

May 1, 2006

Mr. Gary W. Johnson
Granite Construction, Inc.
38000 Monroe Street
Indio, CA 92203

**Subject: Reduction in Heavy Duty Truck Air Emissions Associated with
Product Transport from the Proposed Liberty Quarry**

Dear Mr. Johnson:

This letter report presents the results of an analysis to determine the reduced transportation air emissions that could occur if the Liberty Quarry project is developed. This reduction in air emissions would occur due to a reduction in the travel distance for truck traffic transporting aggregate materials on Interstate 15 in Riverside County.

SUMMARY

Large quantities of aggregate materials (including sand, gravel, asphalt, rip-rap, and concrete) are currently transported to market on Interstate 15 (I-15) in southwestern Riverside County and northern San Diego County from quarries located in San Bernardino County, quarries located near Corona in western Riverside County, and from quarries located in the Irwindale area of Los Angeles County. The proposed Liberty Quarry will be located on the southern boundary of Riverside County with direct access to I-15. Therefore, the Liberty aggregate source would be located closer to the markets in San Diego and Southwestern Riverside County, thus reducing the distance that trucks would need to travel along I-15. This would result in a significant reduction in transport truck traffic and associated air emissions on I-15 in Riverside County.

A study, conducted by Urban Crossroads (dated April 12, 2006), has estimated that at full production of 5 million tons of aggregate per year (mmtpy) the Liberty Quarry could reduce aggregate materials transport truck traffic on I-15 in Riverside County by 16.5 million miles per year. If the Quarry operates at a lower rate of 3.5 mmtpy, the truck traffic reduction is 11.5 million miles per year.

This reduction does not include reductions in truck traffic on surface streets leading from the existing quarries to I-15. The study assumed that the amount of travel on surface streets would be the same regardless of the quarry from which shipments originate. We have used the Urban Crossroads estimate of reduced aggregate materials truck transport miles to estimate the reduction in truck-related air emissions in the year 2020 that would occur. The year 2020 was chosen since the Liberty Quarry may not reach full production until about the year 2020. The operation of the quarry would result in the reduction in emissions as shown in Table 1.

Table 1
Reduced Truck Transport Air Emissions Related to the Proposed Liberty Quarry
 (Based on 312 Operating Days Per Year, Calendar Year 2020 Emissions)

Pollutant	Reduction in Air Emissions Along I-15 in Riverside County if the Quarry Produces 5 mmtpy Aggregate (tons per year)	Reduction in Air Emissions Along I-15 in Riverside County if the Quarry Produces 3.5 mmtpy Aggregate (tons per year)
ROG	-4.2	-2.9
CO	-22.5	-15.8
NO_x	-56.5	-39.6
SO₂	-0.4	-0.3
Tailpipe PM₁₀	-2.3	-1.6

These reduced emissions can be compared to other sources of vehicular emissions in order to give one a perspective on the relative size of the air emission savings from development of the Liberty Quarry. Table 2 presents the results of these comparisons.

Table 2
Reduced Truck Transport Air Emissions
Related to the Proposed Liberty Quarry Compared to Other Sources
 (Other Source Emissions Based on URBEMIS Model for Year 2020)

Pollutant	Reduction in Air Emissions 5 mmtpy Aggregate (tons per year)	Reduction in Air Emissions 3.5 mmtpy Aggregate (tons per year)	Emissions from a 1 million square foot Shopping Mall (tons per year)	Emissions from a Large (1 million square feet) Home Improvement Super Store (tons per year)	Emissions from a Large (200,000 square feet) Discount Super Store (tons per year)
ROG	-4.2	-2.9	19.8	14.7	5.0
CO	-22.5	-15.8	214.0	148.9	55.8
NO_x	-56.5	-39.6	25.0	17.8	6.4
SO₂	-0.4	-0.3	0.3	0.2	0.1
Tailpipe PM₁₀	-2.3	-1.6	56.7*	39.3*	14.8*

*Note that the PM10 emissions from the URBEMIS model for urban activities includes both tailpipe and re-entrained road dust emissions. The Liberty Quarry savings shown include only tailpipe emissions.

