7.0 Air Quality

7.1 ENVIRONMENTAL SETTING

7.1.1 Topography and Meteorology

The Bonny Doon Limestone and Shale Quarries are located in Santa Cruz County in the northwest sector of the North Central Coast Air Basin. The basin is dominated by the Santa Cruz Mountains and includes large agricultural, grazing and forested areas, but relatively less industry or urban density compared with the San Francisco Bay Area to the north.

The semi-permanent high-pressure cell in the eastern Pacific is the basic controlling factor in the climate of the air basin. In the summer, the high-pressure cell is dominant and causes persistent west and northwest winds over the California coast. The onshore air current passes over cool ocean water to bring fog and cool air into the coastal valleys. In the fall, the surface winds become weak and occasionally air flow is reversed in a weak offshore movement. During the winter, the Pacific high-pressure cell migrates southward and has less influence on the air basin.

The quarry site is well ventilated even under low wind conditions due to the coastal location and the elevated terrain. Indeed, previous attempts to model the Quarry at various area sources predicted ground level concentrations higher than were actually found in field measurements, which suggests that there is probably a great deal more vertical mixing due to the rugged terrain in the site vicinity and the steep walls of the quarry pit.

The pit has effectively a 100 to 200 percent wall slope at the down-wind perimeter so that emissions generated within the pit mix with the air volume in the pit before being pushed over the quarry rim. When the air mass passes out of the pit, it is pushed up at a 45 to 60 degree angle significantly increasing vertical mixing. The surrounding terrain and dense vegetation increase surface roughness and further increase vertical mixing and more rapid pollutant dilution.

7.1.2 Air Pollutants

The principal relevant air pollutants expected to be generated by the Bonny Doon Limestone Quarry Boundary Expansion Project include particulate matter 10 microns in diameter (PM10), ozone precursors, and toxic air contaminants (TACs).

7.1.2.1 Particulate Matter (PM10)

Particulate matter is solid particles or liquid droplets suspended in the air. Particulate matter may be produced by natural causes or by human activity. PM10 consists of “respirable” particulates smaller than or equal to 10 microns in diameter that can cause adverse health effects.

In July 1997, the EPA adopted a new National Ambient Air Quality Standards (NAAQS) for PM2.5, which represents the “fine” fraction of inhalable particulate matter (particles smaller than or equal to 2.5 microns in diameter), and is primarily a product of combustion. PM2.5 causes health problems by penetrating deeply into the lungs, and is responsible for most of the

visibility reduction attributable to particulate matter. The EPA has not promulgated enforcement measures for this pollutant class.

7.1.2.2 Ozone Precursors: VOC-NOx

Ozone (the main component of "smog") is not emitted directly into the atmosphere but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving volatile organic compounds (VOC) and nitrogen oxides (NOx). Ozone is a regional air pollutant because its precursors are transported by wind concurrently with ozone production by the photochemical reaction process.

7.1.2.3 Toxic Air Contaminants (TAC) – Diesel Particulate Matter (DPM)

TAC includes a broad class of compounds with specific toxic or carcinogenic risk. Particulate matter associated with diesel exhaust (DPM) is recognized to pose a hazard to the general population and exposure is associated with increased cancer risk.

7.1.3 Existing Ambient Air Quality

In Santa Cruz County, the coastal mountains exert a strong influence on air circulation resulting in generally good air quality. The North Central Coast Air Basin is a non-attainment area for PM10: concentrations exceeded the state PM10 Ambient Air Quality Standard (AAQS) at MBUAPCD monitoring stations throughout the air basin on 7 days in 2003, 7 days in 2004, 2 days in 2005, and 2 days in 2006 (California Air Resources Board, 2007). There were no recorded violations of the federal PM10 24-hour AAQS at MBUAPCD monitoring stations since 1999.

