SAN RAFAEL ROCK QUARRY VIBRATION REPORT

**Blast Information**

- Location: PB-7
- Max. Charge Weight: 120
- Date of Blast: 9/8/14
- Northing: 37°59'08" N
- Time of Blast: 11:40
- Easting: 122°27'11" W
- Blast Duration: 5% ms
- Blast Number: 1608

<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>4550</td>
<td>4560</td>
</tr>
<tr>
<td>Last Calibration Date</td>
<td>5/3/13</td>
<td>5/3/13</td>
<td>5/3/13</td>
</tr>
</tbody>
</table>

**Location Information**

- Location: Marin Ag, Via Montabella, San Marino, McNear Park
- Northing: 37°59'19" N, 37°59'18" N, 37°59'31" N, 37°59'30" N
- Easting: 122°27'22" W, 122°27'53" W, 122°27'30" W, 122°27'16" W
- Distance from Blast: 1956, 3489, 2256, 2164
- Scaled Distance: 178, 318, 251, 197

**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)

**General Comments**

Seismograph Operator: [Signature]

Signature: [Signature]
### SAN RAFAEL ROCK QUARRY BLAST REPORT

#### BASE DATA:
- **Location:** PB-7
- **Designed Bench Height (ft):** 18
- **Date:** 4 28 19
- **Northing:** 39°51'08"N
- **Rock Density (lb/cubic ft):** 2.27
- **Easting:** 122°27'11"W
- **Time:** 11:40
- **Relative Rock Hardness:** 7
- **Blast Number:** 1608

#### DESIGN DATA:
- **Number of Holes Shot:** 35
- **Hole Dia. (in):** 6 3/4
- **Stemming (ft):** 13
- **Loading Time Required (min hrs):** 6
- **Ave. Hole Depth (ft):** 21
- **Burden (ft):** 13
- **Stem Type:** 
- **Staggered Pattern (y or n):** N
- **Relative Confinement:** Spacing (ft): 19
- **Subdrill (ft):** 3
- **Number of Lost Holes:** 3
- **Tons Shot:** 9470

#### 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><strong>Titanium</strong></td>
<td>3.88</td>
<td>450 g</td>
<td>35</td>
<td>50 x 2</td>
<td>35</td>
<td></td>
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</table>

- **Max (lb/hole):** 12.0
- **Blast Duration (sec):** 596

#### VIBRATION DATA:
- **Nearest Structure:** Marine Area
- **Seismograph Loc.:** 0
- **Temperature:** 53°F
- **Max. Chrg. (lb/ft ms):** 12.0
- **Northing:** 39°51'08"N
- **Sky Condition:** Clear
- **RPPV:**
- **Easting:** 122°27'11"W
- **Wind Direction:** N
- **Frequency:**
- **Distance Away:** 1956

#### PERFORMANCE DATA:
- **Powder Factor (lb/ton):** 4
- **Displacement:** seal
- **Crushability:**
- **Fines:**
- **Lb/ft*3:** 19
- **Vibration:** 0.2
- **Fragmentation:** 0.25
- **Wind Speed:** 0.2
- **Dig ability:**
- **Blaster in Charge:** D. Jackson

#### Comments:
33 Holes
33:52 ft
13:42 ns.
1:12, 115
154 ft 450 yd
3,880 lbs

depth 21
120 lbs per
13' stemming

Main 1956
N.A. 3484
South 2256
H.W. 2164

3/59 DBA
122° 27' H.W.

O = depth 10
5% Hole Collapsed
Open it up kept
Collapse 3'
used Restraint 10'
Serial No: 8154 v5.11
Client: COUNTY OF MARIN
Operation: SAN RAFAEL ROCK QUARRY
Location: 16 MARIN BAY PARK CT.
Distance: 
Operator: VIBRA-TECH IP2
Comment: WILLIAM HOSKEN RES.

Begin Date: 04/28/2014 07:39:42 (UTC-7)
End Date: 04/28/2014 12:31:54 (UTC-7)
Events over Trigger: 0 (0--1)
Record Time: 5.0 s
Seismic Trigger: 0.030 in/s
Sound Trigger: N/A
Battery Level: 8.3

Shaketable Calibrated: 01/23/2014
By: Vibra-Tech, Inc.
2700 Holloway Road - Suite 113
Louisville, KY 40209 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 located at 16 Marin Bay Park Court (S/N 8154) did not trigger during the shot on April 28, 2014 at approximately 11:40 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.
The seismograph on Quarry Property (S/N 9668) did not trigger during the shot on April 28, 2014 at approximately 11:40 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.