RELATION TO EMISSIONS FROM GOODS MOVEMENT

The California Air Resources Board (ARB) has been studying measures to reduce the air quality impacts of movement of goods from California ports and harbors. The most recent Emission Reduction Plan (ARB Plan) was published by the ARB on March 21, 2006. The ARB Plan concluded that emissions associated with goods movement is now the dominant contributor to emissions in the State. The ARB staff has developed an extensive set of mitigation measures to reduce emissions, costing on the order of \$6 to \$10 billion in present value dollars by the year 2020.

According to the ARB Plan, trucks are the largest contributor for goods movement for NO_x and on-shore diesel PM₁₀ emissions, and the South Coast Air Basin goods movement emissions are about one-fourth of the statewide total. The ARB Plan presents numerous strategies aimed at reducing truck NO_x emissions from goods movement in the South Coast Air Basin by about 5.3 tons per day (1,935 tons per year) over current emission reduction strategies by the year 2020. The cost of the proposed control strategies to achieve the targeted truck emission reductions in 2020 has been estimated by the ARB at about \$3.2 billion statewide (about \$0.8 billion in the South Coast Air Basin) by the year 2020.

For comparison, it is instructive to note that the truck aggregate transport NO_x emission reductions that will be achieved by the Liberty Quarry in the year 2020 at 5 mmtpy aggregate production are about 0.2 tons per day (56.5 tons per year divided by 312 operating days per year) and the PM₁₀ emission reductions are about 0.02 tons per day. The NO_x reductions from the Liberty Quarry alone are nearly 4% of the NO_x goods movement emission reductions being sought by the ARB Plan in the South Coast Air Basin.

FUEL SAVINGS

Aggregate haul trucks tend to get relatively low fuel mileage, on the order of 8 miles per gallon (mpg). The amount of fuel saved from the aggregate haul truck mileage reduced is about 2.1 million gallons per year (16.5 million miles divided by 8 miles per gallon) for the 5 mmtpy operational scenario, and 1.4 million gallons per year (11.5 million miles divided by 8 miles per gallon) for the 3.5 mmtpy operational scenario.

FUTURE CALENDAR YEARS

As a result of existing and planned future regulations limiting emissions from all vehicle classes and as a result of vehicle replacement with newer models, emissions per vehicle tend to decrease in the future. For example, NO_x emissions per vehicle mile traveled from heavy heavy duty diesel trucks in calendar year 2020 are about 70% less than emissions in calendar year 2010. Accordingly, when comparing vehicle emissions among various programs and emission sources, the same calendar year needs to be used.

The Liberty Quarry will be reviewed under the California Environmental Quality Act (CEQA) process. For the CEQA process, a “worst case” analysis is conducted. Since the quarry could begin commercial production at levels approaching full capacity as early as calendar year 2010, the CEQA process will be based on year 2010 emissions. In calendar year 2010, the emissions reduced by the Liberty Quarry would be as shown in Table 3 (assuming 5 mmtpy and 3.5 mmtpy production rates).

Table 3
Reduced Truck Transport Air Emissions Related to the Proposed Liberty Quarry
(Based on 312 Operating Days Per Year, Calendar Year 2010)

Pollutant	Reduction in Air Emissions Along I-15 in Riverside County if the Quarry Produces 5 mmtpy Aggregate (tons per year)	Reduction in Air Emissions Along I-15 in Riverside County if the Quarry Produces 3.5 mmtpy Aggregate (tons per year)
ROG	-7.9	-5.5
CO	-35.2	-24.6
NO_x	-193.4	-135.7
SO₂	-0.4	-0.3
Tailpipe PM₁₀	-3.8	-2.7

METHODOLOGY

Tailpipe Emissions Associated with Aggregate Transport

The Urban Crossroads study estimated the vehicle miles saved as the result of the proposed Liberty Quarry by first assessing the existing aggregate materials transport truck traffic (number of trucks and miles traveled per day to get total miles per day) on I-15 under current conditions and then calculating the change in the number of truck trips and miles per day that would occur if the Liberty Quarry were fully operational. The difference is the vehicle miles saved.

