	50	1996	-	-	-	-	-	-
826600	Retired	Forklift	50	1997	-	-	-	-	-	-
826700	Retired	Forklift	50	1998	-	-	-	-	-	-
6100 1102	Retired*	Generator	890	1992	0.59	9.12	0.29	13.84	0.000028	0.525
333410	3410	Grader	275	1987	0.86	12.27	0.62	13.84	0.00028	0.4087
330100	3301	Loader	375	1985	0.86	12.27	0.62	14.18	0.00028	0.3618

EQUIP #	DOORS #	Type	hp	Engine Year	HC EF (g/hp-hr)	NOx EF (g/hp-hr)	PM EF (g/hp-hr)	CO EF (g/hp-hr)	SO2 EF (g/hp-hr)	Load Factor
330200	3302	Loader	690	2004	0.26	4.64	0.14	1.11	0.00028	0.3618
298600	3303	Loader	235	1992	0.76	9.71	0.51	5.53	0.00028	0.3618
330500	3305	Loader	690	2004	0.26	4.64	0.14	1.11	0.00028	0.3618
330800	3308	Loader	690	1985	0.86	12.27	0.62	14.18	0.00028	0.3618
333046	3346	Loader	690	1995	0.69	9.12	0.45	3.34	0.00028	0.3618
333060	Retired	Loader	690	1994	-	-	-	-	-	-
331200	Retired	Loader	500	1985	-	-	-	-	-	-
207500	Retired	Manlift	150	1999	-	-	-	-	-	-
299000	Retired	Dump Truck	300	1988	-	-	-	-	-	-
332102	Retired	Grease Truck	300	1969	-	-	-	-	-	-
332132	Retired	Lube Van	300	1987	-	-	-	-	-	-
332136	Retired	Fuel Truck	300	1973	-	-	-	-	-	-
293413	5134	Sweeper	150	1983	1.05	13.06	0.74	5.79	0.00028	0.4556
826000	Retired	Sweeper	150	1992	-	-	-	-	-	-
827100	Retired	Sweeper	150	2002	-	-	-	-	-	-
-	2202	Lube Truck	215	1985	0.99	13.06	0.74	5.67	0.00028	0.3417
-	2232	Lube Truck	322	1988	0.69	9.13	0.45	13.84	0.00028	0.3417
-	2237	Fuel Truck	370	1994	0.69	9.12	0.45	13.84	0.00028	0.3417
-	2271	Guzzler	322	2001	0.22	5.10	0.13	1.03	0.00028	0.3417
-	2290	Dump Truck	425	1989	0.69	9.13	0.45	13.84	0.00028	0.3417
-	5171	Sweeper	52	2003	0.93	7.54	0.82	4.10	0.00028	0.3417
330900	3209	Truck	1050	1991	0.59	9.12	0.29	13.84	0.00028	0.3819
333411	3211	Truck	635	2006	0.27	2.66	0.14	1.12	0.00028	0.3819
331600	3216	Truck	938	2000	0.33	7.11	0.20	3.34	0.00028	0.3819
333251	Retired	Truck	1050	1982	-	-	-	-	-	-
333252	3252	Truck	1050	2002	0.33	7.11	0.20	3.34	0.00028	0.3819
333053	3253	Truck	635	2004	0.29	4.73	0.14	1.14	0.00028	0.3819
333254	3254	Truck	1050	2004	0.33	7.11	0.20	3.34	0.00028	0.3819
333255	3255	Truck	1050	2004	0.33	7.11	0.20	3.34	0.00028	0.3819
333256	3256	Truck	1050	1997	0.59	9.29	0.32	13.84	0.00028	0.3819
333257	3257	Truck	760	2000	0.33	7.11	0.20	3.34	0.00028	0.3819
333091	Retired	Truck	635	1992	-	-	-	-	-	-
333098	Retired	Truck	635	1990	-	-	-	-	-	-

* White Knob Generator was replaced by a contractor-owned portable crushing system. The White Knob Generator emissions characteristics are retained for purposes of analysis. Classes of units that are retired (i.e. crane and manlift) are assumed to be replaced by contractor or rental equipment with equal emissions characteristics.

Emissions factors in Table 10 were combined with activity data in Table 6 to calculate baseline vehicular emissions that are presented in Table 11.

Table 11: Baseline Vehicle Emissions

Location	Type	Avg. (hp-hr)	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO_2 (tpy)
Pit	Dozer Total	44,393	28	376	18	536	0.012	26
Pit	Excavator Total	57,265	34	447	22	163	0.013	33
Pit	Loader Total	3,543,333	1,468	21,668	950	13,951	0.781	2,064
Plant	Bobcat Total	12,167	24	70	8	81	0.003	7
Plant	Crane Total	5,050	4	46	2	19	0.001	3
Plant	Forklift Total	887,473	447	2,981	308	1,816	0.109	517
Plant	Guzzler Total	0	-	-	-	-	-	-
Plant	Loader Total	71,287	46	625	32	561	0.016	42
Plant	Manlift Total	4,350	2	21	1	9	0.001	3
Plant	Sweeper Total	70,650	62	640	48	307	0.017	41
Roads	Dump Truck Total	165,430	87	1,137	56	1,725	0.034	96
Roads	Fuel Truck Total	25,500	13	175	9	266	0.005	15
Roads	Grader Total	168,392	130	1,862	95	2,101	0.042	98
Roads	Lube Truck Total	93,270	59	780	42	685	0.019	54
Roads	Truck Total	16,706,243	4,897	91,813	2,789	57,696	3.885	9,730
WKQ	Generator Total	847,280	575	8,940	285	13,576	0.271	493
	Grand Total	22,692,682	7,869	131,513	4,663	93,464	5.207	13,217

Note: WKQ = White Knob Quarry.

