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Ms. Berenice Davidson  
County of Marin  
Department of Public Works  
P.O. Box 4186  
San Rafael, CA 94913-4186

**RE: Review of Blasting Operations Safety Plan  
Dutra Materials  
San Rafael Rock Quarry**

Dear Ms. Davidson,

Vibra-Tech Engineers, Inc. is pleased to submit the following response based on the review of the Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan, for compliance with the San Rafael Rock Quarry Amended Reclamation Plan (2005102122) and Amended Surface Mining and Quarrying Permit (2007082097).

In the Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan there are some aspects missing or phrases which need clarification in order to ensure compliance with the San Rafael Rock Quarry Amended Reclamation Plan (2005102122) and the Amended Surface Mining and Quarrying Permit (2007082097).

The following suggestions and/or changes should be made to the Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan to show compliance with the reclamation plan and the quarrying permit.

In the Marin County Surface Mining Permit # Q-72-03, Amendment # 1, Section: General Quarrying Operations, Subsection: "Blasting", #78 it states "Blasting shall be limited to an annual (calendar year) average of two times per week (104 times per year) and a maximum of three times per week (Mitigation measures P4.1-9, P4.2-6c, P42-7a, P4.2-7d, C4.2-9b & P4.6-6b)"

- The Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan does not indicate that blasting should be limited in the manner specified in the Marin County Surface Mining Permit.

In the Marin County Surface Mining Permit # Q-72-03, Amendment # 1, Section: "General Quarrying Operations", Subsection: "Blasting", #79 it states "Blasting shall be limited to the hours of 11:30 a.m. to 1:30 p.m. Monday through Friday. No blasting is to occur on State holidays or weekends."

- The Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan does not indicate that blasting should be limited to the times specified in the Marin County Surface Mining Permit

In the Marin County Surface Mining Permit # Q-72-03, Amendment # 1, Section: "General Quarrying Operations", Subsection: "Blasting", #86 it states "All blast monitoring of ground motion and air-overpressure effects done by either Permittee personnel or third-party service providers should be done in full conformance with ISEE guidelines provided in Attachment I of the REVEY Associates, Inc. report in Appendix J of the Combine FEIR, Volume II: Appendices. (All above in Blasting section, Mitigation Measure P4.7-7a, P4.7-7b)"

- The Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan does not indicate that blast monitoring of ground motion and air-overpressure effects shall be completed as specified in the Marin County Surface Mining Permit.

In the Marin County Surface Mining Permit # Q-72-03, Amendment # 1, Section: "General Quarrying Operations", Subsection: "Blasting", #87 it states "No blasting shall take place when wind velocity equals or exceeds 25 miles per hour. The wind speed shall be measured at the top of the quarry bowl."

- The Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan does not indicate that blasting should not occur when wind speed equals or exceeds 25 miles per hour as specified in the Marin County Surface Mining Permit. In addition, it does not state that wind speed should be measured at the top of the quarry bowl, who will measure the wind speed, how or what the wind speed will be measured with, or how this information will be conveyed to the blaster in charge.

In the Marin County Surface Mining Permit # Q-72-03, Amendment # 1, Section: "General Quarrying Operations", Subsection: "Blasting", #88 it states "No blasting shall take place on days when 'Spare the Air Days' declared by the Bay Area Air Quality Management District are in effect, provided the BAAQMD gives at least 48 hours notice."

- The Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan does not indicate that blasting should not be conducted on 'Spare the Air Days' as specified in the Marin County Surface Mining Permit. In addition, it does not indicate the procedure to find out if a 'Spare the Air Day' is in effect.

It is essential that flyrock awareness is built into the blast design process; to understand and control the outcomes and manage the associated risks. Since many injuries are caused by excessive flyrock any discussion of safety must emphasize the prevention of flyrock. In Section 3 "Hazard and Risk Assessment" of the Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan, it should state to review site conditions and blast design parameters that could lead to potential flyrock. (i.e. observe/profile face conditions, review drill logs, etc.)

