

AIR QUALITY EMISSIONS INVENTORY

REVISED RECLAMATION PLAN FOR ALVIC & ALUMINA QUARRY

CA Mine ID # 91-36-0105

San Bernardino County
Reclamation Plan # 84M-012

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October 2020

**ALVIC & ALUMINA QUARRY
AIR POLLUTANT EMISSIONS
ASSUMPTIONS AND CALCULATIONS
October 2020**

**Table 1
Production and Blast Information**

	Existing	Proposed	Change	% Change
Ore (tons/year)	100,000	250,000	150,000	150%
Overburden (10%) (tons/year)	10,000	25,000	15,000	150%
Total (tons/year)	110,000	275,000	165,000	150%
# of Blasts	3	6	+3	200%
Tons/Blast	47,000	47,000	---	---
# of Drill Holes	140	280	+140	200%
Area of each blast (varies) (square feet)	12,300	12,300	0	NC
ANFO (est. tons)	53.4	106.8	+53.4	200%

Data above is estimated and depends on geologic conditions and area within the pit development.

Silt content of silica – 0.5%

Moisture Content of silica (ore) – 1.0%

Moisture Content of OB – 0.5% (also worst case per MDAQMD)

PM10 = 0.489 of Total Particulate Matter

PM2.5 = 0.208 of PM 10

Source: CEIDARS List SCAQMD 2006

All tons are short tons.

Table 2
Typical Quarry Equipment for Alvic & Alumina Quarry

Equipment	Typical Number	Current Days/Year	Planned Days/Year	Hours/Day (typical)	Purpose
Front-End Loader (CAT 996 typ.)	1	60	150	10	Loading of excavated materials into the processing plant at quarry.
Front-End Loader (CAT 992 typ.)	1	60	150	8	Loading of processed materials into off-road haul trucks.
Dozer (CAT D8 typ.)	1	10	20	8 (ave)	Mining and stockpiling of material. Construction and maintenance of roads and quarry benches. Used as needed.
Grader (CAT 140 typ.)	1	10	20	8 (ave)	Construction and maintenance of roads. Use as needed.
Drill Rig (varies with contractor)	1	15	30	2 (ave)	Drill holes for placement of explosives. 8 hrs./day for up to 30 days/year.
Off-Road Haul Trucks (100-ton CAT 777 typ.)	1	60	150	8	Transportation of excavated material to the cement plant and overburden to stockpiles.
Water Truck (4,000 gallons typ.)	1	60	150	4	Water spray haul roads, active quarry areas, overburden stockpiles, and general dust control.
Processing plant (vibrating grizzly, crusher, screen, and conveyors)	1	60	150	8	Portable tracked crushing/screening plant (currently Sandvik QA340) brought on-site as needed to process ore prior to shipping. Permitted under Statewide Portable Equipment Registration with CARB. Future plants shall comply with applicable air quality rules.
Ancillary Equipment	Varies		Varies	---	Maintenance vehicles, pick-ups, SUVs, etc.

Source: CEMEX 2020

List above is typical equipment used on-site. Equipment types are not expected to vary. Specific equipment will change during the life of the project due to replacement of aging equipment and updated equipment and fleet emission standards.

Table 3
Alvic & Alumina Quarry
Daily Fugitive Dust Emissions (PM₁₀ & PM_{2.5})
Tons/Year (Controlled)