Table 12 presents the emissions summed by area. Quarry emissions are assumed to occur in locations where material is being excavated (quarries) and deposited (overburden areas). Plant emissions are assumed to occur at the processing plant. Road emissions are further allocated to specific roads based upon the vehicle miles traveled (VMT) presented in Table 9. Figure 2 shows the location of each road segment. VMT is calculated based upon the tons of material being transported and the capacity of haul trucks.

Table 12: Baseline Vehicle Emissions by Location

	Average (hp-hr)	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO_2 (tpy)
Quarry Subtotal	3,644,992	1,531	22,491	990	14,650	0.806	2,123
Plant Subtotal	1,041,576	578	4,316	396	2,765	0.144	607
Roads Subtotal	17,158,834	5,186	95,767	2,990	62,474	3.987	9,994
WKQ Generator	847,280	575	8,940	285	13,576	0.271	493
Total	22,692,682	7,869	131,513	4,663	93,464	5.207	13,217

Note: WKQ = White Knob Quarry.

The Roads Subtotal in Table 12 is combined with road dust emissions and offsite haul truck emissions in Table 13.

Table 13: Baseline Emissions on Roads

	On-site	Off-site	Total
VMT (miles/yr)	133,590	3,787,946	3,921,535
TSP – Dust (tpy)	248.44	69.74	318.18
PM_{10} – Dust (tpy)	70.65	13.95	84.60
$PM_{2.5}$ – Dust (tpy)	7.06	3.42	10.49
TSP – Exhaust (tpy)	1.50	2.95	4.44
PM_{10} – Exhaust (tpy)	1.50	2.95	4.44
$PM_{2.5}$ – Exhaust (tpy)	1.38	2.71	4.09
HC (tpy)	2.59	2.72	5.31
NOx (tpy)	47.88	51.33	99.21
CO (tpy)	31.24	12.32	43.6
SOx (tpy)	0.002	0.07	0.07
CO_2 (tpy)	9,994	7,067	17,061

Table 14 presents mining and processing dust emissions that were scaled up from the 2008 reporting and adjusted as described previously in this section. Table 15 presents combustion emissions.

Table 14: Baseline Mining and Processing Dust Emissions

Emission Source / Operation / Activity	Processing Plant (tons per year)			Butterfield and Sentinel Quarries (tons per year)			White Knob Quarry (tons per year)		
	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	PM2.5	TSP	PM_{10}	$PM_{2.5}$
Drilling	-	-	-	0.31	0.25	0.25	0.23	0.19	0.19
Blasting	-	-	-	14.46	7.52	0.43	5.41	2.81	0.16
Explosives	-	-	-	-	-	-	-	-	-
Bulldozing, Scraping and Grading Of Material	0.185	0.090	0.028	28.27	13.75	4.20	20.99	10.21	3.12
Loading Quarry / Pad	0.0072	0.0035	0.0011	0.39	0.19	0.06	1.65	0.81	0.25
Primary Crushing	-	-	-	8.43	1.48	0.46	11.83	3.83	1.20
Ball Mill #1	1.68	0.106	0.033	-	-	-	-	-	-
Tertiary Crushing	34.7	2.25	0.69	-	-	-	-	-	-
Roller Mill #1	3.61	0.242	0.076	-	-	-	-	-	-
Roller Mill #2	2.66	0.167	0.052	-	-	-	-	-	-
Roller Mill #3	1.62	0.104	0.033	-	-	-	-	-	-
Roller Mill #4	1.60	0.104	0.033	-	-	-	-	-	-
Surface Treating Plant	0.011	0.0010	0.0003	-	-	-	-	-	-
Rock Storage System/Plan	19.5	5.47	1.71	-	-	-	-	-	-

Emission Source / Operation / Activity	Processing Plant (tons per year)			Butterfield and Sentinel Quarries (tons per year)			White Knob Quarry (tons per year)		
Optical Sorter	0.019	0.014	0.004	-	-	-	-	-	-
Coarse Product Storage System	0.48	0.080	0.025	-	-	-	-	-	-
Silo 81-70c	0.58	0.082	0.026	-	-	-	-	-	-
Bulk Loadout 82 System	0.16	0.025	0.008	-	-	-	-	-	-
Bulk Loadout 83 System	0.028	0.005	0.001	-	-	-	-	-	-
Stockpiles - Wind Erosion	1.06	0.53	0.21	0.67	0.34	0.13	0.18	0.09	0.04
Exhaust - Stationary and Portable Equipment	0.047	0.046	0.046	0.04	0.04	0.04	-	-	-
Exhaust - Mobile and Vehicular Equipment*	-	-	-	-	-	-	-	-	-
Paved Roads - Entrained Dust*	-	-	-	-	-	-	-	-	-
Unpaved Roads - Entrained Dust*	30.84	9.10	1.40	-	-	-	-	-	-
Wind Erosion From Unpaved Operational Areas and Roads	11.25	5.62	2.25	20.10	10.05	4.02	20.66	10.33	4.13
Total	110.03	24.04	6.62	72.66	33.61	9.59	60.96	28.27	9.08

Notes: In general, engine exhaust and road dust emissions are calculated elsewhere with exception of the following which were scaled from levels reported in 2008: road dust within the processing plant facility and portable engine exhaust from engines used to pump water. Windblown dust is not scaled because the active area that is disturbed daily is assumed to remain unchanged.

Table 15: Baseline Mining and Processing Combustion Emissions

Sources	CO (tpy)	NOx (tpy)	ROG (tpy)	SOx (tpy)
Sentinel Quarry Blasting & Water Pumps	4.2	1.6	0.042	0.037
White Knob Quarry Blasting *	3.71	0.94	0	0
Processing Plant Heaters	0.12	0.48	0.01	0.01
Total	8.03	3.02	0.052	0.047

* White Knob quarry generator emissions are quantified with the offroad vehicle emissions in Table 12.