The North Central Coast Air Basin is a moderate non-attainment area for state ozone AAQS. Based on monitoring data from ambient monitoring stations, ozone concentrations exceeded the state AAQS on 3 days in 2003, 0 days in 2004, 2 days in 2005, and 2 days in 2006. Ozone concentrations exceeded the federal 8-hour ozone standard on 2 days in 2003, 0 days in 2004, 1 day in 2005, and 2 days in 2006 (California Air Resources Board, 2007). These exceedances occurred at the Pinnacles or the Hollister-Fairview Road monitoring stations, downwind from the urban emissions of Monterey/Salinas or the Santa Clara Valley. Although ozone levels at the coastal are low, precursor emissions (VOC and NOx) travel inland and would contribute to elevated ozone downwind.

There have been no recorded violations of the federal or state carbon monoxide AAQS at District monitoring stations.

The air monitoring station nearest to the Bonny Doon project site is at Davenport, 1.6 miles west of the Limestone Quarry. From 2004 through 2006, there were no exceedances of the state NAAQS for ozone (California Air Resources Board, 2007). In the same period, fine particulate matter (PM10) exceeded the state 50 ug/m3 24-hour standard two to seven times per year. There were no exceedances of the federal 150 ug/m3 standard. It is likely that some of the exceedances are due to natural particulate matter form ocean surf action or from transient local sources as well as from the nearby CEMEX Portland cement plant. The annual average over this period ranged from 24.3 to 28.6 ug/m3. The state annual PM10 standard is 20 ug/m3.

PM2.5 data are collected at Santa Cruz-2544 Soquel Avenue. From 2000 through 2002, the average was 8.5 ug/m3 and the 24-hour maximum was 23.3 ug/m3. Santa Cruz County is not in the area recommended to EPA by CARB for PM2.5 non-attainment designation (California Air Resources Board 2004).

7.1.4 Sensitive Receptors

A sensitive receptor is a location where a population may be exposed to air pollutants. These typically include residences, hospitals, and schools. The nearest sensitive receptors are residences owned by CEMEX adjacent to the northern property boundary and other residences to the northeast and east. See Figure 38, Sensitive Receptors and Table 7-1, Distance to Sensitive Receptors.

The residences to the north are located 830 and 950 feet away from the northern property line and current mining plan boundary. The expansion of the mining plan boundary 400 feet east would not bring operations closer to these northern residences than currently permitted. Three additional residences are within 2000 feet of the proposed Boundary Expansion Area (Figure 38). These residences are located between 1300 feet and 1500 feet to the northeast and east of the proposed mining boundary on the quarry property.

Table 7-1
Distance to Sensitive Receptors

	Parcel	Residence Distance to Existing Mining Area (feet)	Residence Distance to Expanded Mining Area (feet)	Parcel Distance to Expanded Mining Area (feet)
CEMEX Parcels				
	C1	NA	NA	950
	C2	1180	1500	600
	C3	950	900	Adjoining
	C4	830	980	670
	C5	NA	NA	Adjoining
	C6	NA	NA	1,100
Residences				
	R1	1900	1520	1220
	R2	1850	1410	1060
	R3	1650	1320	1140
	R4	1900	1340	1220

Note: NA: Not Applicable, no residence on parcel.
Source: Bowman & Williams, 2001a&b, TRA Environmental Sciences, Inc., 2007. (See Figure 38)

7.1.5 Previous Air Quality Studies

7.1.5.1 Bonny Doon Quarries Certificate of Compliance and Reclamation Plan EIR

Air Quality impacts of the Bonny Doon Quarry operations were assessed previously in the Bonny Doon Quarries Certificate of Compliance and Reclamation Plan EIR (County of Santa Cruz 1996a&b). This study incorporated pollutant dispersion modeling by Engineering Science, 1993. Engineering Science and TRA found that the large uncertainty in emissions factors for blasting dominated air pollutant model results. The predicted exceedance of state ambient air

quality standards was higher than seemed credible so monitoring was recommended for one year to demonstrate compliance with the Mining Regulations.

Engineering Science used available emissions factors for diesel equipment and fugitive dust to compile an emissions inventory. The original emission inventory (Table IV-10 of the 1996 EIR) is reproduced here with one modification: mitigation requiring a high level of dust abatement on unpaved haul roads was imposed by the permit and has been confirmed by compliance monitoring; Table 7-2 shows the mitigated emissions level for that source.

