

SAN RAFAEL ROCK QUARRY VIBRATION REPORT

GENERAL INFORMATION

Location: PB-7 Max. Charge Weight: 320 Date of Blast: 2 21 12
 Northing: 37° 59' 11 N Blast Duration: 4.88 ms Time of Blast: 11:34
 Easting: 122° 27' 15 W Blast Number: 1568

SEISMOGRAPH INFORMATION

Seismograph Model	Serial Number	Last Calibration Date
30010	4550	5 21 11
Micro	4567	5 26 11
Micro	4570	5 26 11

LOCATION INFORMATION

Location	Northing	Easting	Distance from Blast	Scaled Distance
Micro	37° 59' 19 N	122° 27' 22 W	1015	56
Micro	37° 59' 18 N	122° 27' 53 W	3115	174
Micro	37° 59' 31 N	122° 27' 30 W	2428	135
Micro	37° 59' 30 N	122° 27' 16 W	1953	109

VIBRATION INFORMATION

Longitudinal Peak Particle Velocity (ips)	Longitudinal Peak Frequency (Hz)	Transverse Peak Particle Velocity (ips)	Transverse Peak Frequency (Hz)	Vertical Peak Particle Velocity (ips)	Vertical Peak Frequency (Hz)	Peak Vector Sum (ips)	Peak Air Overpressure (db)
.09	20.8	.13	18.5	.11	16.1	.16	112
.08	11.1	.08	13.5	.06	12.5	.10	106
.08	16.6	.05	9.2	.07	21.7	.10	104
No Trigger							

GENERAL COMMENTS

Seismograph Operator: Deon Lopes Signature: Deon Lopes

SAN RAFAEL ROCK QUARRY BLAST REPORT

BASE DATA:

Location: PR-7 Designed Bench Height (ft): 32 Date: 2.21.17
 Northing: 37° 59' 11" N Rock Density (lb/ft³): 2.23 Time: 11:34
 Easting: 172° 27' 15" W Relative Rock Hardness: 7 Blast Number: 1568

DESIGN DATA:

Number of Holes Shot: 25 Hole Dia. (in.): 3 1/4 Stemming (ft): 15 Loading Time Required (man hrs): 6 Deck Type: -
 Ave. Hole Depth (ft): 34 Burden (ft): 13 Stem Type: 3/4" AT Staggered Pattern (Y or N): N Length (ft): -
 Relative Confinement: - Spacing (ft): 14 Subdrill (ft): 2 Number of Lost Holes: 0 Tons Shot: 14,045

EXPLOSIVES DATA:

Bulk Explosive	Weight	Boosters	Units	Delays	Units	Misc.	Units	Max (lb/hole):	Blast Duration (sec):
<u>PR-7</u>	<u>1510</u>	<u>450</u>	<u>50</u>	<u>00 02</u>	<u>20</u>	<u>-</u>	<u>-</u>	<u>32.0</u>	<u>428 ms</u>
<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>50 02</u>	<u>25</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>40 ms</u>	<u>9</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>17ms</u>	<u>1</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
								Total Charge Wt.: <u>2876</u>	

VIBRATION DATA:

Nearest Structure: Maxim 09 Seismograph Loc.: Sc. 119 Temperature: 63° Max. Chrg. (lb/8ins): 32.0
 Northing: 37° 59' 11" N Easting: - Sky Condition: Clear RPPV: 16
 Easting: 172° 27' 22" W Wind Direction: N Frequency: 20.0
 Distance Away: 100 Distance Away: - Wind Speed: 0.2 Airblast: 112