5.3 Potential Future Emissions

The Project is limited to expanding the White Knob and White Ridge Quarries area but overall combined production from all quarries is limited by the processing plant maximum production rate. The Project would allow up to the maximum production rate to be extracted exclusively from the White Knob and White Ridge Quarries. This would result in no material being quarried at Butterfield and Sentinel Quarries which is an indirect effect of the Project that necessitates calculation of Butterfield and Sentinel Quarry emissions in the baseline. Moreover, vehicular activity data provided by Omya does not distinguish which units operate in each quarry. Thus, the emissions from vehicles are calculated for the fleet and apportioned to quarries based on throughput amount and to units operating on roads by VMT. Potential future activity levels are presented in Table 16.

Table 16: Activity Scaling Factors

Source	Baseline Value	Project Value	Scale Factor
Processing Plant (all associated sources except wind erosion)	653,635 tons/yr	680,000 tons/yr	1.04
Processing Plant wind erosion	14.88 acres	14.88 acres	1.00
Off-site Road Emissions	3,787,945 VMT/yr	3,940,736 VMT/yr	1.04
On-site Road Emissions	133,590 VMT/yr *	136,002 VMT/yr *	1.02
Emissions from Vehicles Working in Quarries (based on total tons excavated)	1,087,658 tons/yr	1,950,000 tons/yr	1.79
Crusher Engine	847,280 hp-hr/yr	2,143,755 hp-hr/yr	n/a

* Value calculated based upon tonnage moved, capacity of trucks, and road segments traveled. White Knob haul distance to processing plant is shorter than the haul from the Sentinel crusher. The amount of waste rock is greater in the Project than the Baseline. These characteristics offset each other to result in little change in VMT with the Project.

Project emissions are calculated in Appendix I and presented in the following tables.

Table 17: Project Vehicle Emissions by Location

	Average (hp-hr)	**HC (lb/yr)**	**NOx (lb/yr)**	**PM (lb/yr)**	**CO (lb/yr)**	**SOx (lb/yr)**	**CO_2 (tpy)**
Quarry Subtotal	6,534,896	2,744	40,322	1,776	26,265	1.44	3,806
Plant Subtotal	1,093,368	607	4,531	416	2,902	0.15	643
Roads Subtotal	17,468,707	5,279	97,496	3,044	63,602	4.06	10,174
Mobile Crusher	2,143,755	1,072	9,879	317	6,451	0.69	656
Total	27,240,727	9,702	152,228	5,554	99,220	6.34	15,278
Baseline*	22,692,682	7,869	131,513	4,663	93,464	5.21	13,222
Increment	**4,548,045**	**1,833**	**20,715**	**891**	**5,756**	**1.13**	**2,056**

* See also Table 12.

Table 18 presents potential future emissions on roads and the increment from baseline that would result from the Project.

Table 18: Project Emissions on Roads

	On-site	Off-site	Total	Baseline	Increment
VMT (miles/yr)	136,002	3,940,736	4,076,738	3,921,535	155,203
TSP – Dust (tpy)	252.93	72.55	325.48	318.18	7.30
PM_{10} – Dust (tpy)	71.92	14.51	86.43	84.60	1.84
$PM_{2.5}$ – Dust (tpy)	7.19	3.56	10.75	10.49	0.27
TSP – Exhaust (tpy)	1.51	3.07	4.57	4.44	0.13
PM_{10} – Exhaust (tpy)	1.51	3.07	4.57	4.44	0.13
$PM_{2.5}$ – Exhaust (tpy)	1.39	2.82	4.21	4.09	0.12
HC (tpy)	2.64	2.83	5.47	5.31	0.16
NOx (tpy)	48.75	53.40	102.14	99.21	2.93
CO (tpy)	31.80	12.81	44.62	43.55	1.06
SOx (tpy)	0.002	0.07	0.07	0.07	0.003
CO_2 (tpy)	10,174	7,339	17,514	17,061	453

Note: See also Table 13 and Table 17.

Table 19 presents Project emissions and incremental emissions from mining and processing activities. The Sentinel and Butterfield Quarries would have zero emissions because there would be no activity there if the Project maximum were to be quarried from the White Knob and White Ridge Quarries.

Table 19: Project On-Site Particulate Matter Emissions

Emission Source / Operation / Activity	Processing Plant (tons per year)			Butterfield and Sentinel Quarries (tons per year)			White Knob (tons per year)		
	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5
Drilling	-	-	-	-	-	-	0.98	0.78	0.78
Blasting	-	-	-	-	-	-	22.76	11.83	0.68
Explosives	-	-	-	-	-	-	-	-	-
Bulldozing, Scraping And Grading Of Material	0.19	0.09	0.03	-	-	-	88.31	42.96	13.13
Loading Quarry / Pad	0.01	0.00	0.00	-	-	-	6.96	3.39	1.03
Primary Crushing	-	-	-	-	-	-	49.77	16.12	5.06
Ball Mill #1	1.75	0.11	0.03	-	-	-	-	-	-
Tertiary Crushing	36.05	2.34	0.72	-	-	-	-	-	-
Roller Mill #1	3.75	0.25	0.08	-	-	-	-	-	-
Roller Mill #2	2.77	0.17	0.05	-	-	-	-	-	-
Roller Mill #3	1.68	0.11	0.03	-	-	-	-	-	-
Roller Mill #4	1.67	0.11	0.03	-	-	-	-	-	-