Engineering Science used the U.S. EPA Industrial Source Complex (ISC) model to predict offsite PM10 concentrations on an annual average and on a maximum day basis. All sources operate in conjunction, so that heavy equipment exhaust and fugitive dust form material handling and blasting are all included in the same large area source. Because of high particulate emissions factors for blasting, Engineering Science predicted substantial violations of the state 50 ug/m3 24-hour standard for PM10.

7.1.5.2 Desert Research Institute (DRI) 1999

Desert Research Institute (DRI) monitored PM10 emissions during blast periods on June 11, August 20, and October 12, 1998. Continuous PM10 and meteorology monitoring was conducted at three sites from June 1998 through September 1999. These sites were the MBUAPCD site at Davenport (monitored June 1998-September 1999) and the Sola and Strong residences to the northeast (monitored September 1998 through September 1999). On Figure 38, parcel C5 is the former Sola residence; the Strong residence was located immediately east of parcels R1 and R2.

The findings are documented in Effects of Bonny Doon Limestone Quarry on Off-site PM10 Concentrations (DRI, 1999). Analysis of PM10 data collected over the course of the study showed no exceedances of California or National ambient air quality standards for PM10. There were also no discernible differences in concentrations recorded on blast days, operational non-blast days, or non-operational days that would indicate a noticeable impact of quarry operations or blasting on 24-hour average PM10 concentrations at nearby residences.

Table 7-2
Emissions Inventory for the
Bonny Doon Limestone Quarry Boundary Expansion Project

Emission Sources	Process Rate	Operating Hrs/Yr	Emissions (lbs/yr)		
			PM10	NOx	ROG
LIMESTONE QUARRY					
Drilling	1,570,405 tons/yr	1,680	157		
Blasting*		96	12,972		
Unpaved haul road**	53,256 miles/yr	1,680	7,172		
Truck Loading*		1,680	377		
Truck Unloading*		1,680	3		
Primary Screen*		1,680	345		
Crusher*		1,680	628		
Material Transfer Pts	6,046,059 tons/yr	1,680	242		
Secondary Screen*		1,680	302		
Fines Storage Pile	0.124 acres	1,680	214		
Haul Truck Engines	53,256 miles/yr	1,680	387	2,018	344
Loader Engines	1,680 hrs/yr	1,680	289	3,175	420
Bulldozer Engines (D10)	1,440 hrs/yr	1,440	238	5,999	276
Water Truck Engines	1,680 hrs/yr	1,680	428	6,989	321
	Limestone Quarry Total		23,754	18,181	1,361
SHALE QUARRY					
Unpaved haul road	3,746 VTM/yr	720	4,088		
Area worked by loader/dozer	0.275 acre/day	720	475		
Truck Loading*		720	52		
Truck Unloading*		720	0.4		
Primary Screen*		720	47		
Crusher*		720	43		
Material Transfer Pts**	859,260 tons/yr	720	34		
Haul Truck Engines	3,746 miles/yr	720	27	142	24
Bulldozer Engines (D9)	480 hrs/yr	480	79	2,000	92
Loader Engines	720 hrs/yr	720	124	1,361	180
	Shale Quarry Total		4,969	3,503	296
General Light Truck Use	9,000 miles/yr	1,680	2	17	29
Unpaved Road	9,000 miles/yr	1,680	814		
	TOTAL **Average day*****		**29,539** **123 lbs/day**	**21,701** **90.4 lbs/day**	**1,686** **7.0 lbs/day**

Notes:
* Emissions levels shown for these devices are taken by Engineering Science directly from 1991 AB2588 Biennial Report Update with adjustment as necessary
** Reflects 90% reduction from dust abatement measures implemented at the Quarry.
*** Average day reflects 240 working days per year.
Source: Engineering Science 1993, reported in County of Santa Cruz 1996a&b, adapted by TRA Environmental Sciences.

Table 7-3 lists the DRI 24-hour average PM10 measurements. The highest 24-hour concentration observed during an operating day was 24 ug/m3 at the closer Sola residence and 25 ug/m3 at the Strong residence. Both levels were below the state 50 ug/m3 24-hour standard. The annual average of all measurements was 9 ug/m3 at both sites, below the state 20 ug/m3 annual average standard.

