### SAN RAFAEL ROCK QUARRY VIBRATION REPORT

**Location:** R-8-7  
**Max. Charge Weight:** 160  
**Date of Blast:** 8-10-11  
**Northing:** 37°59'10" N  
**Time of Blast:** 12:40  
**Easting:** 122°27'17" W  
**Blast Duration:** 335 MS  
**Blast Number:** 1552

<table>
<thead>
<tr>
<th>Seismograph Model</th>
<th>Micro</th>
<th>Micro</th>
<th>Micro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Number</td>
<td>2481</td>
<td>4650</td>
<td>4667</td>
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<tr>
<td>Last Calibration Date</td>
<td>5-24-11</td>
<td>5-26-11</td>
<td>5-26-11</td>
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</tbody>
</table>

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<thead>
<tr>
<th>Location</th>
<th>Marin Hwy</th>
<th>Via Montalvo</th>
<th>Sea Marine</th>
<th>A'Nar Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northing</td>
<td>37°59'10&quot; N</td>
<td>37°59'18&quot; N</td>
<td>37°59'31&quot; N</td>
<td>37°59'50&quot; N</td>
</tr>
<tr>
<td>Easting</td>
<td>122°27'17&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>
</tbody>
</table>

| Distance from Blast | 1056 | 3009 | 2429 | 2059 |
| Scaled Distance    | 83   | 237  | 192  | 162  |

| Longitudinal Peak Particle Velocity (ips) | .09 |
| Longitudinal Peak Frequency (Hz) | 17.2 |
| Transverse Peak Particle Velocity (ips) | .08 |
| Transverse Peak Frequency (Hz) | 16.6 |
| Vertical Peak Particle Velocity (ips) | .09 |
| Vertical Peak Frequency (Hz) | 29.4 |
| Peak Vector Sum (ips) | 0.1 |
| Peak Air Overpressure (db) | 109 |

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

BASE DATA:
Location: PB-7
Designed Bench Height (ft): 51-40
Date: 8-10-11
Northing: 37° 59' 10" N
Rock Density (lb/ft^3): 2.7
Time: 12:40
Easting: 122° 27' 17" W
Relative Rock Hardness: 2
Blast Number: 1552

DESIGN DATA:
Number of Holes Shot: 15
Hole Dia (in.): 6 3/4
Stemming (ft): 15
Loading Time Required (man hrs): 8
Deck Type: 3/4" Steel
Ave. Hole Depth (ft): 40.43
Burden (ft): 15
Stem Type: 3/4" x 1" x 16' x 16'
Staggered Pattern (y or n): Y
Length (ft): 8.15
Relative Confinement: -
Spacing (ft): 16
Subdrill (ft): 3 - 0
Number of Lost Holes: 0
Tons Shot: 4,100

EXPLOSIVES DATA:
Bulk Explosive Weight: 10,000 lb
Boosters: 452.0
Units: 450 grain
30 80' 62 15
80' 62 15
40' 62 11 5
Max (lb/hole): 240

VIBRATION DATA:
Nearest Structure: 100 ft
Seismograph Loc.: 500 ft
Temperature: 75°
Max Chrg. (lb/ft^2): 160
Northing: 37° 59' 10" N
Northing: 37° 59' 10" N
Sky Condition: Clear
RPPV: 11
Easting: 122° 27' 17" W
Easting: 122° 27' 17" W
Wind Direction: 5 W
Frequency: 3.9 Hz
Distance Away: 1000 ft
Distance Away: 1000 ft
Wind Speed: 0.0
Airblast: 105

PERFORMANCE DATA:
Powder Factor (lb/ton): 3
Displacement: Fair
Crushability:
Lb/yard^3: 9
Vibration: Great
Fines:
Fragmentation: Good
Dig ability:
Comments:
Blaster in Charge: [Signature]
16 holes
12. 80 F.Z.
13. 60 F.Z.
2. 42 M.Q.
61. 40 F.Z.

Hitton High 49.740

Acq. Ht. 43-40

8:10:11
PB:7
41552

31°54'10.7N
122°27'17.4W
The seismograph on Quarry Property (S/N 9856) did not trigger during the shot on August 10, 2011 at approximately 12:40 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.
The seismograph located across the street from 16 Marin Bay Park Court (S/N 7155) did not trigger during the blast on August 10, 2011 at approximately 12:40 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.
The seismograph at 114 San Marino Drive (S/N 9669) did not trigger during the shot on August 10, 2011 at approximately 12:40 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.