Under Section 6 "Blast Design" of the Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan, subsection 6.1 it states: "Blast designs shall never compromise safety, and safety goals shall have the highest design priority. Blasts will be designed to maintain a minimum scaled distance of  $52.8 \text{ ft/lb}^{1/2}$ , maximum onsite peak velocity of .25 in/s and onsite air overpressure limit of 133 dbL.

In the Marin County Surface mining Permit # Q-72-03, Amendment #1, Section: "General Quarrying Operations," Subsection: "Blasting," #85 states "Blasting vibration beyond the Quarry property boundary shall be limited to a maximum peak velocity of 0.25 inches per second."

Does the 0.25 in/sec velocity limit apply onsite, offsite, or at any monitoring location?

The air overpressure limit of 133 dB should specify the use of a 2 Hz microphone system.

In addition, some language should be added to define where the scaled distance of  $52.8 \text{ ft/lb}^{1/2}$  applies. Does it apply to the closest monitoring location or closest offsite structure?

Lightning is the single greatest environmental danger associated with blasting. A direct lightning strike can initiate an electric or non-electric cap, and a lightning strike hundreds of yards away can do the same thing through ground current. Whenever an electrical storm approaches blasting operations must cease and the blast site and area around it must be evacuated. Under Section 7 "Blast Planning" of the Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan, subsection 7.3 it states to develop plans for dealing with special environmental conditions which may occur during this work, and examples are given such as lightning, floods, cold or hot weather, etc. The plans for the special environmental conditions mentioned in Section 7 "Blast Planning" subsection 7.3 (specifically a lightning detection plan during blasting operations) should be located in this section or should be attached in the Appendix of the blast plan. The lightning detection plan should define how the lightning will be detected and what the procedure will be if lightning is detected.

The driller plays a crucial role in the preparation of the blast. Communication between the driller and the blaster is essential. Information about any unusual conditions such as voids, crevices, mud seams, or any other incompetent material encountered in the borehole must be relayed to the blaster who can make adjustments to the explosive loading accordingly. Under Section 7 "Blast Planning" of the Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan a statement should be added which conveys that the driller and the blaster should review the drill log information submitted by the driller to determine if voids, crevices, mud seams, or any other incompetent material was encountered while drilling, and the blaster shall make adjustments to the explosive loading accordingly.

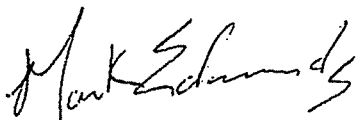
Section 9 "Blast Round Charging Operations" of the Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan subsection 9.2 "Safety Review Meetings" lists some proper tools which the explosive loading crew should have to safely perform loading and site security tasks. Equipment such as lightning detectors should be added to this section; either short range detectors which would be used to monitor nearby storms or long range lightning detectors which would be used for advanced planning by monitoring storms further away.

Section 9 "Blast Round Charging Operations" of the Dutra Materials - San Rafael Rock Quarry Blasting Operations Safety Plan subsection 9.2 "Safety Review Meetings" lists topics which are to be discussed at the pre-explosive loading safety meeting. At the safety meetings it is important for the blaster in charge to review the drill log information provided by the driller with the explosive loading crew. The blaster should relay information to the loading crew regarding the presence of voids, crevices, mud seams, or any other incompetent material encountered during drilling. If any of these characteristics are noted in the drill logs, the location of the borehole/boreholes should be conveyed to the loading crew so they can make adjustments to the explosive loading accordingly.

If any questions or comments arise regarding this review of the Blasting Operations Safety Plan, for compliance with the San Rafael Rock Quarry Amended Reclamation Plan (2005102122) and Amended Surface Mining and Quarrying Permit (2007082097), please contact our office.

Respectfully submitted,

**VIBRA-TECH ENGINEERS, INC.**



Mark Edwards  
Vibration and Sound Analyst



Douglas Rudenko  
Vice President