Source	Controlled Emission Factors (PM ₁₀) (PM _{2.5})	Existing Conditions		Proposed Conditions		
			Tons /Year		Tons /Year	Change from Existing
Drilling	0.64 lb/hole (PM ₁₀) 0.13 lb/hole (PM _{2.5})	Drill Holes 140	0.05 (PM ₁₀) 0.01 (PM _{2.5})	Drill Holes 280	0.09 (PM ₁₀) 0.02 (PM _{2.5})	0.04 (PM ₁₀) 0.01 (PM _{2.5})
Blasting	9.34 lbs./blast (PM ₁₀) 1.94 lbs./blast (PM _{2.5})	3 blasts/yr.	0.014 (PM ₁₀) 0.003 (PM _{2.5})	6 blasts/yr.	0.03 (PM ₁₀) 0.006 (PM _{2.5})	0.016 (PM ₁₀) 0.003 (PM _{2.5})
	Lbs/Hour	Hours/Yr	Tons/year	Hours	Tons/year	
Dozing & Grading	9.6(PM ₁₀) 2.0 (PM _{2.5})	160	0.77 (PM ₁₀) 0.16 (PM _{2.5})	320	1.54 (PM ₁₀) 0.32 (PM _{2.5})	0.77 (PM ₁₀) 0.16 (PM _{2.5})
	Lbs/Ton	Tons		Tons		
Loading¹	0.002 lbs/ton 0.0004 lbs./ton	110,000 (load-dump)	0.11 (PM ₁₀) 0.02 (PM _{2.5})	275,000 (load-dump)	0.275 (PM ₁₀) 0.055 (PM _{2.5})	0.165 (PM ₁₀) 0.035(PM _{2.5})
		Acres		Acres		
Active Areas & Stockpiles²	0.15 lbs./day/ac 0.044 lbs./day/ac	3	0.08 (PM ₁₀) 0.024 (PM _{2.5})	5	0.14 (PM ₁₀) 0.04 (PM _{2.5})	0.06 (PM ₁₀) 0.026 (PM _{2.5})
Active OB Areas²	1.63 lbs./day/ac 0.49 lbs./day/ac	2	0.60 (PM ₁₀) 0.18 (PM _{2.5})	4	1.20 (PM ₁₀) 0.36 (PM _{2.5})	0.60 (PM ₁₀) 0.18 (PM _{2.5})
Unpaved Roads³	---	---	---	---	---	---
Off-Road Haul Trucks	<u>Existing</u> 0.74 lbs./mi (PM ₁₀) 0.16 lbs./mi (PM _{2.5}) <u>Proposed</u> 0/34 lbs/mi (PM ₁₀) 0.07 lbs/mi (PM _{2.5})	2,496 miles/yr.	0.92 tons/yr. (PM ₁₀) 0.20 tons/yr. (PM _{2.5})	6,240 miles/yr.	1.06 tons/yr. (PM ₁₀) 0.22 tons/yr. (PM _{2.5})	0.14 tons/yr. (PM ₁₀) 0.02 tons/yr. (PM _{2.5})
Totals	---	---	2.54 tons/yr. (PM₁₀) 0.60 ton/yr. (PM_{2.5})	---	4.34 tons/yr. (PM₁₀) 1.02 tons/yr. (PM_{2.5})	1.8 ton/yr. (PM₁₀) 0.42 ton/yr. (PM₁₀)

Source: CEMEX & Lilburn Corporation 2020. See Appendix A

- Notes:
1. Loading includes two operations, one into off-road haul trucks and one drop at the cement plant or overburden stockpile. Assume 60% control based on water spraying material.
 2. Active quarry areas/stockpiles at any one time (2 acres existing; increase to 4 acres in future); ore stockpile (1 acre - no change in future); and OB stockpiles (2 acre; increase to 4 ac in future). Assume 60% control with water spraying. Limestone with lower silt content than overburden.
 3. Unpaved roads include off-road haul truck movement to cement plant storage area and to overburden stockpiles. Existing controls 65%; planned control 83% with watering, dust palliatives, gravel, and speed limit.

Table 4
Alvic & Alumina Quarry
Existing Annual Baseline Compared to Future Conditions
Estimated Annual Maximum Air Pollutant Emissions (tons/year)

EMISSIONS SOURCES	ROG		NO _x		CO		PM ₁₀		PM _{2.5}	
	Existing Baseline	Future	Existing Baseline	Future	Existing Baseline	Future	Existing Baseline	Future	Existing Baseline	Future
Mobile Equip. & Haul Trucks (Exhaust)	0.04	0.07	0.84	2.11	1.62	4.05	0.01	0.02	0.01	0.02
Portable Generators	0.0012	0.03	0.11	0.27	0.11	0.28	0.0024	0.015	0.0024	0.0135
Processing Plant Fugitive Dust	---	---	---	---	---	---	0.12	0.29	0.02	0.06
Fugitive Dust	---	---	---	---	---	---	2.54	4.34	0.60	1.02
Emission Totals (tons/year)	0.04	0.10	0.95	2.38	1.73	4.33	2.67	4.67	0.63	1.09
Emission Change	0.06		1.73		2.60		2.0		0.46	
MDAQMD CEQA Thresholds	25		25		100		15		15	
Significant	No		No		No		No		No	