Emission Source / Operation / Activity	**Processing Plant (tons per year)**			**Butterfield and Sentinel Quarries (tons per year)**			**White Knob (tons per year)**		
	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5
Surface Treating Plant	0.01	0.00	0.00	-	-	-	-	-	-
Rock Storage System/Plan	20.33	5.69	1.78	-	-	-	-	-	-
Optical Sorter	0.02	0.01	0.00	-	-	-	-	-	-
Coarse Product Storage System	0.50	0.08	0.03	-	-	-	-	-	-
Silo 81-70c	0.60	0.09	0.03	-	-	-	-	-	-
Bulk Loadout 82 System	0.16	0.03	0.01	-	-	-	-	-	-
Bulk Loadout 83 System	0.03	0.00	0.00	-	-	-	-	-	-
Stockpiles - Wind Erosion	1.06	0.53	0.21	-	-	-	0.18	0.09	0.04
Exhaust - Stationary and Portable Equipment	0.05	0.05	0.05	-	-	-	-	-	-
Exhaust - Mobile and Vehicular Equipment*	-	-	-	-	-	-	-	-	-
Paved Roads - Entrained Dust	-	-	-	-	-	-	-	-	-
Unpaved Roads - Entrained Dust*	32.08	9.47	1.45	-	-	-	-	-	-
Wind Erosion From Unpaved Operational Areas and Roads	11.25	5.62	2.25	-	-	-	20.66	10.33	4.13
Project Total by Area	113.97	24.77	6.79	-	-	-	190	85.5	24.9
Baseline by Area	110.03	24.04	6.62	72.7	33.6	9.59	61.0	28.3	9.08
Increment by Area	3.94	0.72	0.17	-72.7	-33.6	-9.59	129	57.2	15.8
Increment Total	59.9	24.4	6.35						

Note: Elimination of windblown dust from White Knob Quarry accounts for beneficial effect on $PM_{2.5}$. See also Table 14.
* Unpaved roads outside the processing area are assessed separately.

Table 20 presents Project emissions and the Project increment from mining and processing activities.

Table 20: Project Mining and Processing Combustion Emissions

Sources	**CO (tpy)**	**NOx (tpy)**	**ROG (tpy)**	**SOx (tpy)**
Sentinel Quarry Blasting & Water Pumps	0	0	0	0
White Knob Quarry Blasting	15.6	3.96	0	0
Processing Plant Heaters	0.12	0.50	0.0054	0.13
Total	15.7	4.5	0.0054	0.13
Baseline	8.03	3.02	0.052	0.047
Increment	**7.7**	**1.5**	**-0.04**	**0.083**

Note: mobile crusher engine emissions are accounted for vehicle emissions presented in Table 17.

Table 21 summarizes the incremental change in emissions that would occur if the Project were to operate at the maximum rate of 680,000 tons per year production and 100% of the ore being mined from the White Knob and White Ridge Quarries.

Table 21: Incremental Change in Emissions

	Total Sentinel Butterfield (tons/yr)	Total White Knob (tons/yr)	Total Processing Plant (tons/yr)	Total Offsite (tons/yr)	Total Project w/o Sentinel-Butterfield Reductions (tons/yr)	Total Project w/ Sentinel-Butterfield Reductions (tons/yr)
HC	-2.08	2.99	0.01	0.11	3.11	1.03
NOx	-36.8	47.1	0.10	2.07	49.3	12.5
CO	-24.0	26.8	0.07	0.50	27.4	3.4
SOx	-0.0015	0.0021	0.0000	0.0027	0.0048	0.0033
TSP	-210	292	4.04	2.93	299	89
PM_{10}	-69.2	104.8	0.76	0.68	106.3	37.1
$PM_{2.5}$	-11.1	21.9	0.18	0.25	22.4	11.31
CO_2	-7,542	9,408	26.7	0.14	9,435	1,893

5.4 Dispersion Modeling

Dispersion modeling was performed utilizing flat terrain. Flat terrain is conservative for this Project because the receptors are generally located at lower elevations than the sources and the emissions points are close to the ground. In general, Project plumes will travel along the ground between sources and receptors, which is conservatively modeled as flat terrain (i.e. the actual distance between the source and receptor is greater with actual elevation changes than it is with flat terrain and utilization of flat terrain minimizes the amount of vertical mixing).

Meteorological data used in the modeling was purchased from Lakes Environmental which used the Pennsylvania State University / National Center for Atmospheric Research Mesoscale Model known as MM5 to predict the meteorological conditions near the Project for the five year period of 2008 through 2012. MM5 data was chosen in consultation with the MDAQMD on the basis that there is no representative station data available and the dataset would enable the AERMOD model to be used rather than the older ISCST model.

Several models with a consistent set of volume sources and varying list of receptors (i.e. discrete, boundary, and grid) were run. The discrete receptor model includes the receptors shown in Table 22 and Figure 4.

Table 22: Nearby Receptors

ID	UTM, Easting (meters)	UTM, Northing (meters)	Type – Location
1	493520	3801220	Horse Springs Campground
2	497885	3805925	Residence – 2 miles north of White Knob Quarry
3	500757	3805056	Residence – 1.75 miles northeast of White Knob Quarry
4	503805	3802145	Residence – 2.66 miles east of White Knob Quarry
5	504720	3804980	Residence – 0.25 miles northwest of processing plant
6	509570	3795820	Holcomb Valley Campground
7	498780	3797730	Big Pine Flat Campground

The boundary receptor run includes only receptors along a boundary around the quarry area (Figure 5). The boundary receptor run is used to estimate concentrations of PM_{10} and $PM_{2.5}$ at the point of maximum impact for comparison to primary ambient air quality standards (i.e. to protect human health). The boundary on the north was chosen to coincide with the east-west trending foothills. The boundaries on the south and west were chosen to reflect the concentration that may be experienced by an individual on the nearest roadway. The boundary on the east was chosen to exclude residences located in the foothills along Crystal Creek Road (i.e. since the residences are outside the project boundary, the boundary concentrations are closer to the sources and conservatively represent concentrations at the residences.

Grid receptor runs were used in the health risk assessment and the deposition model. The health risk assessment grid uses 200 meter spacing (Figure 6). The deposition model grid uses 500 meter spacing (Figure 7).