Table 7-3
Desert Research Institute Local PM10 Monitoring 1998-1999
(PM10 ug/m3)

Condition/Site	Mean	Standard Deviation
Quarry Non-operational (10 days)		
Sola Residence	12.9	4.7
Strong Residence	12.5	4.7
Quarry Operating, no blast (18 days)		
Sola Residence	8.8	5.4
Strong Residence	9.3	6.5
Quarry Blasting (13 days)		
Sola Residence	12.9	5.8
Strong Residence	12.5	4.7

Source: DRI 1999; measurements taken from Sept 1998 to Sept 1999

The relatively low levels of PM10 in the field study is likely due to two factors: 1) actual particulate emissions are low for unpaved haul roads and blasting with this limestone substrate, and with the dust management techniques in use; and 2) the strong winds and highly unstable conditions at the coastal site combine with rugged terrain to accelerate mixing, particularly in the vertical air column, and this rapidly dilutes the concentration of particulate matter from the Quarry.

As a result of the extensive field measurements, the fugitive dust and other particulate emissions from the Quarry were concluded not to result in violation of an ambient air quality standard. This field measurement is a significant result because it measured all PM10, meaning PM10 from the Limestone Quarry as well as PM10 from all other local and regional sources and thus it shows the cumulative level of Quarry emissions on top of background emissions in the actual project location.

7.2 REGULATORY SETTING

7.2.1 Ambient Air Quality Standards

The California Air Resources Board (CARB) is responsible for air pollution control and setting state ambient air quality standards and allowable emission levels for motor vehicles. In 1969, California established the first California Ambient Air Quality Standards (CAAQS), which are administered by the CARB. The following year, the Federal Clean Air Act Amendments of 1970 established NAAQS administered by the EPA. Although both processes focused on mitigating the effects of poor air quality on health, the state and federal ambient standards were developed independently with differing purposes and methods. As a result, considerable differences exist between state and national standards currently in effect in California.

As required under the Federal Clean Air Act (1970) and California's Mulford-Carrell Act (1969), ambient (outside) air quality standards were established for several air pollutants. These standards were designed to protect public health as well as the environment (visibility, vegetation and property). Currently, there are federal and California standards for ozone, carbon monoxide (CO), PM10, nitrogen dioxide (NO_2), sulfur oxides (SOx) and lead (Pb). In addition, California has standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles.

7.2.2 Diesel Particulate Matter

Particulate matter associated with diesel exhaust is also recognized to pose a risk to the general population and is of growing concern.

CARB conducted a study to estimate cancer risks from exposure to DPM in the state and to develop a risk reduction plan. CARB reported that for the year 2000, the statewide average cancer risk from exposure to diesel exhaust was estimated to be 540 in a million. CARB also estimated that cancer risks from diesel exhaust are about 70 percent of the total risks from exposure to TAC in the ambient air (California Air Resources Board, 2000).

Accordingly, CARB has promulgated a program for step-wise reduction of diesel particulate (and nitrogen oxides) emissions requiring the use of state-of-the-art catalyzed diesel particulate filters and very low-sulfur diesel fuel. The regulations establish "tiers" of compliance set by year of equipment manufacture. EPA and CARB have been developing formalized guidelines for assessing the risk of particulate diesel exhaust to the general population and have not, to date, issued final direction on this matter. EPA and CARB Diesel Risk Reduction Plan efforts are currently focusing on improvements to the quality of diesel fuel, tightened restrictions on new diesel engines, and reducing emissions from existing diesel engines. Diesel fuel sold in California is specifically designed to reduce particulate matter emissions related to diesel exhaust. Emission standards for diesel engines have been tightening through the use of mandated improvements to engine design and implementation of advanced technologies.

In May of 2003, the EPA proposed new emission standards for non-road diesel engines, including construction equipment, and sulfur reductions in non-road diesel fuel that would dramatically reduce emissions. These new engine standards would take effect in the 2008 model year. By June of 2010, sulfur in non-road diesel fuel would be limited to 15 ppm (ultra low sulfur fuel), thereby reducing sulfur 99 percent from existing levels. The EPA estimates that PM would be reduced 95 percent, NOx would be reduced 90 percent, and SOx would be virtually eliminated as an emission from this source.