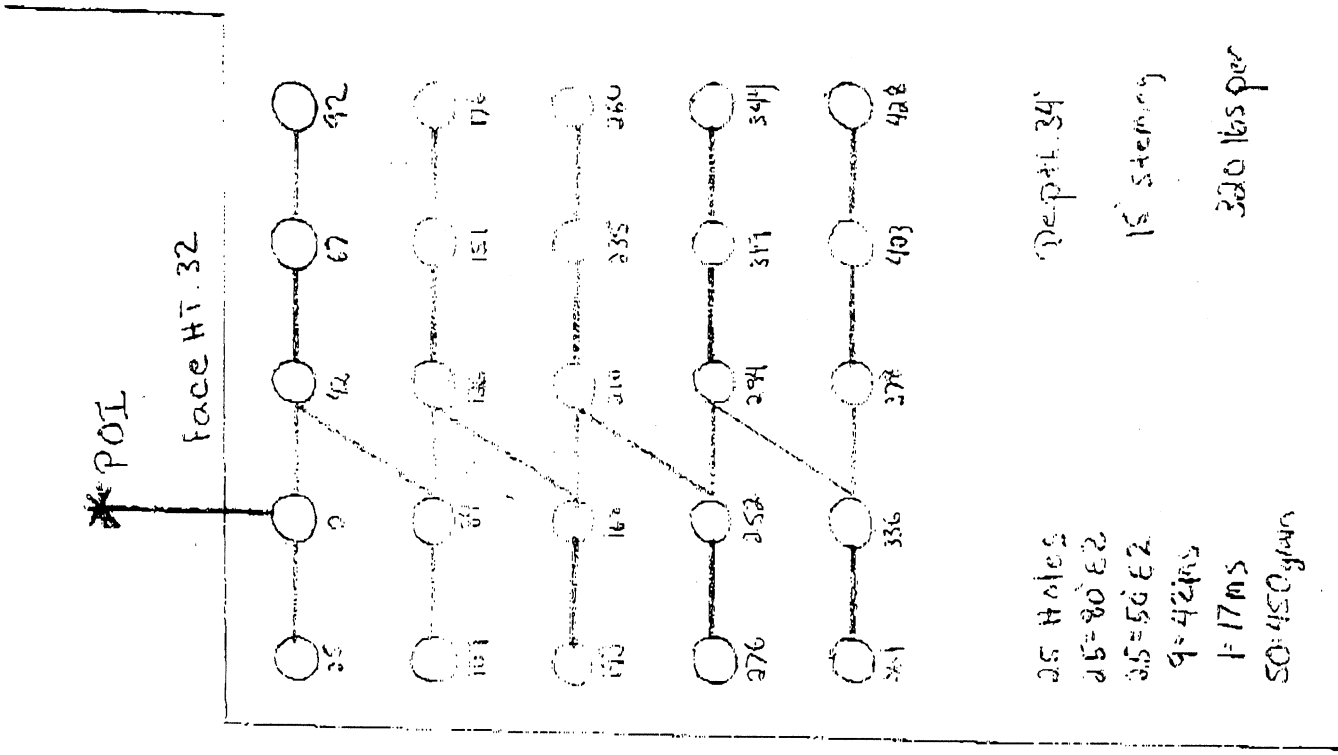
PERFORMANCE DATA:

Powder Factor (lb/ton): 6 Displacement: 66 c.c.d Cushability: -
 Lb/ft³: 1.4 Vibration: 6.6 c.c.d Fines: -
 Fragmentation: sf.c.c.d Dig ability: -
 Comments: F. [Signature] Blaster in Charge: F. [Signature]

2.21.12
P.B-7
#1568

13 X 14

main 1003
VIA M 3115
SM 2428
M'N 1953
37°59'11N
122°27'15W



Depth 34'
15' stemming
320 lbs per

25 Holes
25 = 80' E2
25 = 50' E2
9 = 42' M5
F 17ms
50 = 450 g/m

7,820# T:Ten 1000

Ramp to PB-8

GeoSonics Inc. Seismic Analysis

Stop Event Report

Serial No: 7334 v3.23
Client: COUNTY OF MARIN
Operation: SAN RAFAEL ROCK QUARRY
Location: 114 SAN MARINO DRIVE
Distance:
Operator: VIBRA-TECH GSM
Comment: Veronique Raskin Res.

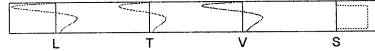
Begin Date: 02/21/2012 06:00:50 (UTC-8)
End Date: 02/21/2012 12:32:16 (UTC-8)
Events over Trigger: 0 (5-4)
Record Time: 5.0 s
Seismic Trigger: 0.030 in/s
Sound Trigger: N/A
Battery Level: 8.9

Additional Info:

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 7334) did not trigger during the shot on February 21, 2012 at approximately 11:34 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.