The deposition model is the only model run prepared for the Project that assumes the plume is depleted by deposition. The deposition model considers three sizes of particulates. TSP (i.e. PM_{30}), PM_{10}, and $PM_{2.5}$ are calculated for each source and the amount of each size varies based on the source accordingly. For instance, the dominant source of dust emissions is the roads which emit a combination of dust and diesel particulate matter. When dust and diesel PM emissions are combined the resulting fractionation for unpaved roadway particulates is 3.34% $PM_{2.5}$; 25.5% $PM_{10-2.5}$; and 71.2% PM_{30-10}. The combination of sources operating at the processing plant results in fractionation of 4.5% $PM_{2.5}$; 14.0% $PM_{10-2.5}$; and 81.5% PM_{30-10}. Other source fractionations were varied according to the calculated amounts of dust and diesel PM.

Table 23: Deposition Parameters

Particle Size Bin (µm)	Assumed Density (grams/cubic centimeter)
2.5	1.0
2.5 - 10 µm	1.75
10 - 30 µm	2.5

Source: http://www.arb.ca.gov/research/ltads/ltads-ws/4-dust.pdf.

The weight of particles presented in Table 23 is most appropriate for dust particles which constitute the majority of particulate matter emitted by project sources. Because the diesel particulates are emitted in smaller quantities, the dust densities are applied to all particulates regardless of their origin.

5.5 Health Risk Assessment

Constituents in diesel exhaust and dust emissions were speciated into toxic components using the following CARB Speciation Profiles:

- Particulate matter from unpaved roads (PM Profile #470);
- Particulate matter from paved roads (PM Profile #471);
- Particulate matter from aggregate processing (PM Profile #90013);
- Diesel particulate matter (PM Profile #6139 for the 2013 fleet); and
- Diesel total organic gases (Organic Profile #818).

The HRA calculations are performed using HARP. The AERMOD software air dispersion output data (χ/Q) is used as the input file for the HARP health risk assessment module. Before inputting the AERMOD output into HARP it was converted using the HARP ONRAMP software to a format that is compatible with HARP. Exposure to TACs by routes other than inhalation is included by the multi-pathway risk assessment. Exposure via home grown produce, dermal absorption, soil ingestion, and mother's milk are included. Deposition for the multipathway assessment is assumed to occur at a rate of 0.02 meters per second.

Cancer risk is assessed using a 70 year lifetime exposure, 63 kg body weight and the Derived (Adjusted) Method. The Derived (Adjusted) Method is similar to the Derived (OEHHA) Method which is described in the OEHHA HRA Guidelines (October 2003). The Derived (OEHHA) Method calculates cancer risk for two dominant (driving) exposure pathways using the high-end point-estimates of exposure, while the remaining exposure pathways use average point estimates. Specifically, the inhalation pathway which is a dominant pathway in the HRA would be based upon a Daily Breathing Rate of 373 liters of air per kilogram of body weight per day (L/kg BW *Day) under the Derived (OEHHA) Method.

The Derived (Adjusted) Method breathing rate is 80th percentile of exposure rather than the high-end point-estimate. The Derived (Adjusted) method is used when the inhalation pathway is determined to be a dominant exposure route in a multipathway assessment as described in the Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk (CARB, October 9, 2003).

The dermal pathway risk would be calculated using 63 kg body weight, and average or high end values for soil loading (0.2 and 1.0 mg/cm^2-day), exposure frequency (121 and 350 days/yr), and surface area exposed (4,700 and 5,500 cm^2). Risk from soil ingestion is calculated using a point estimate of 1.7 mg/kg BW * Day. Ingestion via home grown produce accounts for average and high end of various produce including exposed, leafy, protected, and root which have varying consumption rates in units g/kg BW * Day. Breast milk consumption rates of 102 and 138 g/kg BW * Day are used for a period of one year.

6.0 PROJECT IMPACTS

The Project does not propose to construct any structures other than excavations and piles which are created from mining operations. Thus, only operation phase is assessed (Appendix I). Project emissions are compared to the mass-based thresholds from the MDAQMD CEQA Handbook in Table 24.

Table 24: Project Emissions Comparisons

Criteria Pollutant	Project Increment (tons/yr)	Significance Threshold (tons/yr)	Significant?
Greenhouse Gases (CO_2e)	1,893	100,000	No
Carbon Monoxide (CO)	3.4	100	No
Oxides of Nitrogen (NO_X)	12.5	25	No
Volatile Organic Compounds (VOC)	1.03	25	No
Oxides of Sulfur (SO_X)	0.003	25	No
Particulate Matter (PM_{10})	**37.1**	**15**	**Yes**
Particulate Matter ($PM_{2.5}$)	11.7	15	No
Hydrogen Sulfide (H_2S)	ND	10	ND
Lead (Pb)	0.06	0.6	No

Notes: ND = Not Determined. CO_2e emissions can be converted from tons to metric tonnes by multiplying by 90.7%. Comparison of Project emissions (i.e. 1,893 tons/yr * 0.907 = 1,717 $MTCO_2e$/yr) with the San Bernardino County Climate Action Plan "review standard" of 3,000 $MTCO_2e$/yr demonstrates that the Project is consistent with the Plan.

As shown in Table 24, the increment in emissions exceeds the mass-based thresholds for PM_{10}. Other pollutant emissions occur at or below levels that will significantly affect regional air quality.

6.1 Federal Conformity

As discussed in Section 3.1, federal conformity analysis is not required provided that:

- NOx and VOC emissions are less than 25 tons per year each;
- PM_{10} emissions are less than 100 tons per year; and
- Emissions are less than 10% of the non-attainment area emissions inventory.

As shown in Table 24, the Project emits 1.03 tons per year of VOC (i.e. ROG) and 12.5 tons per year of NOx which are each less than the 25 tons per year screening threshold. PM_{10} emissions are 37.1 tons per year which is less than the 100 ton per year federal conformity screening threshold.

