

Buckley Powder Co.

BLAST REPORT

SERVICE SITE LOCATION: Louviers ORDER NO.: D7403979BLAST NUMBER: #9-7-2018 BLAST TIME: 11:27 am BLAST DATE: 07/17/2018CUSTOMER: MARTIN MARIETTA MINE: RED CANYON ADDRESS: Colorado Springs, COROCK TYPE: Granite Tons/Yd3: 2.20 EXPECTED VIBRATION: 36.450 IPS

LOCATION OF BLAST

LOCATION OF BLAST IN MINE: North BENCH: Bench 7BLAST GPS POINTS: N 038 36 26.76000 & W -104 56 38.10000

WEATHER

WEATHER: Partly Cloudy CEILING: High TEMPERATURE: 88 F WIND DIRECTION & SPEED: North 7 MPH

NEAREST NON-OWNED STRUCTURE

NAME: North Hillside GPS Points: N 038 36 22.41000 & W -104 56 31.21980DISTANCE: 701 (FT) DIRECTION: 128°

SEISMOGRAPH DATA

LOCATION				DISTANCE		GPS POINTS			CALIBRATION DATE	
1	North Hillside			701 (FT)		N 038 36 22.41000 & W -104 56 31.21980			09/02/2017	
	L	(F)	T	(F)	V	(F)	AIR (db)	SEISMOGRAPH	SERIAL	OPERATOR
1	0.070	31.3	0.063	27.8	0.065	38.5	118	VibraTech 7816	7816	

BLAST DATA

NUMBER OF HOLES (EA)		EXPLOSIVES SIZE, TYPE & WEIGHT		
HOLE DIAMETER (IN)	4.5	SIZE	TYPE	WEIGHT
HOLE DEPTH (FT)	25.5	0.75	SPARTAN 350SR	38.25
FACE HEIGHT (FT)	23.5	BULK	TITAN 1000 XL	7,220
SUB DRILLING (FT)	2			
AVG. STEM FACE HOLES (FT)	14.786			
STEM OTHER HOLES (FT)	12.081			
BURDEN FRONT ROW (FT)	13 - 15			
BURDEN OTHER ROWS (FT)	13			
SPACING FRONT ROW (FT)	13 - 15			
SPACING OTHER ROWS (FT)	15			
TOTAL WEIGHT (LB):				7,258.25

DETONATORS USED IN BLAST: Electronic MATS USED: No STEM TYPE: 3/4 x 1/2 CRUSHED TOTAL DRILL DEPTH: 1,301 (FT)

TYPE	MFG	DATE CODE	USED	TYPE	MFG	DATE CODE	USED
DIGISHOT 30 FT	Dyno Nobel Global	07MY18	51	SPARTAN 350SR	Dyno Nobel Global	18FE18	51

CU YDS IN SHOT: 8,656 SCALED DISTANCE FACTOR: 32 % OF ANFO: 0TONS IN SHOT: 19,043 HOLES/DELAY: 3 FUEL OIL % (BULK): 0MAX LBS/DELAY: 452 AVERAGE LBS/HOLE: 143POWDER FACTOR (TONS/LB): 2.62 POWDER FACTOR POUNDS/YD3: 0.84BLASTER'S NAME: Farmer, Jimmie BLASTER'S NUMBER & STATE: 1-035-0748 ColoradoBLASTER'S SIGNATURE: Jimmie A. Farmer SITE SAFETY INSPECTION PERFORMED: YesNUMBER OF PERSONNEL ON SITE: 4

REMARKS : Shot drilled with GPS drilling. All holes wet and loaded from the bottom. Density at 1.15 Cup. We had a tagging issue with our count so we retagged the pattern and corrected the problem. Shot has good breakage.

START TIME	END TIME	TOTAL TIME	TRUCK NUMBERS
7:30 AM	10:00 AM	02:30	5013

APPENDIX A

Date: 7/17/18

Location: MM Ralcan

shot #: 9-1



BLASTER'S CHECKLIST

Must be filled out as you go!