GeoSonics Inc. Seismic Analysis

Velocity Waveform Analysis

Serial No: 7257 v3.23
Date: 02/21/2012 11:34:46 (UTC-8)
Event No: 5
Record Time: 5.0 s
Client: COUNTY OF MARIN
Operation: SAN RAFAEL ROCK QUARRY
Location: 16 MARIN BAY PARK CT.
Distance:
Operator: VIBRA-TECH GSM
Comment: William Hosken Residenc
Seismic Trigger: 0.030 in/s

USBM Safe Blasting Levels

SN: 7257 Event: 5

	Summary Data		
	L	T	V
PPV (in/s)	0.020	0.020	0.043
FREQ (Hz)	55.6	50.0	38.5
PD (.001")	0.21	0.24	0.20
PPA (g)	0.013	0.013	0.046
Peak Vector Sum :	0.043 in/s		
Peak Air Pressure:	107 db		
	0.00073 PSI @ 1.0 Hz		

Additional Info:

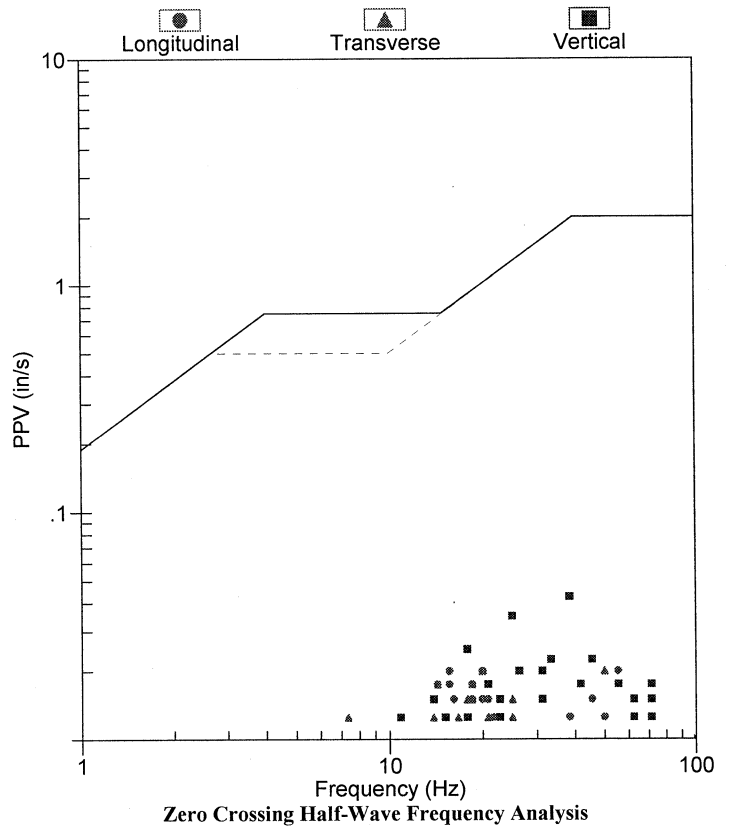
j-GEO-01252
 N37 59.524, W122 27.373

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

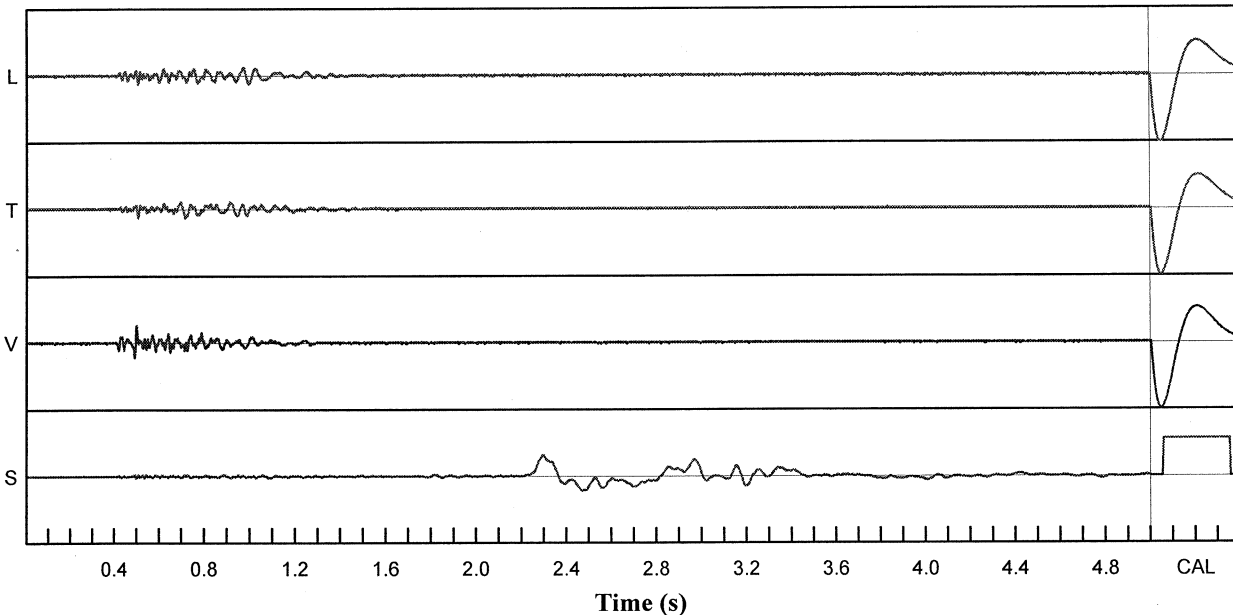
Velocity Waveform Graph Scale

Time Scale: 0.100 s
Seismic Scale: +/- 0.160 in/s
Sound Scale: +/- 0.0023 PSI