Source: Lilburn Corporation 2020

ASSUMPTIONS

Drilling and Blasting

Production/Extraction

Existing: 110,000 tpy(ore & overburden) 3 blasts/year
 Revised Plan: 275,000 tpy (ore & overburden) 6 blasts/year

Drilling Emission Factors: 1.3 lb/hole (TPM);
 0.64 lb/hole (PM₁₀);
 0.13 lb/hole (PM_{2.5})

Source: AP-42 (1998); Table 11.9-4
 & SCAQMD Particulate Matter EF (December 2014).

Blasting Emission Factor:

EF (lbs/blast) = (0.000014*Area^{1.5} * k (particulate matter-varies))

K (PM₁₀) = 0.489
PM_{2.5} = 0.208 of PM₁₀
Sources: AP-42 (1998); Table 11.9-4
& SCAQMD Particulate Matter EF (December 2014)

$$\begin{aligned} \text{EF}(\text{PM}_{10}) &= 0.000014 * 12,300^{1.5} * 0.489 \\ &= 9.34 \text{ lbs./blast} \end{aligned}$$

$$\text{EF}(\text{PM}_{2.5}) = 9.34 \text{ lbs./blast (PM}_{10}) * 0.208 = 1.94 \text{ lbs./blast (PM}_{2.5})$$

Dozing/Grading

Dozing Emission Factor (PM₁₀) = 9.6 lbs./hour (controlled)
Dozing Emission Factor (PM_{2.5}) = 2.0 lbs./hour (PM_{2.5} = 0.208 of PM₁₀)

Increase from 160 to 320 hours/year (dozing and grading)

Source of dozing equation below: AP-42, Section 11.9, Table 11.9.1

$$\begin{aligned} \text{EF (PM}_{10}) &= 1.0 * (s)^{1.5} / M^{1.4} * k \text{ lb./hr.} \\ &= 8.0^{1.5} / 0.5^{1.4} * 0.75 \text{ lb./hr.} \\ &= 22.6 / 0.38 * 0.75 \\ &= 44.6 \text{ lbs./hr.} \end{aligned}$$

k = 0.75 (PM₁₀)
Silt content (s) = 8.0% (MDAQMD for sand and gravel roads)
Moisture content (M) = 0.5% (MDAQMD default)

Control factor = 78.5% (water spraying); Table 3, page 13 of MDAQMD (increase M from 0.5% to 1.5%)

$$44.6 \text{ lbs./hr.} * (100 - 78.5\%) = 9.6 \text{ lbs./hr. (controlled)}$$

Loading

Loading Emission Factor = 0.005 lbs/ton (PM₁₀ uncontrolled)
Loading Emission Factor = 0.002 lbs/ton (PM₁₀ controlled)

Loading Emission Factor = 0.0016 lbs/ton (PM_{2.5} uncontrolled)
Loading Emission Factor = 0.0004 lbs/ton (PM_{2.5} controlled)
(PM_{2.5} = 0.208 of PM₁₀)

Control factor = 60% (water spraying); Table 3, page 13 of MDAQMD (increase M from 1% to 2%)

Source: AP-42, Section 13.2.4 (1995)

$$EF (PM_{10}) = k * 0.0032 * \frac{(U/5)^{1.3}}{(M/2)^{1.4}} \text{ lbs/ton}$$

k = 0.35 (for PM₁₀)

k = 0.11 (for PM_{2.5})

U = mean wind speed (7.7 mph (MDAQMD default))