PRE-TRIP CHECKLIST

✓	Measuring Tapes and lead ends
✓	Burden pole Tape/ Profiler
✓	Loading Poles
✓	Marking Paint
✓	Starter and primers
✓	Blasting Signs & cones
✓	Sirens in working order
✓	Set back stakes
✓	Digital video camera & Tripod

yes/no/NA

✓	Scientific Calculator
✓	Pocket Mirror
✓	Empty Shot bags
✓	Powder Punch
✓	GPS
✓	Non sparking Knife
✓	Wire strippers
✓	Splices
✓	Flash Light & Batteries

yes/no/NA

✓	Drill Logs
✓	Shot reports
✓	Hold Hammlesses
✓	Seismographs
✓	Density Cup and Scales
✓	Two Way Radios / fully
✓	Wheel Chocks
✓	Harness & Lanyard / "T" post
✓	First Aid Kits

PRESHIFT CHECKLIST

✓	Inspect blast area for Unsafe Working Conditions (including face) for voids, cracks, caves, etc..
✓	Ensure all employees have their site specific training.
✓	Secure blast site with warning signs and cones (including floor in front of face)
✓	Check shot access including traffic activity
✓	Pre shift inspections on all equipment -OK and safe to operate (includes back up alarms, brakes, horns, etc..)
✓	Mark fall zone area at least six(6) feet from the crest
✓	Inspect Harness/ Lanyard before each use if needed for fall zone or on top of trucks
✓	Insure all needed products are present-enough boosters, detonators etc
✓	Calculate Minimum Burden and Measure front row burden with burden pole or profiler (Document)
✓	Check drill log and all holes for proper depth and blockage
✓	Insure blast design is consistent with closest structures requirements
✓	Any need for calling assistance (Hold Harmless, equipment to close, drilling problems, etc...)
✓	Conduct pre-blast safety meeting with blast crew. If there is not a timing diagram, detonator tie-in must be discussed at the
	Calculate pounds per delay: Expl density x expl diam ² x .3405 = _____ lbs/ ft x avg powder column= _____
	lbs/hole x expected _____ holes / delay = _____ lbs/delay
	Calculate scale distance: 1) Distance _____ 2) divided by lbs/delay _____ 3) hit square root then equals _____ =S.D. (4)
	Calculate expected vibration: S.D. (4) _____ Push 1/x on calculator. Push (yx) key then 1.6 hit equals x 160 = _____ exp. vib.

TIE-IN CHECKLIST

✓	Shot tie inspected and signed off by two persons prior to shot including lead line (include names below)
	<u>70</u> _____ <u>Travis</u> <u>Lyke</u>
✓	Blast area is cleared and blocked before attaching starter cap and lead line
✓	Blaster in charge in communication with all guards at this time
✓	Blaster in charge will insure blast area has been cleared and guarded before the siren is sounded
✓	After proper waiting time blaster in charge will contact all guards before firing blast
✓	Seismograph located at nearest off site structure or at the Property Line related to nearest off-site
✓	Video Recording Made of Shot

POST BLAST CHECKLIST

✓	Maintain guards until shot is cleared and "all clear" is sounded
✓	Check for misfires, undetonated explosives or burning product and other dangers
✓	Sound all clear that is audible to all parties
✓	Dispose of lead line in approved manner
✓	Dispose of empty boxes in approved methods only
✓	Complete all required paper work prior to leaving customer location- shipping Papers, delivery ticket, Blaster's
✓	Make one final check of blast site before leaving property to insure no materials have been left
	and that no hazards are present that may have been missed during clearing process

Must completed and turned in daily- end of shift

Blaster In Charge

J.D. Farmer

Seismic Analysis

Velocity Waveform Analysis

Serial Number: 7816
 Firmware Version: 0C-06.05
 Event Date: 07/17/2018 11:27:23 (UTC -06:00)
 Event number: 20
 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):	0.07	0.063	0.065
FREQ (HZ):	31.3	27.8	38.5
PD (.001"):	0.54	0.52	0.36
PPA (g):	0.039	0.039	0.039