We used the Urban Crossroads vehicle miles saved per day data and the EMFAC 2002 (Version 2.2, April 23, 2003) mobile emission model published by the California Air Resources Board to estimate the resultant decrease in air emissions related to product transport. EMFAC 2002 is the most current emission model available for California, and estimates emissions for any future calendar year. The EMFAC model was run for both calendar year 2020 and 2010.

Aggregate is transported by what is termed in the EMFAC model “heavy-heavy duty diesel” (HHDD) vehicles. The EMFAC model yields both individual vehicle emission rates (grams per vehicle mile traveled) and total emissions for a vehicle mix, termed “burden” (tons per day). The total burden mode emissions, which include idling emissions, cold starts, etc. were used. The EMFAC model input parameters and results are shown in Attachments 1 through 4.

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Tailpipe and Road Dust Emissions from Other Sources

The ARB has published another emissions model, URBEMIS, that yields vehicular emissions (both tailpipe and road dust) associated with various typical sources found in an urban setting, such as a shopping mall, hospital, discount store, etc. We ran the URBEMIS model (Version 8.7.0 released April 29, 2005) for such sources and compared the emissions from those sources to the reduction in emissions associated with aggregate materials transport from the Liberty Quarry. Note that for purposes of the Urban Crossroads study, it was assumed that product would be transported 312 days per year. Although other urban sources (e.g., the shopping mall) operate 365 days per year, to be consistent, the URBEMIS results were also based on 312 days per year of operation. The URBEMIS model was run with default input parameters for the South Coast Air Basin.

Road Dust Associated with Aggregate Transport

The emission savings reported above for aggregate material truck transport related to the Liberty Quarry do not include re-entrained road dust emissions that would also be reduced due to a reduction in truck transport miles on I-15, as the road dust calculations are quite complex. We plan to develop a methodology for this assessment in consultation with governmental agencies and other air quality professionals, and will present those results in future correspondence.

CONCLUSION

According to the Urban Crossroads study, the proposed Liberty Quarry will result in a reduction of aggregate truck transport traffic on I-15 within Riverside County of either 16.5 or 11.5 million miles per year, depending on production rates (5 mmtpy or 3.5 mmtpy aggregate). Air emission savings from this reduced truck traffic has a significant benefit to Riverside County and the region. The Liberty Quarry NO_x emission reductions associated with aggregate materials transport truck miles saved is about 4% of the year 2020 emission reductions being sought by the ARB from goods movement by truck in the South Coast Air Basin. The net decrease in NO_x emissions is especially important for Riverside County since the area does not currently attain the ozone ambient air quality standards and NO_x is an ozone precursor. The amount of diesel fuel saved is 1.4 to 2.1 million gallons per year.

Please feel free to call me at (303) 840-4571 if you have any questions.

Sincerely,
KLEINFELDER, INC.



Russell E. Erbes, CCM
Senior Principal

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Cc: Mr. Martin Derus, Lilburn Corporation

Attachment 1: EMFAC Model Results for 5 mmtpy Production Year 2010
Attachment 2: EMFAC Model Results for 3.5 mmtpy Production Year 2010
Attachment 3: EMFAC Model Results for 5 mmtpy Production Year 2020
Attachment 4: EMFAC Model Results for 3.5 mmtpy Production Year 2020

ATTACHMENT 1
EMFAC V2.2 MODEL RESULTS FOR 5 mmtpy PRODUCTION YEAR 2010

Displaced Heavy Heavy Duty Diesel Trucks

Compound	ton/day	lbs/day	ton/yr
ROG	0.02746	54.9	8.57
CO	0.12332	246.6	38.48
NOx	0.67032	1340.6	209.14
SOx	0.00130	2.6	0.41
PM10	0.01328	26.6	4.14

EMFAC Input Parameters:

Population	292 HHDD trucks	Assumed based on typical truck odometer mileage of 60,000 mi/yr-truck: (56,173 mi/day x 312 day/yr) divided by (60,000 mi/yr-truck) = 292 trucks
Accrual	60,000 mi/yr-truck	Assumed typical truck odometer mileage/yr
Trips	2-way 1282 trips/day	Based on April 2006 Urban Crossroads Study
VMT	56,173 mi/day	Based on April 2006 Urban Crossroads Study
Model Yr	2010	
Location	Riverside County	