Moisture content (M) = 1%

$$EF (PM_{10}) = 0.35 * 0.0032 * (7.7/5)^{1.3} / (1/2)^{1.4}$$

$$EF (PM_{10}) = 0.00112 * 1.75 / 0.38 = 0.005 \text{ lbs./ton}$$

STOCKPILES

Active Mining and Stockpile Areas assumptions:

Mining – 2 acres to 4 acres

Quarry stockpiles – 1 ac existing; no change

Overburden stockpiles (active) - 2 ac existing; increase to 4 ac

Source: MDAQMD Mineral Guidance 2013 Section G

$$EF = J * 1.7 * sl / 1.5 * (365 - P) / 235 * I / 15 \text{ lb./day/ac}$$

J = 0.5 for PM₁₀

J = 0.2 for PM_{2.5}

Silt loading (sl) = 0.5 for silica/limestone

sl for overburden = 5.25 (half silica/limestone (sl of 1.0); half alluvium (sl = 10) (1.0 + 10 / 2 = 5.5

P = ave. days of precipitation (default = 20 days) MDAQMD

I = windy hours greater than 12 mph = 13.3% (MDAQMD default)

For Active Mine Areas, Stockpiles, and Crusher Area

$$EF(PM_{10}) = 0.5 * 1.7 * 0.5 / 1.5 * 1.47 * 0.89 = 0.37 \text{ lbs./day/ac (uncontrolled)}$$

At 60% control with water spraying = 0.15 lbs./day/ac

For PM_{2.5} = 0.11 (uncontrolled) and 0.044 lbs./day/ac (controlled)

For Overburden Stockpiles

Emission Factors:

$$EF(PM_{10}) = 0.5 * 1.7 * 5.5 / 1.5 * 1.47 * 0.89 = 4.08 \text{ lbs./day/ac (uncontrolled)}$$

At 60% control = 1.63 lbs./day/ac

For PM_{2.5} = 1.22 lbs./day/ac (uncontrolled) and 0.49 lbs./day/ac (controlled)

UNPAVED ROADS

ONSITE HAUL ROAD DUST

Off-Road Haul Truck Data

For Haul Roads from Quarry to Cement Plant and to Overburden Stockpiles

**ON-SITE HAUL ROAD DUST
Off-Road Haul Trucks**

Parameter	Existing Conditions	Proposed Conditions
CAT 777G (typ) Off-Road Haul Trucks Capacity	100 tons	100 tons
Truck Weight (tons) (CPC)		
Empty	71	71
Full	171	171
Ave.	121	121
Ore Production	100,000 tpy	250,000 tpy
Overburden Production	10,000 tpy	25,000 tpy
Ore Trips/Day	17 at 2.4 miles RT	17 at 2.4 miles RT
Overburden Trips/Day	2 at 0.4 miles RT	2 at 0.4 miles RT
Days/Year	60	150
Vehicle miles traveled (VMT) (round trip)/day	41.6	41.6
Miles/Year	2,496	6,240
PM10 Emission Factors (controlled)	0.74 lbs./mile	0.34 lbs/mile
PM2.5 Emission Factors (controlled)	0.16 lbs./mile	0.07 lbs/mile
Control Factors	65% Water spraying	83% Additional water spraying, speed limits, & approved dust suppressants
Daily PM10 Emissions (Controlled)	30.8 lbs./day	14.1 lbs./day
Annual PM10 Emissions (Controlled)	0.92 tons/yr.	1.06 tons/yr. (-0.14)
Daily PM2.5 Emissions (Controlled)	6.7 lbs./day	2.91 lbs./day
Annual PM2.5 Emissions (Controlled)	0.2 tons/yr.	0.22 tons/yr. (+0.02)

Emission Factor (PM₁₀) = K * (s/12)^a * (W/3)^b

Source: AP-42, Section 13.2.2, Unpaved Roads (11-2006 & SCAQMD)

K = 1.5 for PM₁₀ (lbs/VMT)

s (silt content) = 0.5 - 5% (used 2.75% (0.5% from material testing of limestone; 5% from aggregate or gravel roads; AP-42 and MDAQMD)