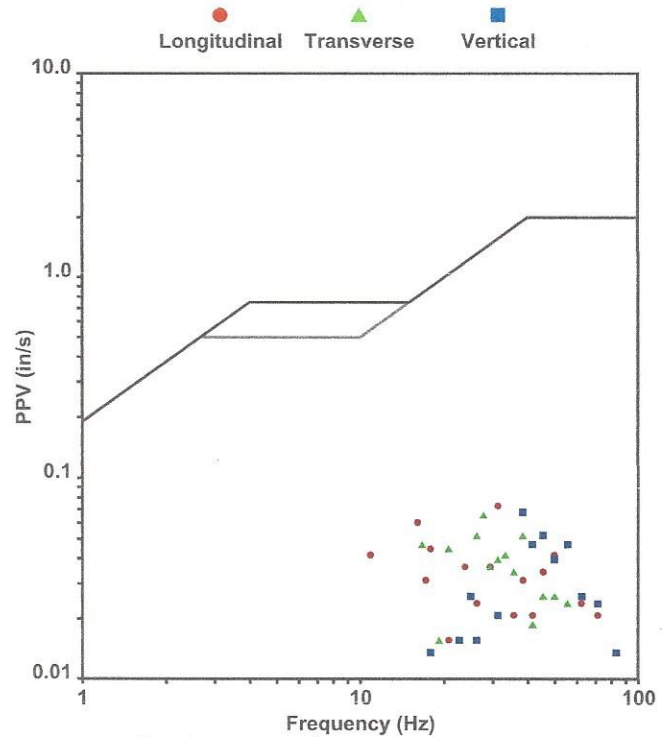
Peak Vector Sum: 0.08 in/s
 Peak Air Pressure: 118 dB
 0.0025 psi @ 1.5 HZ

Shaketable Calibrated

On: 09/02/2017 (UTC -06:00)
 By: Vibra-Tech, Inc.
 2700 Holloway Road - Suite 113
 Louisville, KY 40203 U.S.A.

USBM Safe Blasting Levels

SSN: 7816 Event: 20



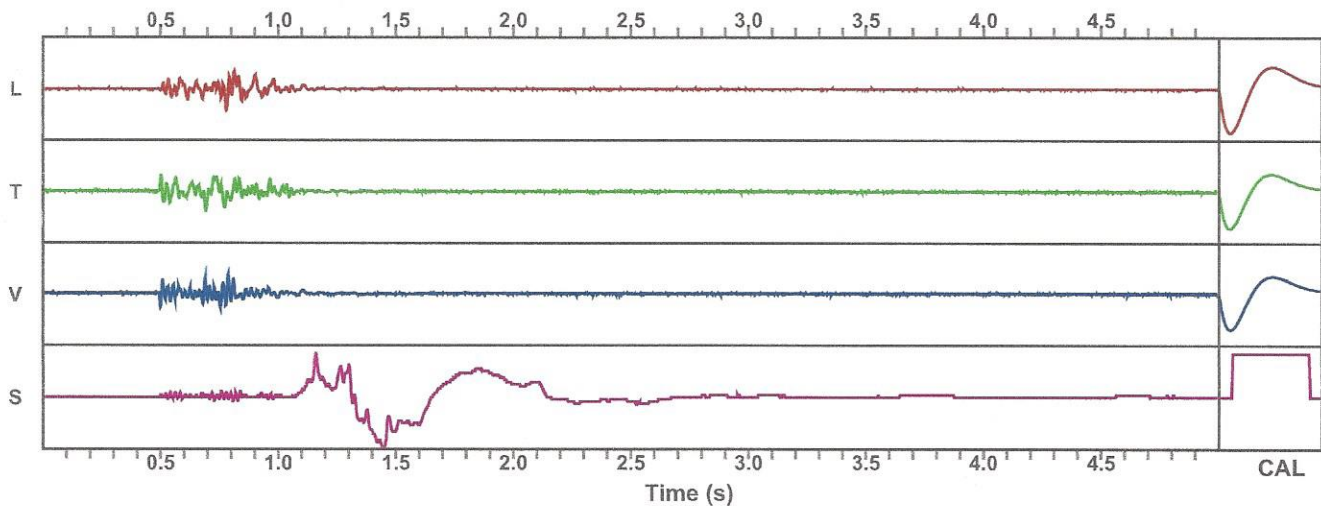
Zero Crossing Half-Wave Frequency Analysis