Velocity Waveform

SN: 7257 Event: 5



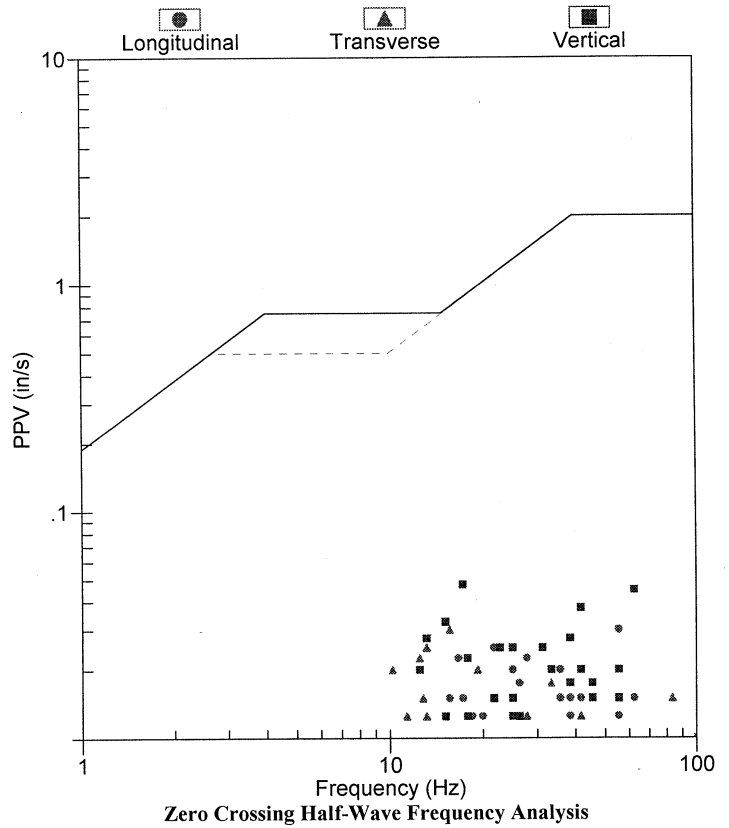
GeoSonics Inc. Seismic Analysis

Velocity Waveform Analysis

Serial No: 7179 v3.23
Date: 02/21/2012 11:34:44 (UTC-8)
Event No: 5
Record Time: 5.0 s
Client: COUNTY OF MARIN
Operation: SAN RAFAEL ROCK QUARRY
Location: ON QUARRY PROPERTY
Distance:
Operator: VIBRA-TECH GSM
Comment:
Seismic Trigger: 0.030 in/s

USBM Safe Blasting Levels

SN: 7179 Event: 5



	Summary Data		
	L	T	V
PPV (in/s)	0.030	0.030	0.048
FREQ (Hz)	55.6	15.6	17.2
PD (.001")	0.21	0.36	0.34
PPA (g)	0.026	0.020	0.039
Peak Vector Sum :	0.050 in/s		
Peak Air Pressure:	107 db		
	0.00071 PSI @ 2.4 Hz		

Additional Info:

j-GEO-01253
 N37 59.481, W122 27.256

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

Velocity Waveform Graph Scale

Time Scale: 0.100 s
Seismic Scale: +/- 0.160 in/s
Sound Scale: +/- 0.0023 PSI

Velocity Waveform

SN: 7179 Event: 5