W (ave. truck wt.) = 121 tons

a = 0.9

b = 0.45

$$\begin{aligned} \text{EF (PM}_{10}\text{)} &= 1.5 * (2.75/12)^{0.9} * (121/3)^{0.45} = 1.24 \text{ lbs./VMT} \\ &= 1.5 * 0.26 * 5.28 = 2.1 \text{ lbs./VMT} \end{aligned}$$

Dust Control Estimates

Existing - 65%

$$2.1 \text{ lbs./VMT} * (100-65\% \text{ control}) = \mathbf{0.74 \text{ lbs./VMT (PM}_{10}\text{) (controlled)}}$$

$$0.74 \text{ lbs./VMT} * 0.208 = \mathbf{0.16 \text{ lbs./VMT (PM}_{2.5}\text{) (controlled)}}$$

Future – 83%

CEMEX will implement additional water spraying, establish speed limits, and use dust suppressants on haul roads.

Control Factors:

Water spray – 61% (SCAQMD)

15 mph speed limit – 57% (SCAQMD)

Use of approved dust suppressant on unpaved roads and work areas – 84% (SCAQMD)

Used 83% for unpaved roads and areas: (100-61% control) * (100-57% control) = 83%

$$2.1 \text{ lbs./VMT} * (100-61\% \text{ control}) * (100-57\%) = \mathbf{0.34 \text{ lbs./VMT (PM}_{10}\text{) (controlled)}}$$

$$0.34 \text{ lbs./VMT} * 0.208 = \mathbf{0.07 \text{ lbs./VMT (PM}_{2.5}\text{) (controlled)}}$$

**Table A1
Alvic & Alumina Quarry Existing Conditions (100,000 tpy)**

Onsite Mobile Diesel Equipment Emissions (Typical)											
Operation	Emission Factor	Units	Equation Variables		Emissions						
			1	2	PM-10 lbs/day	PM-2.5 lbs/day	ROC lbs/day	CO lbs/day	NOx lbs/day	CO2 lbs/day	CH4 lbs/day
			Equipment #	Operating Hrs							
Equipment Exhaust Emissions											
PM-10 966 Loader 280hp; T4	0.002	lbs/hr	1	10	0.02	0.02					
PM-2.5 992 Loader 800hp; T4	0.011	lbs/hr	1	8	0.09	0.08					
777 Haul Trk 1025hp; T4	0.015	lbs/hr	1	8	0.12	0.11					
140 Grader 180hp; T4	0.002	lbs/hr	1	2	0.00	0.00					
D8 Dozer 400 hp; T4	0.003	lbs/hr	1	2	0.01	0.01					
725 Water Trk 342hp; T4	0.003	lbs/hr	1	4	0.01	0.01					
Port Screen gen set 100 hp	0.011	lbs/hr	1	8	0.08	0.08					
Drill 539hp; T4	0.005	lbs/hr	1	2	0.01	0.01					
ROG 966 Loader 280hp; T4	0.013	lbs/hr	1	10			0.13				
992 Loader 800hp; T4	0.032	lbs/hr	1	8			0.26				