Granite Added HHDD Trucks

Compound	ton/day	lbs/day	ton/yr
ROG	0.00218	4.4	0.68
CO	0.01054	21.1	3.29
NOx	0.05033	100.7	15.70
SOx	0.00008	0.2	0.02
PM10	0.00098	2.0	0.31

EMFAC Input Parameters:

Population	18 HHDD trucks	Based on number of trucks needed to average 60,000 miles per year.
Accrual	59,973 mi/yr-truck	Based on (3,460 mi/day x 312 day/yr) divided by (18 trucks) = 59,973 mi/yr-truck
Trips	2-way 384 trips/day	Based on April 2006 Urban Crossroads Study
VMT	3,460 mi/day	Based on April 2006 Urban Crossroads Study
Model Yr	2010	
Location	Riverside County	

Net Emission Decrease – (Based on 312 operating days per year)

Compound	Displaced Trucks	Granite Trucks	Net Decrease	
	tpd	tpd	tpd	tpy
ROG	0.0275	0.0022	0.0253	7.9
CO	0.1233	0.0105	0.1128	35.2
NOx	0.6703	0.0503	0.6200	193.4
SOx	0.0013	0.0001	0.0012	0.4
PM10	0.0133	0.0010	0.0123	3.8

ATTACHMENT 2
EMFAC v2.2 MODEL RESULTS FOR 3.5 mmtpy PRODUCTION YEAR 2010

Displaced Heavy Heavy Duty Diesel Trucks

Compound	ton/day	lbs/day	ton/yr
ROG	0.01926	38.5	6.01
CO	0.08651	173.0	26.99
NOx	0.47028	940.6	146.73
SOx	0.00091	1.8	0.28
PM10	0.00932	18.6	2.91

EMFAC Input Parameters:

Population	205 HHDD trucks	Assumed based on typical truck odometer mileage of 60,000 mi/yr-truck: (39,416 mi/day x 312 day/yr) divided by (60,000 mi/yr-truck) = 205 trucks
Accrual	60,000 mi/yr-truck	Assumed typical truck odometer mileage/yr
Trips	2-way 897 trips/day	Based on April 2006 Urban Crossroads Study
VMT	39,416 mi/day	Based on April 2006 Urban Crossroads Study
Model Yr	2010	
Location	Riverside County	

Granite Added HHDD Trucks

Compound	ton/day	lbs/day	ton/yr
ROG	0.00157	3.1	0.49
CO	0.00757	15.1	2.36
NOx	0.03544	70.9	11.06
SOx	0.00006	0.1	0.02
PM10	0.00069	1.4	0.22

EMFAC Input Parameters:

Population	12 HHDD trucks	Based on number of trucks needed to average 60,000 miles per year.
Accrual	63,102 mi/yr-truck	Based on (2,427 mi/day x 312 day/yr) divided by (12 trucks) = 63,102 mi/yr-truck
Trips	2-way 269 trips/day	Based on April 2006 Urban Crossroads Study
VMT	2,427 mi/day	Based on April 2006 Urban Crossroads Study
Model Yr	2010	
Location	Riverside County	

Net Emission Decrease – (Based on 312 operating days per year)

Compound	Displaced Trucks	Granite Trucks	Net Decrease	
	tpd	tpd	tpd	tpy
ROG	0.0193	0.0016	0.0177	5.5
CO	0.0865	0.0076	0.0789	24.6
NOx	0.4703	0.0354	0.4348	135.7
SOx	0.0009	0.0001	0.0009	0.3
PM10	0.0093	0.0007	0.0086	2.7

**ATTACHMENT 3
EMFAC V2.2 MODEL RESULTS FOR 5 mmtpy PRODUCTION YEAR 2020**

Displaced Heavy Heavy Duty Diesel Trucks

Compound	ton/day	lbs/day	ton/yr
ROG	0.01483	29.7	4.63
CO	0.08012	160.2	25.00
NOx	0.20244	404.9	63.16
SOx	0.00130	2.6	0.41
PM10	0.00793	15.9	2.47

