## SAN RAFAEL ROCK QUARRY VIBRATION REPORT

<table>
<thead>
<tr>
<th>Location: PB-7</th>
<th>Max. Charge Weight: 200</th>
<th>Date of Blast: 9/7/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northing: 37° 55' 11&quot; N</td>
<td>Blast Duration: 351 ms</td>
<td>Time of Blast: 11:31</td>
</tr>
<tr>
<td>Easting: 122° 27'17&quot; W</td>
<td>Blast Number: 1555</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seismograph Model</th>
<th>2000</th>
<th>micro</th>
<th>micro</th>
<th>micro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Number</td>
<td>2481</td>
<td>4550</td>
<td>4567</td>
<td>4570</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Marin Ag</th>
<th>Via Montebello</th>
<th>San Marino</th>
<th>M^2 Near Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northing</td>
<td>37° 55' 11&quot; N</td>
<td>37° 55' 31&quot; N</td>
<td>37° 55' 31&quot; N</td>
<td>37° 55' 30&quot; N</td>
</tr>
<tr>
<td>Easting</td>
<td>122° 27'22&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>1003</td>
<td>3010</td>
<td>2376</td>
<td>2059</td>
</tr>
<tr>
<td>Scaled Distance</td>
<td>7.0</td>
<td>21.2</td>
<td>16.8</td>
<td>45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>9.6</th>
<th>11.6</th>
<th>.04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitudinal Peak Frequency (Hz)</td>
<td>.09</td>
<td>.07</td>
<td>.06</td>
</tr>
<tr>
<td>Longitudinal Peak Particle Velocity (ips)</td>
<td>18.5</td>
<td>.08</td>
<td>.06</td>
</tr>
<tr>
<td>Transverse Peak Frequency (Hz)</td>
<td>12.1</td>
<td>8.7</td>
<td>20.8</td>
</tr>
<tr>
<td>Transverse Peak Particle Velocity (ips)</td>
<td>.16</td>
<td>.07</td>
<td>.08</td>
</tr>
<tr>
<td>Vertical Peak Frequency (Hz)</td>
<td>12.1</td>
<td>8.7</td>
<td>20.8</td>
</tr>
<tr>
<td>Vertical Peak Particle Velocity (ips)</td>
<td>.10</td>
<td>.05</td>
<td>.06</td>
</tr>
<tr>
<td>Peak Vector Sum (ips)</td>
<td>112</td>
<td>106</td>
<td>106</td>
</tr>
<tr>
<td>Peak Air Overpressure (db)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Seismograph Operator: Deon Lopez
Signature: [Signature]
SAN RAFAEL ROCK QUARRY BLAST REPORT

**BASE DATA:**
- Location: PB-7
- Northing: 37°59'11"N
- Easting: 122°27'17"W
- Designed Bench Height (ft): 40
- Rock Density (lb/ft³): 2.7
- Date: 9.7.11
- Time: 11:31
- Relative Rock Hardness: 7
- Blast Number: 1555

**DESIGN DATA:**
- Number of Holes Shot: 21
- Hole Dia. (in.): 6 1/4
- Stemming (ft): 15
- Loading Time Required (man hrs): 8
- Ave. Hole Depth (ft): 43
- Burden (ft): 15
- Stern Type: 3/4" Shot
- Staggered Pattern (y or n): n
- Deck Type: 3/4" Shot
- Deck Depth: 5
- Relative Confinement: 
- Spacing (ft): 16
- Subdrill (ft): 3
- Number of Lost Holes: 0
- Tons Shot: 20,110

**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>Titan 1000</td>
<td>7900</td>
<td>450</td>
<td>42</td>
<td>80</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Max (lb/hole): 3.80
- Blast Duration (sec): 35.1ms
- Total Charge Wt.: 79.42

**VIBRATION DATA:**
- Nearest Structure: Marin Ag
- Seismograph Loc.: Same
- Temperature: 78°
- Max. Chrg. (lb/ft³): 36.0
- Northing: 37°59'11"N
- Easting: 122°27'17"W
- Sky Condition: Clear
- RPPV: 2.0
- Wind Direction: SE
- Frequency: 18.5
- Distance Away: 1003

**PERFORMANCE DATA:**
- Powder Factor (lb/ton): 1.06
- Lb/yard³: 1.3
- Fragmentation: Good
- Comments: Deck loaded
- Blaster in Charge: Troy Hager

- Displacement: 12 ft
- Crushability: 
- Fineness:
- Dig ability: 
- Airblast: 112
Seismic Analysis
Velocity Waveform Analysis

Serial No: 9856 v3.23
Date: 09/07/2011 11:31:07 (UTC-7)
Event No: 4
Record Time: 5.0 s
Client: COUNTY 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></th>
<th>L</th>
<th>T</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPV (in/s)</td>
<td>0.045</td>
<td>0.038</td>
<td>0.050</td>
</tr>
<tr>
<td>FREQ (Hz)</td>
<td>50.0</td>
<td>15.6</td>
<td>41.7</td>
</tr>
<tr>
<td>PD (.001&quot;)</td>
<td>0.29</td>
<td>0.34</td>
<td>0.40</td>
</tr>
<tr>
<td>PPA (g)</td>
<td>0.039</td>
<td>0.025</td>
<td>0.046</td>
</tr>
<tr>
<td>Peak Vector Sum</td>
<td>0.058 in/s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Air Pressure</td>
<td>108 db</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.00078 PSI @ 2.2 Hz</td>
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<td></td>
</tr>
</tbody>
</table>

Additional Info:

j-GEO-01253
N37 59 481, W122 27 256

Shacktel Calibrated: 01/27/2011
By: Vibra-Tech, Inc.
2700 Holloway Road - Suite 113
Louisville, KY 40209 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: 9856 Event: 4

Printed: September 07, 2011 File: 515485762.g3k (GeoSonics Inc. AnalysisNET v8.1.35)
Seismic Analysis
Velocity Waveform Analysis

Serial No: 7155 v3.23
Date: 09/07/2011 11:31:04 (UTC-7)
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

<table>
<thead>
<tr>
<th>Summary Data</th>
<th>L</th>
<th>T</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPV (in/s)</td>
<td>0.038</td>
<td>0.028</td>
<td>0.038</td>
</tr>
<tr>
<td>FREQ (Hz)</td>
<td>17.9</td>
<td>26.3</td>
<td>35.7</td>
</tr>
<tr>
<td>PD (001 °)</td>
<td>0.29</td>
<td>0.21</td>
<td>0.22</td>
</tr>
<tr>
<td>PPA (g)</td>
<td>0.020</td>
<td>0.026</td>
<td>0.033</td>
</tr>
<tr>
<td>Peak Vector Sum</td>
<td>0.050 in/s</td>
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<td></td>
</tr>
<tr>
<td>Peak Air Pressure</td>
<td>104 db</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.00052 PSI @ 2.1 Hz</td>
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<td></td>
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</tbody>
</table>

Additional Info:
- j-GEO-01252
- N37 59.524, W122 27.375

Shaketable Calibrated: 01/26/2011
By: Vibra-Tech, Inc
2700 Holloway Rd - 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

Printed: September 07, 2011   File: 265881704.g3k (GeoSonic Inc. AnalysisNET v8.1.35)
The seismograph at 114 San Marino Drive (S/N 9669) did not trigger during the shot on September 7, 2011 at approximately 11:31 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.