



BLAST REPORT

SOUTHWEST ENERGY LLC
2040 W GARDNER LANE
TUCSON, ARIZONA 85705-2208
(520) 696-9495

Date: 6/13/17 Customer: Martin Marietta Materials, In Location: Red Canyon
Shot Fired: 1:09 PM Permit No: 0405136 Pit: Main Pit Level: 6

Shot Number:	4	Shot Coordinates:	38.6076088x104.44561755
Rock Type:	Limestone/Granite	Rock Density:	149 lbs/cu ft
Shot Classification:	Production	Mats Used:	No
Sky Conditions:	Clear	Temperature:	80 °F
Wind Direction:	SE	Wind Speed:	25 mph
Hole Diameter:	4.5 in	Avg Stem Height:	12 ft
Burden-Spacing:	13 x 15 ft	Avg Hole Depth:	35 ft
Holes:	58	Sub-Drilling:	3 ft
Total Holes:	58	Shot Tons:	26,963
Total Lbs Explos:	11,721	Powder Factor:	0.43 lbs/ton
Max Lbs/Delay:	264	Max Holes/Delay:	58
Stemming Type:	Crushed Stone	Shot Duration:	952 ms
Contract Blaster:	Jim Santhuff	License No:	1-998-09915
Blast Crew:	Smith, Miller, Atwood, Santhuff, Taylor, Castens		
Note:			
Safety Meeting:	Yes	Workplace Inspection:	Yes

Tuesday, June 13, 2017

Contract Blaster:



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Red Canyon

PRODUCT DESCRIPTION		HOLES	QUANTITY	UNIT
Shot # 4 Main Pit 6	Holes	58		
	502 (Fortis Control)		11,634	Lbs
	i-kon Duplex Harness Wire 400m		2	Spool
	Pentex DP 12 (340)		116	Ea
	Unitronic 600 15M 50'		116	Ea
Totals for 6/13/17	Total Holes	58		
	502 (Fortis Control)		11,634	Lbs
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	Pentex DP 12 (340)		116	Ea
	Unitronic 600 15M 50'		116	Ea

Seismic Analysis

Velocity Waveform Analysis

Serial Number: 9835
Firmware Version: 0C-06.05
Event Date: 06/13/2017 13:10:19 (UTC -06:00)
Event number: 11
Recording Time: 5 s
Client: Martin Marietta
Operation: Red Canyon Quarry
Location: North Hill Side
Distance:
Operator: Vibra Tech
Comment: Pueblo, Colorado
Seismic Trigger: 0.02 in/s
Sound Trigger: 133 dB

Additional Info:

j-GEO-16060
 N38 36 22 W104 56 31

Summary Data

	L	T	V
PPV (in/s):	0.023	0.023	0.028
FREQ (HZ):	17.9	14.7	35.7
PD (.001"):	0.24	0.33	0.16
PPA (g):	0.02	0.02	0.026

Peak Vector Sum: 0.035 in/s
Peak Air Pressure: 117 dB
 0.002 psi @ 4.6 HZ

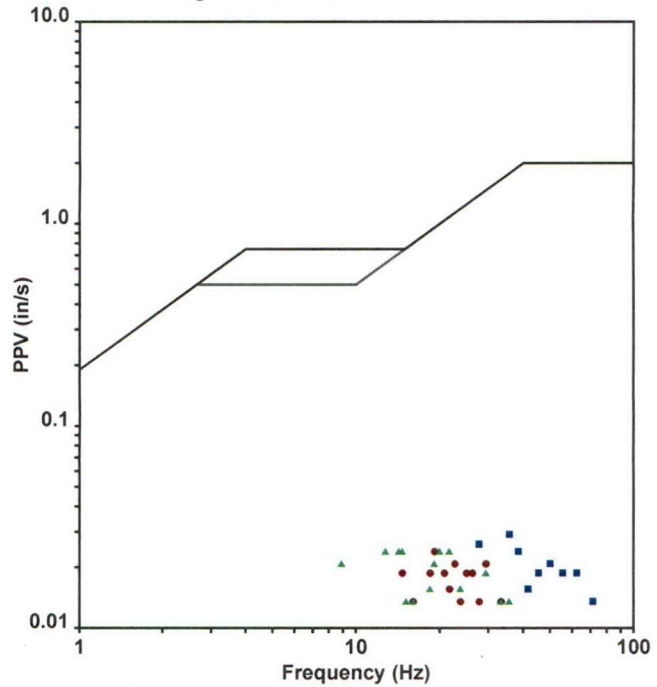
Shaketable Calibrated

On: 10/21/2016 (UTC -06:00)
By: Vibra-Tech, Inc.
 2700 Holloway Road - Suite 113
 Louisville, KY 40203 U.S.A.