Waveform Graph Scale

Time Scale: 0.1 s
 Seismic Scale: +/- 0.16 in/s
 Sound Scale: +/- 0.0024 psi

Velocity Waveform

SSN: 7816 Event: 20

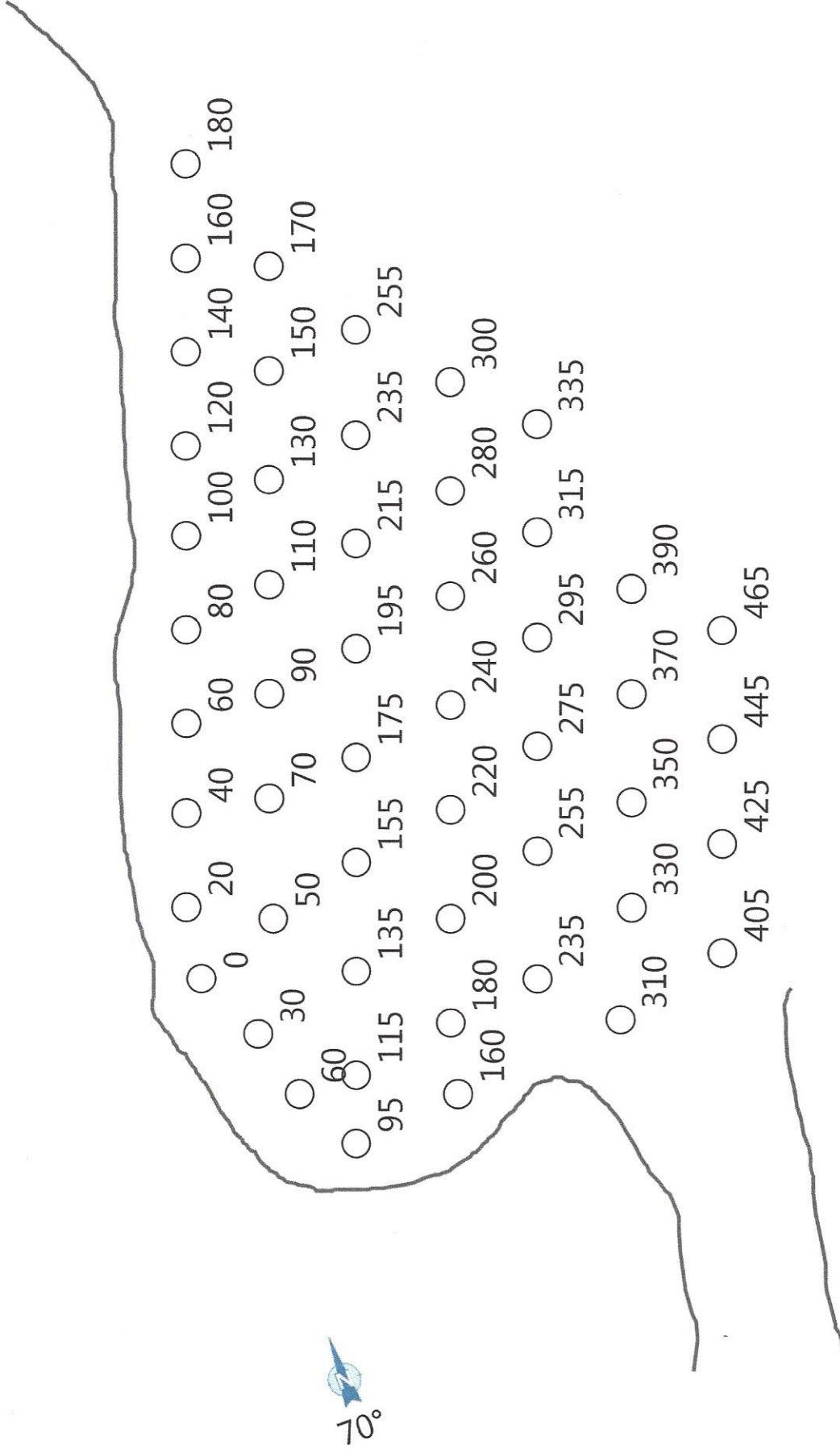


Buckley Powder Co.