777 Haul Trk 1025hp; T4	0.043	lbs/hr	1	8			0.34				
140 Grader 180hp; T4	0.010	lbs/hr	1	2			0.02				
D8 Dozer 400 hp; T4	0.019	lbs/hr	1	2			0.04				
725 Water Trk 342hp; T4	0.017	lbs/hr	1	4			0.07				
Port Screen gen set 100 hp	0.051	lbs/hr	1	8			0.40				
Drill 539hp; T4	0.030	lbs/hr	1	2			0.06				
CO 966 Loader 280hp; T4	0.488	lbs/hr	1	10				4.88			
992 Loader 800hp; T4	1.678	lbs/hr	1	8				13.42			
777 Haul Trk 1025hp; T4	2.131	lbs/hr	1	8				17.05			
140 Grader 180hp; T4	0.358	lbs/hr	1	2				0.72			
D8 Dozer 400 hp; T4	0.833	lbs/hr	1	2				1.67			
725 Water Trk 342hp; T4	0.630	lbs/hr	1	4				2.52			
Port Screen gen set 100 hp	0.464	lbs/hr	1	8				3.71			
Drill 539hp; T4	1.306	lbs/hr	1	2				2.61			
NOX 966 Loader 280hp; T4	0.060	lbs/hr	1	10					0.60		
992 Loader 800hp; T4	1.420	lbs/hr	1	8					11.36		
777 Haul Trk 1025hp; T4	1.922	lbs/hr	1	8					15.38		
140 Grader 180hp; T4	0.042	lbs/hr	1	2					0.08		
D8 Dozer 400 hp; T4	0.098	lbs/hr	1	2					0.20		
725 Water Trk 342hp; T4	0.074	lbs/hr	1	4					0.30		
Port Screen gen set 100 hp	0.438	lbs/hr	1	8					3.50		
Drill 539hp; T4	0.154	lbs/hr	1	2					0.31		
CO2 966 Loader 280hp; T4	181	lbs/hr	1	10						1810	
992 Loader 800hp; T4	486	lbs/hr	1	8						3888	
777 Haul Trk 1025hp; T4	625	lbs/hr	1	8						5000	
140 Grader 180hp; T4	124	lbs/hr	1	2						248	
D8 Dozer 400 hp; T4	221	lbs/hr	1	2						442	
725 Water Trk 342hp; T4	205	lbs/hr	1	4						820	
Port Screen gen set 100 hp	78	lbs/hr	1	8						623	
Drill 539hp; T4	311	lbs/hr	1	2						622	
CH4 996 Loader 280hp; T4	0.007	lbs/hr	1	10							0.072
992 Loader 800hp; T4	0.025	lbs/hr	1	8							0.200
777 Haul Trk 1025hp; T4	0.035	lbs/hr	1	8							0.280
140 Grader 180hp; T4	0.009	lbs/hr	1	2							0.018
Dozer 400 hp; T4	0.015	lbs/hr	1	2							0.030
725 Water Trk 342hp; T4	0.010	lbs/hr	1	4							0.041
Port Screen gen set 100 hp	0.005	lbs/hr	1	8							0.037
Drill 539hp; T4	0.008	lbs/hr	1	2							0.016
											0.000
Total Daily					0.34	0.32	1.32	57.72	31.72	13,453	0.694
Annual (tons)					0.01	0.01	0.04	1.73	0.95	367	0.47