In 2010, sources within San Bernardino portion of the Mojave Desert Air Basin (CARB 2009 Almanac) emitted NOx and PM_{10} in the amounts of 55,125 tons per year and 43,646 tons per year, respectively. The Project increment represents 0.023% of the NOx emissions and 0.085% of the PM_{10} emissions in the region. The standard is to evaluate the emissions inventory within the non-attainment area. However, those emissions were not readily available. The Project may represent a somewhat higher percentage of the total emissions within the Western Mojave Desert Ozone Non-Attainment Area and/or the "portion of MDAQMD outside of Southeast Desert Modified AQMA." However, is unlikely that the emissions would exceed 10% in any case.

6.2 Federal Land Managers' Air Quality Related Values

The Federal Land Managers' AQRVs apply to new or modified major sources and are generally used for PSD permitting under the Clean Air Act. The Project does not propose a new stationary major source or a modified stationary major source that would require a permit under the Clean Air Act. Fugitive area source emissions and vehicular emissions are excluded from determining whether the quarry is a major source. The Omya facility is not considered a major source as evidenced by the fact that it holds local district operating permits rather than a federal operating permit under Title V (i.e. 40 CFR Part 70). Thus, none of the sources operated by Omya are capable of producing effects that would trigger concerns with the AQRVs.

The incremental change in emissions from all of the sources combined would slightly exceed major source criteria but the effects are dispersed along roads and within pits. Thus, it is unlikely that the change in emissions will cause or contribute to effects addressed by the AQRVs. The FLAG report provides an equation (Quantity/Distance < 10; or Q/D < 10) by which projects can screen out of detailed analyses of AQRVs. Application of the equation is limited in the FLAG report to projects greater than 50 km from the Class I Wilderness Area. The Project is within 23 km of San Gorgonio but the Q/D test is applied here for disclosure purposes and to acknowledge the scale of emissions from the Project as compared to the screening threshold. Presumably sufficient buffer between the Project Q/D and the screening threshold would be evidence indicating less than significant effects on AQRVs regardless of the distance.

The Q/D test uses the sum of SO_2, NOx, PM_{10} and H_2SO_4 emissions. The Project emits 53.2 tons per year of these pollutants and the distance to San Gorgonio is 23 km. Thus, Q/D for the Project is 2.3 which is a quarter of the screening threshold. Given the fact that there is no single major source and that the emissions are distributed over a large area it seems reasonable to expect that the Project will result in less than significant impacts on AQRVs at Class I Wilderness Areas.

Moreover, monitoring performed in the San Gorgonio Wilderness Area indicates that nitrates, organic matter, and sulfates have the strongest contributions to degrading visibility on worst days (Appendix D). Concentrations of these pollutants result from regional sources and particularly emissions from South Coast Air Basin. The Project emits NOx, some of which may become nitrates but the relative amount as compared to the South Coast Air Basin is de minimis. The Project also emits particulate matter but the worst days are relatively unaffected by particulates. Thus, the Project is unlikely to emit pollutants in amounts that would affect visibility in the San Gorgonio and other nearby Class I Wilderness Areas. The Project impact on visibility and regional haze is considered to be less than significant.

Phytotoxic ozone concentrations may result where the plume from a large combustion source travels relatively intact a sufficient distance for the photo-chemical reaction between NOx and reactive organics to have occurred and produce ozone. The ozone would then be concentrated at a hot spot where vegetation could be affected. The Project sources of NOx are small and distributed over a large area. Therefore, it is unlikely that the Project would cause phytotoxic ozone concentrations and the Project impact for this AQRV is considered less than significant.

The deposition AQRV is concerned with the acidification of water bodies. Specifically, sulfur and nitrogen compounds cause sensitive freshwater lakes and streams to lose acid-neutralizing capacity and sensitive soils to become acidified. Other ecosystems, including the forest, may exhibit fertilization and other effects from excess nitrogen deposition. The Project sources of nitrogen and sulfur are small and distributed over a large area. Therefore, it is unlikely that the Project would cause acidification and the Project impact for this AQRV is considered less than significant.

6.3 Localized Criteria Pollutant Impacts

A project will have a "potentially significant impact" on air quality if it "violates any air quality standard or contributes substantially to an existing or projected air quality violation." Project emissions have the potential to create localized "hot spots" if, when summed with existing ambient concentrations, they result in concentrations greater than the applicable AAQS. The main criteria pollutants of concern for the Project are Total Suspended Particulates (used for deposition modeling), PM_{10}, and $PM_{2.5}$. Ambient air quality standards for pollutants that are less of a concern are discussed first followed by modeling results for the criteria pollutants of concern.

CO AAQS exceedence is generally a concern at high volume vehicular intersections in urban areas that operate at level of service (LOS) D or worse and where CO is emitted into partially or completely enclosed spaces such as parking structures and garages. CO modeling is not warranted for the Project and the impact on CO AAQS is considered less than significant.

SO_2 AAQS exceedences are normally a concern for facilities that burn coal or refine petroleum. Diesel fuel used by the Project will meet CARB specifications for sulfur content. SO_2 modeling is not warranted for the Project and the impact on SO_2 AAQS is considered less than significant.

NO_2 AAQS exceedences are normally a concern for facilities with a large combustion source. The quarrying and transportation of materials is performed by diesel engines which are a source of NO_2. However, the diesel vehicles are comparatively small emitters of NO_2 and they move in order to perform job tasks. Movement reduces the likelihood of a hot spot. NO_2 has annual and hourly AAQS.

On an annual basis, the Project NOx emissions are less than the CEQA Significance Threshold. Therefore, modeling to determine annual NO_2 concentration for comparison to the AAQS is not warranted.

On an hourly basis, the Project does not propose to change the equipment list. The potential for the Project to cause or contribute to an exceedence of the hourly NO_2 AAQS is unlikely given the size of the operational area (335.1 acres), distance from the quarries where activity is expected to be most intense to the boundary at which human health impacts are evaluated, and the limited potential increase in hourly activity at any one location on-site. Therefore, modeling hourly NO_2 concentrations is not warranted for the Project and the impact on NO_2 AAQS is considered less than significant.