Thus, engines in the 175 to 749 hp range typical of the most off-highway construction equipment will have PM10 fleet emissions limited to 0.15 gm/bhp-hr by 2013, falling to 0.08 by 2017, and to 0.02 by 2020.

7.2.3 Monterey Bay Unified Air Pollution Control District (MBUAPCD)

The state is divided into air basins governed by districts. Santa Cruz County is located in the North Central Coast air basin, which is under the jurisdiction of the MBUAPCD. The MBUAPCD also includes Monterey and San Benito Counties. The MBUAPCD is responsible

for air quality attainment planning and monitors and enforces MBUAPCD, State of California, and federal air quality standards.

The MBUAPCD administers a series of Permits to Operate for the Quarry and its associated cement plant. These permits include the Limestone Quarry Mobile Drill Rig, Shale Quarry System, Mobile Rotary Drill Rig #2, Overland Conveyor System, and Limestone Quarry Crushing and Screening System. The MBUAPCD participates in land use review through the CEQA process, which covers all aspects of air pollution. The off-road heavy equipment involved in site preparation and ongoing mining are not subject to MBUAPCD permits. A modification of the Quarry Permit to Operate existing emissions-producing equipment would not be required for the proposed Boundary Expansion Area. No new emissions-producing equipment are being proposed.

The MBUAPCD regulates TAC through Rule 1000. Construction equipment or processes would not result in significant air quality impacts if they would comply with Rule 1000 (MBUAPCD June 2004, Guidelines p. 9-3). Rule 1000, however applies to new or modified sources and the proposed project does not trigger that review because it would not result in a net increase in the potential to emit any TAC and no MBUAPCD Authority to Construct or a Permit to Operate is required.

7.2.4 County of Santa Cruz

The County Mining Regulations 16.54.050 (c)(2) sets forth required conditions and standards for air pollution applicable to the Bonny Doon Quarries. In addition, Use Permit Condition Part III.23 and COC Conditions of Approval III.G.2 through G6 and Conditions III.I through I.5 specify dust control measures and blasting control measures, which affect dust emissions. These measures are summarized in County Plans and Policies, Section 3.0 and fully presented in Appendix B.

7.3 PROJECT IMPACTS

7.3.1 Thresholds of Significance

A project would normally have a significant effect on the environment if it would violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations.

Thresholds for substantial contribution are set by the MBUAPCD and are listed in MBUAPCD CEQA Guidelines (June 2004). The thresholds of significance for the pollutants addressed in this analysis are shown in Table 7-4.

The MBUAPC guidelines recognize the difficulty of accurately estimating fugitive emissions from earth moving and apply general area guidelines as a screening value. In Guidelines Table 5-2, Construction Activity with Potentially Significant Impacts, MBUAPC assumes that up to 8.2 acres may be graded with minimal earthmoving or 2.2 acres may be graded and excavated without exceeding the PM10 threshold of significance of 82 lbs/day.

Table 7-4 Thresholds of Significance for Criteria Pollutants of Concern Operational Impacts*	
Pollutant	**Threshold(s) of Significance**
VOC	137 lb/day (direct + indirect)
NOx	137 lb/day (direct + indirect)
PM10	82 lb/day (on-site)**
	AAQS exceeded along unpaved roads (off-site)
CO	LOS at intersection/road segment degrades from D or better to E or F or V/C ratio at intersection/road segment at LOS E or F increases by 0.05 or more or reserve capacity at intersection/road segment at LOS E or F decreases by 50 or more.
	550 lb/day (direct)***
SOx	150 lb/day (direct)**

Notes:

* Projects that emit other criteria pollutant emissions would have a significant impact if emissions would cause or substantially contribute to the violation of state or national AAQS. Criteria pollutant emissions could also have a significant impact if they would alter air movement, moisture, temperature, climate, or create objectionable odors in substantial concentrations. When estimating project emissions, local or project-specific conditions should be considered.