USBM Safe Blasting Levels

SSN: 9835 Event: 11

● Longitudinal ▲ Transverse ■ Vertical



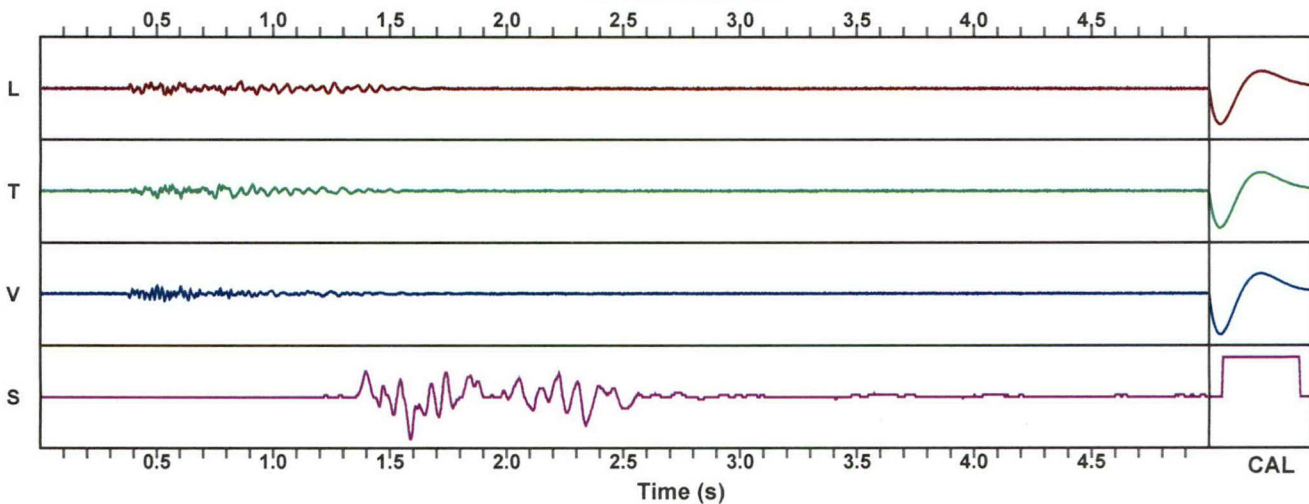
Zero Crossing Half-Wave Frequency Analysis

Waveform Graph Scale

Time Scale: 0.1 s
Seismic Scale: +/- 0.16 in/s
Sound Scale: +/- 0.0023 psi

Velocity Waveform

SSN: 9835 Event: 11



Seismic Analysis

Stop Event Report

Serial Number: 10696 0C-06.05
Client: Martin Marietta
Operation: Red Canyon Quarry
Location: Front Entrance
Operator: Vibra Tech
Comment:

Additional Info:

j-GEO-16222
N38 36 04 W104 56 59

Begin Date: 06/13/2017 05:00:53 (UTC -06:00)
End Date: 06/13/2017 22:00:00 (UTC -06:00)
Events Over Trigger: 0
Record Time: 5 s
Seismic Trigger: 0.02 in/s
Sound Trigger: 133 dB
Battery: 8.4 volts

Shaketable Calibrated:

On: 04/13/2017 (UTC -06:00)
By: Vibra-Tech, Inc.
2700 Holloway Road - Suite 113
Louisville, KY 40203 U.S.A.

Dynamic Calibration Graph:



Hole ID	Comment	Penetration Rate (ft/s)			
		Steel 1	Steel 2	Steel 3	Steel 4
38:13		2-4	3-4	5-7	8+
39:03		2-4	3-4	5-7	8+
40:05	Moved Back 1'	2-5	2-5	2-6	2-6
38:10		2-5	2-5	2-6	2-6
39:01		2-5	2-5	2-6	2-6
38:17		2-4	2-4	2-4	2-4
39:05		2-5	2-5	2-5	2-5
38:09		2-5	2-5	2-5	2-5
39:08		2-5	2-5	2-5	2-5
40:08		2-5	2-5	2-5	2-5
38:22	14' to 23' 7.9'	2-5	2-5	2-5	2-5
40:08		2-5	2-5	2-5	2-5
39:06		2-5	2-5	2-5	2-5
41:09		2-5	2-5	2-5	2-5
46:24		2-5	2-5	2-5	2-5
46:11		2-5	2-5	2-5	2-5
40:41		2-5	2-5	2-5	2-5
40:51		2-5	2-5	2-5	2-5
39:52		2-5	2-5	2-5	2-5
38:11	Moved 1.5' from front	2-6	2-5	2-4	2-4
38:00		2-6	2-5	2-4	2-4
38:44		2-5	2-5	2-5	2-5
38:49		2-5	2-5	2-5	2-5
39:03		2-5	2-5	2-5	2-5
39:07		2-5	2-5	2-5	2-5
38:00		2-7	2-4	2-4	2-4
38:17		2-4	2-4	2-4	2-4
39:05		2-5	2-5	2-5	2-5
39:07		2-5	2-5	2-5	2-5
38:00		2-6	2-5	2-6	2-6
38:28		2-6	2-5	2-6	2-6
39:06		2-6	2-5	2-6	2-6
39:09		2-6	2-5	2-6	2-6
38:22		2-6	2-5	2-6	2-6
38:28		2-6	2-5	2-6	2-6
38:33		2-6	2-5	2-6	2-6
38:38		2-6	2-5	2-6	2-6
38:43		2-6	2-5	2-6	2-6
38:48		2-6	2-5	2-6	2-6
38:53		2-6	2-5	2-6	2-6
38:58		2-6	2-5	2-6	2-6
39:03		2-6	2-5	2-6	2-6
39:08		2-6	2-5	2-6	2-6
39:13		2-6	2-5	2-6	2-6
39:18		2-6	2-5	2-6	2-6
39:23		2-6	2-5	2-6	2-6
39:28		2-6	2-5	2-6	2-6
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40:58		2-6	2-5	2-6	2-6
41:03		2-6	2-5	2-6	2-6
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41:13					

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BLASTING DELIVERY TICKET

6/13/17 TO 6/13/17

Red Canyon

SOLD TO:

Martin Marietta Materials, Inc
3131 Barrett Road
Colorado Springs, CO 80926

SHIP TO:

3131 Barrett Road
Colorado Springs, CO 80926

PRODUCT DESCRIPTION	HOLES	QUANTITY	UNIT
Total Holes / Shots	58	1	Shots
502 (Fortis Control)		11,634	Lbs

DRAFT

Shipper: _____

(Agent)

Customer Acceptance: _____

(Agent)



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