Emissions of the criteria pollutants of concern for the Project (i.e. PM_{10}, $PM_{2.5}$) are modeled to predict concentrations at the off-site point of maximum impact (PMI). Table 25 shows impact assessment results for particulate matter air dispersion model that was prepared. AAQSs are applied when background is less than the AAQS and SILs are applied when background already exceeds the AAQS. Significant impact is when the project exceeds the AAQS. A cumulatively considerable impact occurs when the cumulative concentration exceeds the AAQS; or the project concentration exceeds the SIL in an area where the AAQS is exceeded by background concentrations.

Table 25: Increment in Concentration at Point of Maximum Impact

(all values in units µg/m^3)	PM_{10}-24hr	PM_{10}-Annual	$PM_{2.5}$-24hr	$PM_{2.5}$-Annual
5-Year Maximum Project Concentration	13.1	3.54	3.7	0.48
10-Year Maximum Background	93	25	30.6	10.6
Cumulative Concentration	106.1	28.5	34.3	11.1
Most Stringent AAQS / SIL	50 / 10.4	20 / 2.08	35 / 2.5	12 / 0.63
Exceeds AAQS?	**No**	**No**	**No**	**No**
Exceeds SIL?	**Yes**	**Yes**	**Yes**	**No**

Note: Annual average PMI occurs where the haul road crosses the project boundary (UTM 499604.71, 3803971.15) which is omitted from consideration in favor of the higher of the two adjacent boundary receptors (UTM 499559.62, 3803991.54). Daily PMI occurs on the southwest property boundary (UTM 4980909, 3801590).

Results of criteria pollutant modeling show that the Project would not exceed the AAQS but may increase pollutants concentrations above the SILs. The SILs represent the amount that is cumulatively considerable and are applied as the significance thresholds. An exception is the $PM_{2.5}$ annual SIL which is not exceeded by the Project. The exceedences are because of bulldozing and grading which is likely overestimated by the MDAQMD and US EPA AP-42 calculation methodology. Nevertheless, mitigations and alternatives are assessed in later sections that will reduce the impacts shown in Table 25.

Deposition of dust occurs onto plants surrounding the quarries and specifically areas called out for conservation in the Carbonate Plant Habitat Management Strategy. Deposition outside the operational areas of the quarries is generally between one and five grams per square meter per year (g/m^2-yr). Deposition is considered as an impact on Class II Wilderness Areas that surround the quarries (i.e. Class II areas are all areas in the National Forest that are not Class I).

6.4 Health Risk Impacts

TACs emitted from project operation consist mainly of those found in vehicle exhaust and, to a lesser extent, trace amounts of metals and silica found fugitive dust. Table 26 presents health risk predicted at nearby receptors. As shown in Table 26, health risk impacts from the Project are less than significant. Figure 10 through Figure 14 (Appendix A) contain contoured plots of health risk for the Project.

Table 26: Project Health Risk Impacts

Receptor ID	Cancer Risk *	Chronic Non-Cancer Risk (H.I.) *	Acute Non-Cancer Risk (H.I.)	Significant?
R1	0.54	0.05	0.09	No
R2	1.49	0.12	0.17	No
R3	3.08	0.17	0.24	No
R4	-0.47	0.02	0.05	No
R5	1.71	0.08	0.09	No
R6	-0.14	0.003	0.01	No
R7	0.54	0.05	0.11	No

* Excess cancer cases per million people exposed and hazard index (H.I.).

7.0 MITIGATED IMPACTS

The Project would result in significant PM_{10} emissions, and particulate matter concentrations except annual $PM_{2.5}$ concentration. The following mitigations are recommended to reduce impacts to less than significant levels or the maximum extent feasible:

Mitigation Measure AQ-1: Unpaved roads shall be controlled by at least 80%.

Mitigation Measure AQ-2: Areas to be graded and where bulldozer operates shall be treated with water as necessary to control dust emissions by 85%.

Table 27 presents the mitigated increment in emissions (Appendix J) and compares the increment to significance thresholds. As shown in Table 27, Mitigation Measures AQ-1 through AQ-4 reduce Project emissions to less than the MDAQMD significance thresholds.

Table 27: Mitigated Emissions Comparisons

Criteria Pollutant	Mitigated Increment (tons/yr)	Significance Threshold (tons/yr)	Significant?
Greenhouse Gases (CO_2e)	1,893	100,000	No
Carbon Monoxide (CO)	3.4	100	No
Oxides of Nitrogen (NOx)	12.5	25	No
Volatile Organic Compounds (VOC)	1.03	25	No
Oxides of Sulfur (SOx)	0.003	25	No
Particulate Matter (PM_{10})	-3.9	15	No
Particulate Matter ($PM_{2.5}$)	1.7	15	No
Hydrogen Sulfide (H_2S)	ND	10	ND
Lead (Pb)	0.06	0.6	No

Notes: ND = Not Determined. CO_2e emissions can be converted from tons to metric tonnes by multiplying by 90.7%. Comparison of Project emissions (i.e. 1,893 tons/yr * 0.907 = 1,717 $MTCO_2e$/yr) with the San Bernardino County Climate Action Plan "review standard" of 3,000 $MTCO_2e$/yr demonstrates that the Project is consistent with the Plan.

No additional mitigation is needed if localized cumulative impacts are to be reduced to less than significant levels as shown in Table 28.

Table 28: Mitigated Concentration at Point of Maximum Impact

(all values in units µg/m3)	PM_{10}-24hr	PM_{10}-Annual	$PM_{2.5}$-24hr	$PM_{2.5}$-Annual
5-Year Maximum Project Concentration	7.7	1.72	2.14	0.31
10-Year Maximum Background	93	25	30.6	10.6
Cumulative Concentration	100.7	26.7	32.7	10.9
Most Stringent AAQS / SIL	50 / 10.4	20 / 2.08	35 / 2.5	12 / 0.63
Exceeds AAQS?	**No**	**No**	**No**	**No**
Exceeds SIL?	**No**	**No**	**No**	**No**

Note: Annual average PMI occurs where the haul road crosses the project boundary (UTM 499604.71, 3803971.15) which is omitted from consideration in favor of the higher of the two adjacent boundary receptors (UTM 499559.62, 3803991.54). Daily PMI occurs on the southwest property boundary (UTM 4980909, 3801590).