** MBUAPCD-approved dispersion modeling can be used to refute (or validate) a determination of significance if modeling shows that emissions would not cause or substantially contribute to an exceedance of state and national AAQS.

*** Modeling should be undertaken to determine if the project would cause or substantially contribute (550 lb/day) to exceedance of CO AAQS. If not, the project would not have a significant impact.

Sources: MBUAPCD, 2001. CEQA Guidelines, June 2004.

If the 82 lbs/day threshold is exceeded, then dispersion modeling can be used to demonstrate that predicted particulate concentrations are below the ambient air quality standards.

The guidelines address non-particulate emissions from construction in section 5.3, Criteria For Determining Construction Impacts: " Construction projects using typical construction equipment such as dump trucks, scrappers, bulldozers, compactors and front-end loaders which temporarily emit precursors of ozone [i.e. volatile organic compounds (VOC) or oxides of nitrogen (NOx)], are accommodated in the emission inventories of State- and federally-required air plans and would not have a significant impact on the attainment and maintenance of ozone AAQS."

The MBUAPCD guidelines address Toxic Air Contaminants, and state that "emissions of a carcinogenic TAC that can result in a cancer risk greater than one incident per 100,000 population are considered significant." (MBUAPCD, op. cit. p. 9-3) This so-called 10 E-5 risk level is for continuous exposure projected over a 70-year lifetime.

7.3.2 Site Preparation

The proposed eastward extension of the mining boundary has a site preparation component and a quarrying component. In both cases, heavy equipment is used to strip and transport material and the PM generation potential is similar for both components.

As stated in the Project Description, land preparation of the 17.1-acre Boundary Expansion Area would occur in stages. It is currently anticipated that ground clearing would be conducted during late spring and summer months in each of the first two years of operation. Approximately one-half of the acreage would be cleared each year. The environmental effects would be similar to commercial logging and have limited fugitive dust. The MBUAPCD significance threshold of 8.2 acres graded with minimal earthmoving would apply. The actual activity area subject to disturbance in any work day would be well under the 8.2 acre threshold.

Overburden stripping for site preparation would affect soils and weathered rock with a higher proportion of fine particles than the underlying limestone; although the fugitive dust potential is higher, the relatively cool, damp coastal climate would mean that there is adequate soil moisture to reduce fugitive dust. A water truck is available to control dust on interior haul roads. All the overburden would be disposed of on site and there would be no off-site haul on public roads.

The MBUAPCD significance threshold of 2.2 acres graded with extensive earthmoving would apply to overburden stripping. Although the total area is 17.1 acres, the work would be done in stages so that actual activity area subject to disturbance in any work day would be under the 2.2-acre threshold (Rob Walker, CEMEX, pers. comm.). As long as the work stages remain less than the 2.2-acre MBUAPCD threshold, the dust emissions from land clearance would be less than significant. Mitigation Measure AQ-1 requires that CEMEX demonstrate that its active work areas for site preparation shall not exceed 8.2 acres for clearing or 2.2 acres for overburden stripping at any point in time.

A rough estimate of site preparation emissions based on U.S. EPA emissions data from the older fleet of diesel off-highway equipment is presented in Table 7-5. Site preparation emissions fall below MBUAPCD suggested CEQA thresholds (Table 7-3).

Table 7-5
Bonny Doon Limestone Quarry Boundary Expansion Area
Site Preparation
Off-Highway Equipment Emissions[1]

Contaminant	Factor gm/yd3[2]	Total Tons	Average Tons/year	Average lbs/day
PM10	2.2	1.4	0.7	11.7
CO	138.0	88.1	44.1	367.3
ROG	9.2	5.9	2.9	24.5
NOX	42.4	27.1	13.5	112.8
SOX	4.6	2.9	1.5	12.2

Notes:
(1). Based on 580,000 cubic yards excavated in 240 working days spread over two years.
(2) Grams per cubic yard of earth moved. U.S. EPA AP-42
Source: TRA Environmental Sciences, Inc., 2007.