60 days/year; 1 shift/day; up to 10 hours/day. 100,000 tons of ore /year; 10,000 tons of OB/year
 Equipment information and operational hours based on production rates (CEMEX 2020)
 PM2.5 fraction of PM10 Exhaust is 0.92 (CEIDARS List)
 Emission Source and Load Factors: CARB Carl Moyer Program Guidelines 2017 Revisions
 MTCO2e = metric tons of CO2 equivalent
 Port screen gen set - Composite (Sandvik QA 340 statewide portable registration)

MTCO2e MTCO2e

**Table A2
Alvic & Alumina Quarry Proposed Conditions (250,000 tpy)**

Onsite Mobile Diesel Equipment Emissions (Typical)											
Operation	Emission Factor	Units	Equation Variables		Emissions						
			1	2	PM-10 lbs/day	PM-2.5 lbs/day	ROC lbs/day	CO lbs/day	NOx lbs/day	CO2 lbs/day	CH4 lbs/day
			Equipment #	Operating Hrs							
Equipment Exhaust Emissions											
PM-10 966 Loader 280hp; T4	0.002	lbs/hr	1	10	0.02	0.02					
PM-2.5 992 Loader 800hp; T4	0.011	lbs/hr	1	8	0.09	0.08					
777 Haul Truck 1025hp; T4	0.015	lbs/hr	1	8	0.12	0.11					
140 Grader 180hp; T4	0.002	lbs/hr	1	2	0.00	0.00					
D8 Dozer 400 hp; T4	0.003	lbs/hr	1	2	0.01	0.01					
725 Water Truck 342hp; T4	0.003	lbs/hr	1	4	0.01	0.01					
Port Screen gen set 100 hp	0.025	lbs/hr	1	8	0.20	0.18					
Drill 539hp; T4	0.005	lbs/hr	1	2	0.01	0.01					
ROG 966 Loader 280hp; T4	0.013	lbs/hr	1	10			0.13				
992 Loader 800hp; T4	0.032	lbs/hr	1	8			0.26				
777 Haul Truck 1025hp; T4	0.043	lbs/hr	1	8			0.34				
140 Grader 180hp; T4	0.010	lbs/hr	1	2			0.02				
D8 Dozer 400 hp; T4	0.019	lbs/hr	1	2			0.04				
725 Water Truck 342hp; T4	0.017	lbs/hr	1	4			0.07				
Port Screen gen set 100 hp	0.051	lbs/hr	1	8			0.40				
Drill 539hp; T4	0.030	lbs/hr	1	2			0.06				
CO 996 Loader 280hp; T4	0.488	lbs/hr	1	10				4.88			
992 Loader 800hp; T4	1.678	lbs/hr	1	8				13.42			
777 Haul Truck 1025hp; T4	2.131	lbs/hr	1	8				17.05			
140 Grader 180hp; T4	0.358	lbs/hr	1	2				0.72			
D8 Dozer 400 hp; T4	0.833	lbs/hr	1	2				1.67			
725 Water Truck 342hp; T4	0.630	lbs/hr	1	4				2.52			
Port Screen gen set 100 hp	0.464	lbs/hr	1	8				3.71			
Drill 539hp; T4	1.306	lbs/hr	1	2				2.61			
NOX 966 Loader 280hp; T4	0.060	lbs/hr	1	10					0.60		
992 Loader 800hp; T4	1.420	lbs/hr	1	8					11.36		
777 Haul Truck 1025hp; T4	1.922	lbs/hr	1	8					15.38		
140 Grader 180hp; T4	0.042	lbs/hr	1	2					0.08		
D8 Dozer 400 hp; T4	0.098	lbs/hr	1	2					0.20		
725 Water Truck 342hp; T4	0.074	lbs/hr	1	4					0.30		
Port Screen gen set 100 hp	0.438	lbs/hr	1	8					3.50		
Drill 539hp; T4	0.154	lbs/hr	1	2					0.31		
CO2 966 Loader 280hp; T4	181	lbs/hr	1	10						1810	
992 Loader 800hp; T4	486	lbs/hr	1	8						3888	
777 Haul Truck 1025hp; T4	625	lbs/hr	1	8						5000	
140 Grader 180hp; T4	124	lbs/hr	1	2						248	
D8 Dozer 400 hp; T4	221	lbs/hr	1	2						442	
725 Water Truck 342hp; T4	205	lbs/hr	1	4						820	
Port Screen gen set 100 hp;	78	lbs/hr	1	8						623	
Drill 539hp; T4	311	lbs/hr	1	2						622	
CH4 966 Loader 280hp; T4	0.007	lbs/hr	1	10							0.072
992 Loader 800hp; T4	0.025	lbs/hr	1	8							0.200
777 Haul Truck 1025hp; T4	0.035	lbs/hr	1	0.025							0.001
140 Grader 180hp; T4	0.009	lbs/hr	1	2							0.018
Dozer 400 hp; T4	0.015	lbs/hr	1	2							0.030
725 Water Truck 342hp; T4	0.010	lbs/hr	1	4							0.041
Port Screen gen set 100 hp;	0.005	lbs/hr	1	8							0.037
Drill 539hp; T4	0.008	lbs/hr	1	2							0.016
											0.000
Total Daily					0.46	0.42	1.32	57.72	31.72	13,453	0.414
Annual (tons)					0.03	0.03	0.10	4.33	2.38	917	0.71

150 days/year; 1 shift/day; up to 10 hours/day. 250,000 tons of ore /year; 25,000 tons of OB/year
 Equipment information and operational hours based on production rates (CEMEX 2020)
 PM2.5 fraction of PM10 Exhaust is 0.92 (CEIDARS List)
 Emission Source and Load Factors: CARB Carl Moyer Program Guidelines 2017 Revisions
 MTCO2e = metric tons of CO2 equivalent
 Port screen gen set - Composite (Sandvik QA 340 statewide portable registration)

MTCO2e MTCO2e