8.0 ALTERNATIVES

Reasonable alternatives were developed that respond to the significant issues, reduce potential environmental impacts and address the purpose of and need for action and Project objectives. Alternatives that did not meet the purpose of and need for action, did not resolve environmental conflicts and/or were not available or feasible were eliminated from detailed consideration

The County identified the following two alternatives for detailed analysis in this DEIR/EIS, each of which is summarized below, followed by the detailed analysis.

8.1 Alternative 1: No Action/Mining under Current Entitlements

Under this alternative, Omya would not expand the White Knob and White Ridge Quarries. The existing permitted mining activities located on approximately 145 acres within the area controlled by Omya would continue in accordance with the approved POO and Reclamation Plans and other Federal, State and local regulations.

Cancer risk which would be less than for the Project due to the shortened life of the resource and exposure duration. Existing entitlements would allow the project maximum of 680,000 tons to be produced from the White Knob and White Ridge Quarries exclusively. Aside from the slightly reduced cancer risk, the air quality impacts of the No Action alternative are the same as the Project alternative.

8.2 Alternative 2: Combined Production with the Sentinel and Butterfield Quarries

Historically the limestone ore provided to the Lucerne Valley Processing Plant has been approximately a 60/40 ratio between the Butterfield and Sentinel Quarries and the White Knob Quarry. This alternative would assume that instead of the White Knob and White Ridge Quarries providing 100% (680,000 tpy) of the ore to the processing plant, a range of more realistic production mixes between the quarries would be evaluated.

This alternative would be more likely than the proposed Project and would result in less difference from the existing setting. The haul distance to the processing plant from the Sentinel and Butterfield Quarries is greater than from the White Knob and White Ridge Quarries. On the other hand, the amount of overburden to be removed at White Knob and White Ridge Quarries is greater by 500,000 tons per year than the amount that would need to be removed from the Sentinel and Butterfield Quarries for an equivalent amount of ore. Regardless, the impacts calculated for the Project are greater than those that would be calculated for this alternative.

9.0 REFERENCES

AB 32 Scoping Plan, CARB, December 2008. (http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm).

AERMOD View Version 8.2.0 by Lakes Environmental (AERMOD build number 12345). (http://www.weblakes.com/products/aermod/index.html)

Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, California Office of Environmental Health Hazard Assessment (OEHHA) (August 2003) (http://www.oehha.org/air/hot_spots/HRAguidefinal.html).

AP-42, US EPA. (http://www.epa.gov/ttn/chief).

CalEEMod User Guide Version 2011.1, SCAQMD, February 2011. (http://www.aqmd.gov/caleemod/guide.htm).

CEQA and Federal Conformity Guidelines, MDAQMD, August 2011. (http://www.mdaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=2910).

EMFAC2011, CARB. (http://www.arb.ca.gov/msei/msei.htm).

EPA Memorandum from Tyler Fox, Leader Air Quality Modeling Group C439-01 to Regional Air Division Directors, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard" dated March 1, 2011. (http://www.epa.gov/region7/air/nsr/nsrmemos/appwno2_2.pdf)

EPA's Endangerment Finding – Health Effects Fact Sheet (http://www.epa.gov/climatechange/Downloads/endangerment/EndangermentFinding_Health.pdf).

Final Supplement to the AB 32 Scoping Plan Functionally Equivalent Document, CARB, August 24, 2011. (http://www.arb.ca.gov/cc/scopingplan/document/final_supplement_to_sp_fed.pdf).

HARP Onramp, CARB, February 3, 2009.

HARP User Manual, CARB, December 2003 (http://www.arb.ca.gov/toxics/harp/harp.htm).

Hot Spots Analysis and Reporting Program (HARP) Version 1.4f (Build 23.11.01), CARB, May 2012. (http://www.arb.ca.gov/toxics/harp/harp.htm).

Multiple Air Toxics Exposure Study in the South Coast Air Basin (MATES-II and MATES-III), South Coast Air Quality Management District, March 2000 and September 2008. (http://www.aqmd.gov/matesiidf/matestoc.htm http://www.aqmd.gov/prdas/matesIII/matesIII.html)

OFFROAD2011, CARB. (http://www.arb.ca.gov/msei/msei.htm).

"Phase I Report – Revised 2010," Federal Land Managers' Air Quality Related Values Work Group (FLAG), October 2010. (http://www.nature.nps.gov/air/pubs/pdf/flag/FLAG_2010.pdf).

Rules and Regulations of the Mojave Desert Air Quality Management District. (http://www.mdaqmd.ca.gov/index.aspx?page=138).

Regulatory Advisory 10-414, CARB, May 2011. (http://www.arb.ca.gov/enf/advs/advs414.pdf).

State CEQA Guidelines, National Resources Agency, last updated March 18, 2010. (http://ceres.ca.gov/ceqa/guidelines/).

Speciation Profiles Used in ARB Modeling, CARB, December 12, 2012. (http://www.arb.ca.gov/ei/speciate/speciate.htm).

FIGURES

Appendix A: Figures

Appendix B: Health Effects of Air Pollutants

Appendix C: Ambient Pollutant Concentrations

Appendix D: San Gorgonio Wilderness Area Description

Appendix E: MDAQMD Rule Development Calendar

Appendix F: MDAQMD Mineral Industry Emissions Inventory Guidelines

Appendix G: Baseline Data from Omya

Appendix H: Baseline Emissions Calculations

Appendix I: Project Emissions

Appendix J: Mitigated Emissions

Appendix K: Modeling Files on Electronic Media