The Expansion Area site preparation would likely be done under contract with additional equipment brought in so that limestone would continue in production. The cumulative effect of ongoing quarrying and site preparation would result in doubling of overall area source particulate emissions during substantial portions of the two-year site preparation period. The project and quarry emissions would occur from adjoining area sources. The emissions would substantially

overlap in the direction of the easterly receptors. The DRI findings showed that during mining, PM10 levels at the nearest residential receptors averaged one-quarter of the state 24-hour standard. Even with overlap of the emissions plume from site preparation dust with the emissions plume from ongoing mining dust, the nearby off-site concentrations would likely remain below the state standard. Given the location of residential receptors at a distance of 1,000 feet or more and the good daytime emissions dispersion at the site, ambient air quality at residential receptors would remain below applicable standards.

7.3.3 Expanded Quarry Operations

Approval of the expanded mining area would extend the existing Quarry operation by approximately three years. The environmental impacts of the existing Quarry operation were considered by County of Santa Cruz in 1996 and in the Permit to Operate from the MBUAPCD. The existing Quarry operation has been found to be in conformance with existing Use Permit conditions and applicable County mining regulations. Based on the DRI findings PM10 emissions from the quarry were concluded not to result in violation of an ambient air quality standard.

The existing operations at Bonny Doon Quarries involve many steps of materials handling including blasting, extraction, hauling, and crushing. These activities result in emissions of particulate matter (PM) and vehicle exhaust (PM and NOx). The expansion of the Limestone Quarry mining boundary would facilitate a continuation of these emissions by extending quarry life for approximately three years. The project would not increase the permitted capacity of the quarry to process and transport raw materials to the Davenport cement plant. There would be no change in transportation volume, mode of transportation, or production capacity.

The project would expand the perimeter of the area subject to mining and therefore change the location of emissions associated with the working face – primarily fine particulate and nitrogen oxides from blasting. Overall, the Quarry bowl acts as a large area source roughly 1300 feet across. Enlarging the mining area stretches the edge of that area source by 400 feet and effectively moves the center of the source 200 feet east. Given the results of the DRI field measurements and the apparent effect of complex terrain at this location, the small shift in area source characteristics cannot be accurately modeled.

CEMEX employs several measures in an effort to reduce fugitive dust in accordance with COC Conditions of Approval to assure compliance with County Mining Regulations air quality provisions (Section 16.54.050 (c)(2)) and MBUAPCD Permit to Operate requirements (see Appendix B, COC Conditions III.G.2 through G6 and Conditions III.I through I.5). Dust emissions have been minimized by watering of roadways, working surfaces, and crusher material, routine maintenance of dust control devises on stationary equipment, treating unvegetated disturbed areas to prevent wind blown dust, and restricting vegetation removal to an approved phasing plan. These conditions would be applied to the proposed mining operations in the Boundary Expansion Area through project amendment of the COC. With the implementation of these measures, the fugitive dust emissions generated by mining the Boundary Expansion Area would be less than significant.

7.3.4 Diesel Particulate Toxic Air Contaminant

The original air quality analysis in 1996 was conducted before DPM became regulated as a TAC by the CARB in August 1998 or by the MBUAPCD. The concern for DPM is for its increased cancer potential from long-term exposure. Diesel sources both on- and off-highway is believed to contribute substantially to the overall DPM risk.

A screening level TAC risk from the existing operation was done to estimate the significance of extending the existing DPM TAC for an additional three years. The screening is based on an equipment use inventory and fuel use data supplied by CEMEX and previous air pollutant modeling by Engineering Science. Fuel use levels indicate that the heavy equipment operates at a fairly low average power level (25%) compared with conventional earthmoving for construction; this is presumably due to empty travel, loaded travel downhill, and high idle time. The equipment inventory does not indicate age or emissions standards, but based on models listed, most of the equipment is presumed not to meet the newer CARB standards. At a fleet average of 0.20 g/bhp-hr emissions, full operation would produce an estimated 1,733 lbs/year or 7.2 lbs/day of DPM.