CUSTOMER NAME: RED CANYON
BENCH: Bench 7
BLASTER'S NAME: Farmer, Jimmie

DIAGRAM

BLAST DATE: 07/17/2018
BLAST NUMBER: #9-7-2018



Pounds Pr hole



Shot: #9-7-2018

Bench: Bench 7

Customer: MARTIN MARIETTA

Site: Louviers

Load Sheet Report



Mine: RED CANYON	Shot: #9-7-2018	Date: 7/17/2018	Time: 11:27AM
Blaster: Farmer, Jimmie	License: 1-035-0748	Material: Granite	Holes: 51
Diameter: 4.5 (IN)	Burden: 13 (FT)	Spacing: 15 (FT)	Primers: 51
Exp. Vibration: 36.45 IPS	Fr. Burden: 14 (FT)	Fr. Spacing: 14 (FT)	Total Exp.: 7,258 (LB)
Fuel: 0 (LB)	AN: 0 (LB)	ANFO: 0 (LB)	Emulsion: 7,220 (LB)
Depth: 25.5 (FT)	YD3: 8,656	Tons: 19,043	Tons/Lb: 2.62
Gallons of Fuel: 0			
Max Lbs/Delay: 452 (LB)	Holes / 8ms: 3	Location: N 038 36 26.76000	& W-104 56 38.1000
Temperature: 88° F	Wind Dir: North	Wind Speed: 7 MPH	Ceiling: High
Conditions: Partly Cloudy	Method of Detonation: Electronic		
Pre-Blast Inspection Performed: ☒ Yes / ☐ No	Initiation: Remote		
Load Started: 7:30 AM	Load Ended: 10:00 AM	Total Load Time: 02:30	
Comments: Shot drilled with GPS drilling. All holes wet and loaded from the bottom. Density at 1.15 Cup. We had a tagging issue with our count so we retagged the pattern and corrected the problem. Shot has good breakage.			

Crew

Name	Hours	Name	Hours
Justin Banks	5	Luke Reel	4
Rhys Pupo-Davis	4	Trevor Frogge	4

Trucks Used: 5013

Inventory

Description	Date Code	Out	Description	Date Code	Out
SPARTAN 350SR	18FE18	51	DIGISHOT 30 FT	07MY18	51

Services

Service	Quantity	Service	Quantity
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Product Totals

