SAN RAFAEL ROCK QUARRY VIBRATION REPORT

BLAST INFORMATION

Location: PB-7 | Max. Charge Weight: 400 | Date of Blast: 5.10.12

Northing: 37°59'12.1N | Blast Duration: 398ms | Time of Blast: 11:31

Easting: 122°27'13W | Blast Number: #1525

SEISMOGRAPH INFORMATION	UNIT #1	UNIT #2	UNIT #3	UNIT #4	UNIT #5
Seismograph Model	2000	2000	2000	2000	
Serial Number	1609	2198	2124	2348	
Last Calibration Date	4 27 12	4 27 12	4 27 12	4 27 12	
LOCATION INFORMATION					
Location	Marina	Via Montecello	San Marino	Mt View Park	
Northing	37°59'19N	37°59'19N	37°59'31N	37°59'30N	
Easting	122°27'22W	122°27'53W	122°27'30W	122°27'16W	
Distance from Blast	1003	3221	2376	1795	
Scaled Distance	50	161	118	89	
VIBRATION INFORMATION					
Longitudinal Peak Particle Velocity (ips)	.10		.06	.09	
Longitudinal Peak Frequency (Hz)	26.3		15.5	19.2	
Transverse Peak Particle Velocity (ips)	.16		.06	.04	
Transverse Peak Frequency (Hz)	17.2		16.1	29.4	
Vertical Peak Particle Velocity (ips)	.10		.04	.07	
Vertical Peak Frequency (Hz)	45.4		22.7	29.4	
Peak Vector Sum (ips)	.17		.07	.11	
Peak Air Overpressure (db)	109	—	106	106	

GENERAL COMMENTS:

Seismographs out for Calibration 5/8 2012

Using GeoSonics rented units

Seismograph Operator: Dean Apfeld | Signature: Dean Apfeld

SAN RAFAEL ROCK QUARRY BLAST REPORT

BASE DATA:

Location: PB-7 | Designed Bench Height (ft): 40 | Date: 5.10.12

Northing: 37°59'12 N | Rock Density (t/yd^3): 2.23 | Time: 11:31

Easting: 122°27'13 W | Relative Rock Hardness: 7 | Blast Number: 15-75

DESIGN DATA:

Number of Holes Shot: 30 | Hole Dia.(in.): 6 3/4 | Stemming (ft): 18 | Loading Time Required (man hrs): 7 | Deck Type: —

Ave. Hole Depth (ft): 43 | Burden(ft): 15 | Stem Type: 3/4 stem | Staggered Pattern (y or n): N | Length (ft):

Relative Confinement: | Spacing (ft): 16 | Subdrill (ft): 3 | Number of Lost Holes: 0 | Tons Shot: 23,786

EXPLOSIVES DATA:

Bulk Explosive	Weight	Boosters	Units	Delays	Units	Misc.	Units	
Titan 1000	11,580	450g	60	8025				Max (lb/hole): 400
				5625				Blast Duration (sec): 398 ms
				1/2 ms				
				17 ms				Total Charge Wt.: 11,640

VIBRATION DATA:

Nearest Structure: Main Bg | Seismograph Loc.: Same | Temperature: 81° | Max. Chrg. (lb/8ms): 400

Northing: 37°59'19 N | Northing: | Sky Condition: Clear | RPPV: .17

Easting: 122°27'22 W | Easting: | Wind Direction: S | Frequency: 45.4

Distance Away: 1003 | Distance Away: | Wind Speed: 0-2 | Airblast: 109

PERFORMANCE DATA:

Powder Factor (lb/ton): .5 | Displacement: Great | Crushability:

Lb/yrd^3: 1.12 | Vibration: Great | Fines:

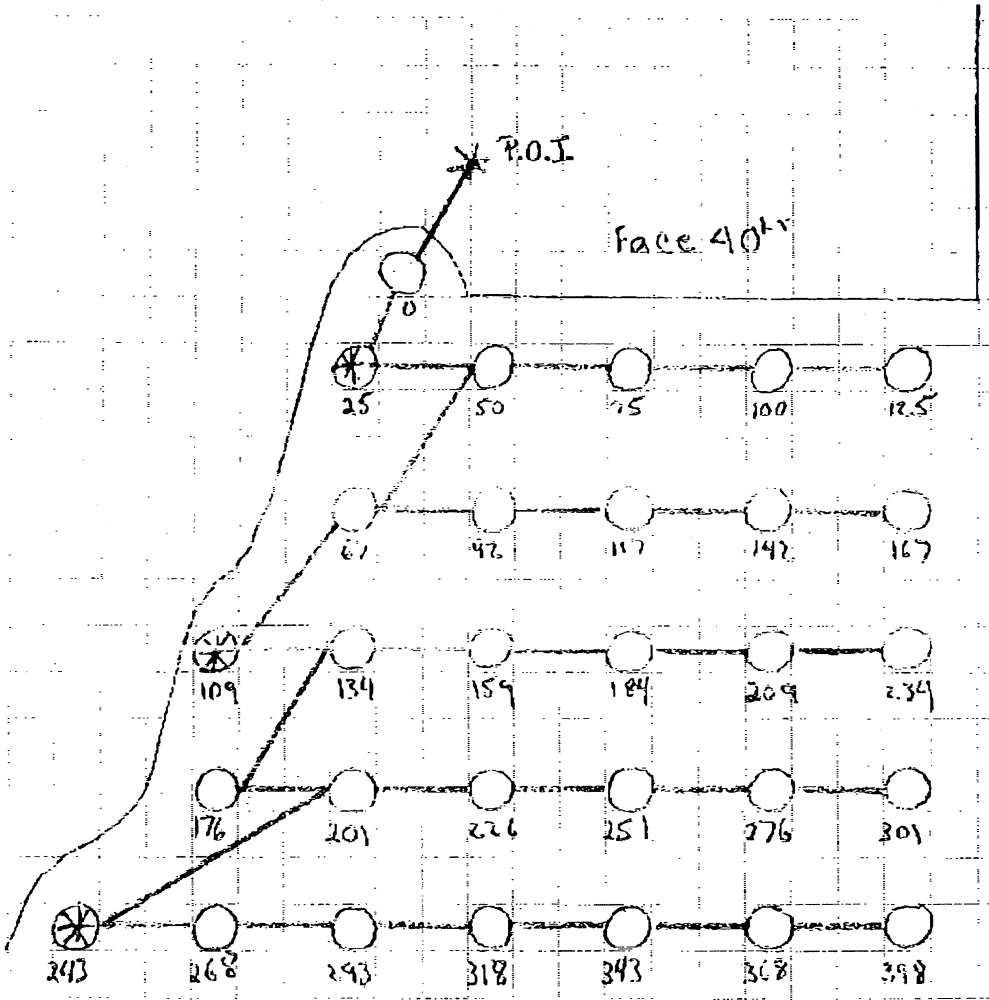
Fragmentation: Great | Dig ability:

Comments: | Blaster in Charge: Dan Lopez

JOB _____ ITEM _____ SPEC. _____

BID ITEM _____ SHEET ___ OF ___ DATE _____ BY _____

THE DUTRA GROUP



5.10.12
P.B-7
*1575

15 x 16

30 Holes
30 = 80' EZ
30 = 50' EZ
4 = 42 ms
1 = 17 ms
60 = 450 g
11,580 lbs Titan

Depth. -13'

18' stemming
400 lbs per

⊛ = 300 lbs per

main - 1003
VIAM 3221
SAAM 2376
M-NP 1795
37° 59' 12 N
122° 27' 13 W

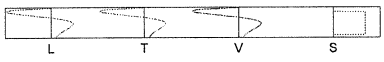
GeoSonics Inc. Seismic Analysis
Stop Event Report