Engineering Science used the ISC model assuming flat terrain and normal vertical dispersion to model annual average PM10 around the quarry. Engineering Science modeled the full, unmitigated particulate emissions including engine exhaust and fugitive dust for an annual average area source emission of 88,303 lbs/yr, dominated by fugitive dust from unpaved haul roads and blasting. The model results shown in Figure 38 plot a line of equal concentration for 1.0 ug/m3 of PM10 stretching around the Quarry and extending to the east, down wind for the prevailing wind at the site. The estimated DPM emissions are 2.0 percent of Engineering Science's annual total PM10, so the Engineering Science 1 ug/m3 line corresponds to a modeled DPM concentration of 0.020 ug/m3.

The California Office of Environmental Health Hazard Assessment (OEHHA) has established a unit risk value for DPM as 300 in a million per microgram per cubic meter. The unit risk value is the increased probability of contracting cancer from this specific factor if exposed to an average concentration of one microgram per cubic meter (µg/m3) continuously over a 70-year lifetime. Dividing the unit risk factor by the one in 100,000 MBUAPCD significance criterion yields 0.033 ug/m3 as the DPM concentration corresponding to one incident per 100,000. Continuous exposure to DPM concentrations below this level are presumed to pose less than significant incremental risk.

The 1.0 ug/m3 concentration line modeled by Engineering Science in the 1996 EIR corresponds to an exposure of 0.020 ug/m3 DPM, which is slightly less than the significant risk concentration, and the line of Quarry DPM corresponding to the significant risk concentration falls well inside that 1.0 ug/m3 concentration line. Thus, despite the substantial DPM emissions associated with the existing operation, the line of predicted significant DPM TAC risk extends only a short way off-site.

Actual risk is likely to be far less than predicted risk for three reasons:

1. Actual dispersion is greater than modeled dispersion. As discussed above, the DRI field measurements show that the steep pit walls, rugged, heavily vegetated surrounding

terrain, and the strong daytime winds at the site produce far more rapid dispersion and dilution of emissions from the Quarry pit. Although DRI specifically looked at 24-hour samples, the findings are applicable to annual average PM10 concentrations in the prevailing downwind direction. The modeled 1ug/m3 line shown on Figure 38 is conservative.

2. DPM emissions will be reduced by regulation in the affected timeframe. Because the proposed project extends future operations in the time frame 2012 to 2015, the DPM emissions would decline as existing equipment is replaced by newer equipment that complies with DPM emissions standards, and because newer fuel regulations would be in full effect. In the future time frame corresponding to project effects, DPM emissions would be between 20 and 40 percent of the present emissions estimate, depending on the rate of equipment replacement.

3. The project would extend operations by only three years. The DPM unit risk factor is based on a full 70-year lifetime exposure. When the three-year increased project life is factored in (at 3/70 = 4 percent), the future risk level outside the property drops to less than significant.

7.3.5 1996 Reclamation Plan Amendment

The proposed amendment to the 1996 Reclamation Plan would modify the target vegetation communities, but not the techniques used to provide final revegetation. The difference in air pollutant emissions would be less than significant.

7.3.6 Cumulative Impact

Previous studies examined Quarry emissions along with emissions from other sources (DRI, 1999). Even with the short term increase in emissions from site preparation, the cumulative effect of the proposed Boundary Expansion along with the existing mining operation and other area background sources would not be likely to result in a violation of an ambient air quality standard and would be less than significant.

7.4 MITIGATION MEASURES

The following measures reduce the air quality impacts of the project to a less than significant level:

IMPACT: *Site preparation including vegetation clearing and overburden removal would occur in several stages over the initial 2-year period. These activities would result in increased emissions of fugitive dust in addition to existing mining operations.*

Measure AQ-1: CEMEX shall limit active work areas for site preparation to less than 8.2 acres for vegetation clearing or 2.2 acres for overburden stripping at any point in time.

Implementation:	CEMEX shall submit a site preparation phasing plan to the County Planning Department. The plan must be approved by the Planning Department prior to any ground disturbance in the proposed Boundary Expansion Area.
Effectiveness:	Measure limits the size of disturbance zone generating dust emissions resulting in PM10 levels that are lower than the significance thresholds established by the MBUAPCD.
Feasibility:	Feasible. The proposed removal of overburden will occur in several stages during spring and summer months over a two-year period.
Monitoring:	Routine inspection by County.