**SAN RAFAEL ROCK QUARRY VIBRATION REPORT**

**Location:** PB-7  
**Max. Charge Weight:** 320  
**Date of Blast:** 2/21/12

**Northing:** N32° 59' 11"  
**Time of Blast:** 11:34

**Easting:** 122° 27' 15" W  
**Blast Duration:** 4.02 ms

**Blast Number:** 1568

<table>
<thead>
<tr>
<th>Seismograph Model</th>
<th>700(0)</th>
<th>micro</th>
<th>micro</th>
<th>micro</th>
<th>micro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Number</td>
<td>3414</td>
<td>4521</td>
<td>4567</td>
<td>4570</td>
<td></td>
</tr>
<tr>
<td>Last Calibration Date</td>
<td>5/21/11</td>
<td>5/21/11</td>
<td>5/21/11</td>
<td>5/21/11</td>
<td></td>
</tr>
</tbody>
</table>

**LOCATION INFORMATION**

<table>
<thead>
<tr>
<th>Location</th>
<th>marina city</th>
<th>Via Monte Villa</th>
<th>Summertime</th>
<th>PB New Rock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northing</td>
<td>32°59'10&quot; N</td>
<td>32°59'10&quot; N</td>
<td>32°59'31&quot; N</td>
<td>32°59'30&quot; N</td>
</tr>
<tr>
<td>Easting</td>
<td>122°27'15&quot; W</td>
<td>122°27'53&quot; W</td>
<td>122°27'30&quot; W</td>
<td>122°27'16&quot; W</td>
</tr>
<tr>
<td>Distance from Blast</td>
<td>1015</td>
<td>315</td>
<td>2428</td>
<td>1953</td>
</tr>
<tr>
<td>Scaled Distance</td>
<td>56</td>
<td>179</td>
<td>135</td>
<td>109</td>
</tr>
</tbody>
</table>

**VIBRATION INFORMATION**

<table>
<thead>
<tr>
<th></th>
<th>Longitudinal Peak Particle Velocity (ips)</th>
<th>.09</th>
<th>.08</th>
<th>.08</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Longitudinal Peak Frequency (Hz)</td>
<td>20.8</td>
<td>16.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transverse Peak Particle Velocity (ips)</td>
<td>.13</td>
<td>.08</td>
<td>.05</td>
</tr>
<tr>
<td></td>
<td>Transverse Peak Frequency (Hz)</td>
<td>18.5</td>
<td>13.5</td>
<td>9.2</td>
</tr>
<tr>
<td></td>
<td>Vertical Peak Particle Velocity (ips)</td>
<td>.11</td>
<td>.06</td>
<td>.07</td>
</tr>
<tr>
<td></td>
<td>Vertical Peak Frequency (Hz)</td>
<td>.11</td>
<td>12.5</td>
<td>21.7</td>
</tr>
<tr>
<td></td>
<td>Peak Vector Sum (ips)</td>
<td>.16</td>
<td>0</td>
<td>.10</td>
</tr>
<tr>
<td></td>
<td>Peak Air Overpressure (db)</td>
<td>112</td>
<td>No Triger</td>
<td>106</td>
</tr>
</tbody>
</table>

**GENERAL COMMENTS**

Seismograph Operator: Deon Lopes  
Signature: [Signature]

---

Date of Blast: 2/21/12  
Time of Blast: 11:34  
Blast Number: 1568  
No Triger  
Signed: [Signature]
**BASE DATA:**

- Location: (location information)
- Designed Bench Height (ft): 32
- Rock Density (ft/yard^3): 2.23
- Date: 2/21/91
- Northing: 37° 01' 11" N
- Rock Density (ft/yard^3): 2.23
- Easting: 172° 27' 15" W
- Relative Rock Hardness: 7
- Time: 11:34
- Blast Number: 1568

**DESIGN DATA:**

- Number of Holes Shot: 25
- Hole Dia (in.): 3/4
- Stemming (ft): 10
- Loading Time Required (man hrs): 6
- Deck Type: —
- Ave. Hole Depth (ft): 24
- Burden (ft): 13
- Stem Type: 3/4
- Staggered Pattern (y or n): 1

**EXPLOSIVES DATA:**

<table>
<thead>
<tr>
<th>Bulk Explosive</th>
<th>Weight</th>
<th>Boosters</th>
<th>Units</th>
<th>Delays</th>
<th>Units</th>
<th>Misc.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.00</td>
<td>16.00</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Max (lb/hole): 32</td>
</tr>
</tbody>
</table>

- Tons Shot: 2, 4.05

**VIBRATION DATA:**

- Nearest Structure: FeVio (ft)
- Seismograph Loc: 56.06
- Temperature: 65°
- Max. Chrg. (lb/ft): 32
- Northing: 30° 01' 11" N
- Sky Condition: Clear
- RPPV: 16
- Easting: 127° 27' 15" W
- Wind Direction: NW
- Frequency: 20, 3
- Distance Away: 1000

**PERFORMANCE DATA:**

- Powder Factor (lb/ton): 6
- Displacement: 6.0
- Crushability: 0
- Lb/yard^3: 1.0
- Vibration: 6.0
- Fines: 0
- Fragmentation: 6.0
- Dig ability: 0

Comments: (signature)
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

Summary Data
L | T | V
PPV (in/s) | 0.020 | 0.020 | 0.043
FREQ (Hz) | 55.6 | 50.0 | 38.5
PD (301") | 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

### Summary Data

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPV (in/s)</td>
<td>0.030</td>
<td>0.030</td>
</tr>
<tr>
<td>FREQ (Hz)</td>
<td>55.6</td>
<td>15.6</td>
</tr>
<tr>
<td>PD (dB)</td>
<td>0.21</td>
<td>0.36</td>
</tr>
<tr>
<td>PPA (g)</td>
<td>0.026</td>
<td>0.020</td>
</tr>
<tr>
<td>Peak Vector Sum</td>
<td>0.050 in/s</td>
<td></td>
</tr>
<tr>
<td>Peak Air Pressure</td>
<td>107 db</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.00071 PSI @ 2.4 Hz</td>
<td></td>
</tr>
</tbody>
</table>

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

USBM Safe Blasting Levels
SN: 7179 Event: 5

Velocity Waveform
SN: 7179 Event: 5

Printed: February 21, 2012 File: 65_7179_20120221_113444_4b8y1b31.g3k (GeoSonics Inc. AnalysisNET v8.1.44)