Serial No:	7178 v3.23	**Begin Date:**	05/10/2012 06:02:29 (UTC-7)
Client:	COUNTY OF MARIN	**End Date:**	05/10/2012 20:00:00 (UTC-7)
Operation:	SAN RAFAEL ROCK QUARRY	**Events over Trigger:**	0 (5-4)
Location:	114 SAN MARINO DRIVE	**Record Time:**	5.0 s
Distance:		**Seismic Trigger:**	0.030 in/s
Operator:	VIBRA-TECH GSM	**Sound Trigger:**	N/A
Comment:	VERONIQUE RASKIN	**Battery Level:**	8.9

Additional Info:
RESIDENCE
j-GEO-01254
N37 59.395, W122 27.700

Shaketable Calibrated: 01/16/2012
By: Vibra-Tech, Inc.
2700 Holloway Road - Suite 113
Louisville, KY 40299 U.S.A.
TEL: 502.240.9900 FAX: 502.240.9902

Dynamic Calibration Graph:



Cal Test Results:

Longitudinal:	**Pass**
Transverse:	**Pass**
Vertical:	**Pass**
Sound:	**Pass**

The seismograph at 114 San Marino Drive (S/N 7178) did not trigger during the shot on May 10, 2012 at approximately 11:30 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.

Seismic Analysis
Velocity Waveform Analysis

Serial Number:	7179
Firmware Version:	08-03.23
Event Date:	05/10/2012 11:30:44 (UTC -07:00)
Event number:	12
Recording Time:	5 s
Client:	COUNTY OF MARIN
Operation:	SAN RAFAEL ROCK QUARRY
Location:	ON QUARRY PROPERTY
Distance:	
Operator:	VIBRA-TECH GSM
Comment:	
Seismic Trigger:	0.03 in/s
Sound Trigger:	75.9 DB

Additional Info:

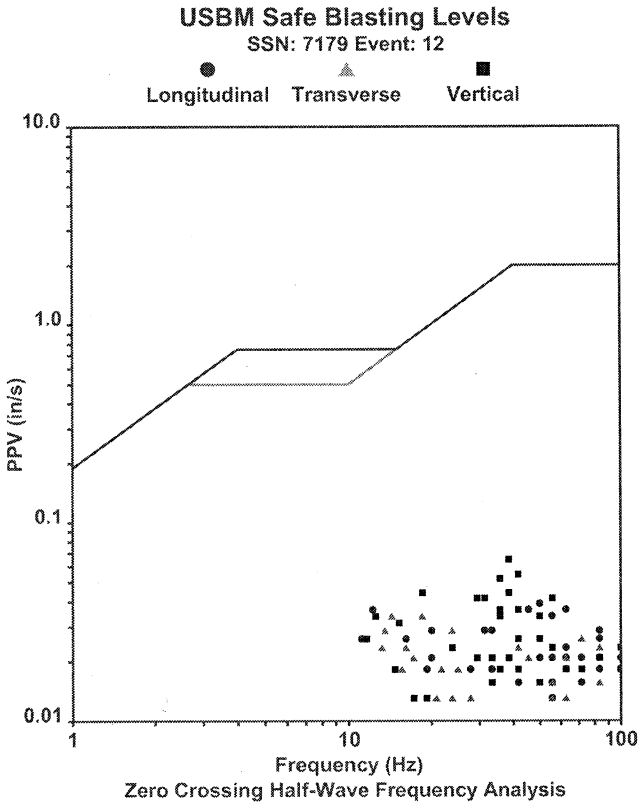
j-GEO-01253
N37 59.481, W122 27.256

Summary Data

	L	T	V
PPV (in/s):	0.0375	0.0325	0.0625
FREQ (HZ):	50	17.9	35.7
PD (.001"):	0.3375	0.48	0.4625
PPA (g):	0.04557	0.03906	0.04557