EMFAC Input Parameters:

Population	292 HHDD trucks	Assumed based on typical truck odometer mileage of 60,000 mi/yr-truck: (56,173 mi/day x 312 day/yr) divided by (60,000 mi/yr-truck) = 292 trucks
Accrual	60,000 mi/yr-truck	Assumed typical truck odometer mileage/yr
Trips	2-way 1282 trips/day	Based on April 2006 Urban Crossroads Study
VMT	56,173 mi/day	Based on April 2006 Urban Crossroads Study
Model Yr	2010	
Location	Riverside County	

Granite Added HHDD Trucks

Compound	ton/day	lbs/day	ton/yr
ROG	0.00141	2.8	0.44
CO	0.00788	15.8	2.46
NOx	0.02151	43.0	6.71
SOx	0.00008	0.2	0.02
PM10	0.00061	1.2	0.19

EMFAC Input Parameters:

Population	18 HHDD trucks	Based on number of trucks needed to average 60,000 miles per year.
Accrual	59,973 mi/yr-truck	Based on (3,460 mi/day x 312 day/yr) divided by (18 trucks) = 59,973 mi/yr-truck
Trips	2-way 384 trips/day	Based on April 2006 Urban Crossroads Study
VMT	3,460 mi/day	Based on April 2006 Urban Crossroads Study
Model Yr	2010	
Location	Riverside County	

Net Emission Decrease – (Based on 312 operating days per year)

Compound	Displaced Trucks	Granite Trucks	Net Decrease	
	tpd	tpd	tpd	tpy
ROG	0.0148	0.0014	0.0134	4.2
CO	0.0801	0.0079	0.0722	22.5
NOx	0.2024	0.0215	0.1809	56.5
SOx	0.0013	0.0001	0.0012	0.4
PM10	0.0079	0.0006	0.0073	2.3

ATTACHMENT 4
EMFAC v2.2 MODEL RESULTS FOR 3.5 mmtpy PRODUCTION YEAR 2020

Displaced Heavy Heavy Duty Diesel Trucks

Compound	ton/day	lbs/day	ton/yr
ROG	0.01040	20.8	3.24
CO	0.05619	112.4	17.53
NOx	0.14198	284.0	44.30
SOx	0.00091	1.8	0.28
PM10	0.00556	11.1	1.73

EMFAC Input Parameters:

Population	205 HHDD trucks	Assumed based on typical truck odometer mileage of 60,000 mi/yr-truck: (39,416 mi/day x 312 day/yr) divided by (60,000 mi/yr-truck) = 205 trucks
Accrual	60,000 mi/yr-truck	Assumed typical truck odometer mileage/yr
Trips	2-way 897 trips/day	Based on April 2006 Urban Crossroads Study
VMT	39,416 mi/day	Based on April 2006 Urban Crossroads Study
Model Yr	2010	
Location	Riverside County	

Granite Added HHDD Trucks

Compound	ton/day	lbs/day	ton/yr
ROG	0.00101	2.0	0.32
CO	0.00564	11.3	1.76
NOx	0.01515	30.3	4.73
SOx	0.00006	0.1	0.02
PM10	0.00043	0.9	0.13

EMFAC Input Parameters:

Population	12 HHDD trucks	Based on number of trucks needed to average 60,000 miles per year.
Accrual	63,102 mi/yr-truck	Based on (2,427 mi/day x 312 day/yr) divided by (12 trucks) = 63,102 mi/yr-truck
Trips	2-way 269 trips/day	Based on April 2006 Urban Crossroads Study
VMT	2,427 mi/day	Based on April 2006 Urban Crossroads Study
Model Yr	2010	
Location	Riverside County	

Net Emission Decrease – (Based on 312 operating days per year)

Compound	Displaced Trucks	Granite Trucks	Net Decrease	
	tpd	tpd	tpd	tpy
ROG	0.0104	0.0010	0.0094	2.9
CO	0.0562	0.0056	0.0506	15.8
NOx	0.1420	0.0152	0.1268	39.6
SOx	0.0009	0.0001	0.0009	0.3
PM10	0.0056	0.0004	0.0051	1.6