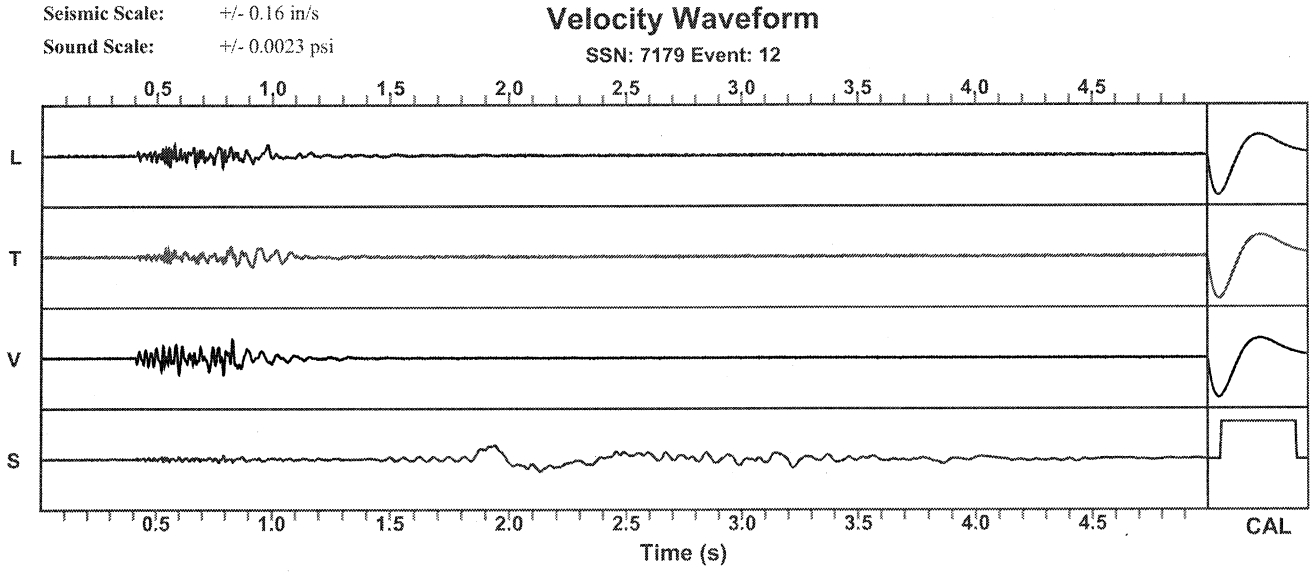
Peak Vector Sum: 0.0625 in/s
Peak Air Pressure: 105.5 DB
0.0006238 psi @ 3.6 HZ

Shaketable Calibrated
On: 01/13/2012 (UTC -07:00)
By: Vibra-Tech, Inc.
2700 Holloway Road - Suite 113
Louisville, KY 40203 U.S.A.



Waveform Graph Scale

Time Scale: 0.1 s
Seismic Scale: +/- 0.16 in/s
Sound Scale: +/- 0.0023 psi



Vibra-Tech

GeoSonics Inc. Seismic Analysis
Stop Event Report

Serial No:	7257 v3.23	**Begin Date:**	05/10/2012 07:00:50 (UTC-7)
Client:	COUNTY OF MARIN	**End Date:**	05/10/2012 20:00:00 (UTC-7)
Operation:	SAN RAFAEL ROCK QUARRY	**Events over Trigger:**	0 (12-11)
Location:	16 MARIN BAY PARK CT.	**Record Time:**	5.0 s
Distance:		**Seismic Trigger:**	0.030 in/s
Operator:	VIBRA-TECH GSM	**Sound Trigger:**	N/A
Comment:	William Hosken Residenc	**Battery Level:**	8.8

Shaketable Calibrated: 01/13/2012
By: Vibra-Tech, Inc.
2700 Holloway Road - Suite 113
Louisville, KY 40299 U.S.A.
TEL: 502.240.9900 FAX: 502.240.9902

Additional Info:

j-GEO-01252
N37 59.524, W122 27.373

Dynamic Calibration Graph:

Cal Test Results:

Longitudinal:	**Pass**
Transverse:	**Pass**
Vertical:	**Pass**
Sound:	**Pass**

The seismograph located across the street from 16 Marin Bay Park Court (S/N 7257) did not trigger during the blast on May 10, 2012 at approximately 11:30 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.