Product	Total (LB)
SPARTAN 350SR	38.25
TITAN 1000 XL	7,220

Row	Col	Depth	Rise	Stem	Wet?	Product	Hole Total (LB)
A	1	25.5	10.5	15	No	SPARTAN 350SR	0.75
A	1	25.5	10.5	15	No	TITAN 1000 XL	120
A	2	25.5	10.5	15	No	SPARTAN 350SR	0.75
A	2	25.5	10.5	15	No	TITAN 1000 XL	120
A	3	25.5	10.5	15	No	SPARTAN 350SR	0.75
A	3	25.5	10.5	15	No	TITAN 1000 XL	120
A	4	25.5	10.5	15	No	SPARTAN 350SR	0.75
A	4	25.5	10.5	15	No	TITAN 1000 XL	120
A	5	25.5	10.5	15	No	SPARTAN 350SR	0.75
A	5	25.5	10.5	15	No	TITAN 1000 XL	120
A	6	25.5	10.5	15	No	SPARTAN 350SR	0.75
A	6	25.5	10.5	15	No	TITAN 1000 XL	120
A	7	25.5	10.5	15	No	SPARTAN 350SR	0.75
A	7	25.5	10.5	15	No	TITAN 1000 XL	120
A	8	25.5	10.5	15	No	SPARTAN 350SR	0.75
A	8	25.5	10.5	15	No	TITAN 1000 XL	120
A	9	25.5	10.5	15	No	SPARTAN 350SR	0.75
A	9	25.5	10.5	15	No	TITAN 1000 XL	120
A	10	25.5	10.5	15	No	SPARTAN 350SR	0.75
A	10	25.5	10.5	15	No	TITAN 1000 XL	120
B	1	25.5	13.5	12	No	SPARTAN 350SR	0.75
B	1	25.5	13.5	12	No	TITAN 1000 XL	149.730
B	2	25.5	13.5	12	No	SPARTAN 350SR	0.75
B	2	25.5	13.5	12	No	TITAN 1000 XL	149.730
B	3	25.5	13.5	12	No	SPARTAN 350SR	0.75
B	3	25.5	13.5	12	No	TITAN 1000 XL	149.730
B	4	25.5	13.5	12	No	SPARTAN 350SR	0.75
B	4	25.5	13.5	12	No	TITAN 1000 XL	149.730
B	5	25.5	13.5	12	No	SPARTAN 350SR	0.75
B	5	25.5	13.5	12	No	TITAN 1000 XL	149.730
B	6	25.5	13.5	12	No	SPARTAN 350SR	0.75
B	6	25.5	13.5	12	No	TITAN 1000 XL	149.730
B	7	25.5	13.5	12	No	SPARTAN 350SR	0.75
B	7	25.5	13.5	12	No	TITAN 1000 XL	149.730
B	8	25.5	13.5	12	No	SPARTAN 350SR	0.75
B	8	25.5	13.5	12	No	TITAN 1000 XL	149.730
C	1	25.5	10.5	15	No	SPARTAN 350SR	0.75
C	1	25.5	10.5	15	No	TITAN 1000 XL	120
C	2	25.5	13.5	12	No	SPARTAN 350SR	0.75
C	2	25.5	13.5	12	No	TITAN 1000 XL	149.730
C	3	25.5	13.5	12	No	SPARTAN 350SR	0.75

C	3	25.5	13.5	12	No	TITAN 1000 XL	149.730
C	4	25.5	13.5	12	No	SPARTAN 350SR	0.75
C	4	25.5	13.5	12	No	TITAN 1000 XL	149.730
C	5	25.5	13.5	12	No	SPARTAN 350SR	0.75
C	5	25.5	13.5	12	No	TITAN 1000 XL	149.730
C	6	25.5	13.5	12	No	SPARTAN 350SR	0.75
C	6	25.5	13.5	12	No	TITAN 1000 XL	149.730
C	7	25.5	13.5	12	No	SPARTAN 350SR	0.75
C	7	25.5	13.5	12	No	TITAN 1000 XL	149.730
C	8	25.5	13.5	12	No	SPARTAN 350SR	0.75
C	8	25.5	13.5	12	No	TITAN 1000 XL	149.730
C	9	25.5	13.5	12	No	SPARTAN 350SR	0.75
C	9	25.5	13.5	12	No	TITAN 1000 XL	149.730
D	1	25.5	10.5	15	No	SPARTAN 350SR	0.75
D	1	25.5	10.5	15	No	TITAN 1000 XL	120
D	2	25.5	13.5	12	No	SPARTAN 350SR	0.75
D	2	25.5	13.5	12	No	TITAN 1000 XL	149.730
D	3	25.5	13.5	12	No	SPARTAN 350SR	0.75
D	3	25.5	13.5	12	No	TITAN 1000 XL	149.730
D	4	25.5	13.5	12	No	SPARTAN 350SR	0.75
D	4	25.5	13.5	12	No	TITAN 1000 XL	149.730
D	5	25.5	13.5	12	No	SPARTAN 350SR	0.75
D	5	25.5	13.5	12	No	TITAN 1000 XL	149.730
D	6	25.5	13.5	12	No	SPARTAN 350SR	0.75
D	6	25.5	13.5	12	No	TITAN 1000 XL	149.730
D	7	25.5	13.5	12	No	SPARTAN 350SR	0.75
D	7	25.5	13.5	12	No	TITAN 1000 XL	149.730
D	8	25.5	13.5	12	No	SPARTAN 350SR	0.75
D	8	25.5	13.5	12	No	TITAN 1000 XL	149.730
E	1	25.5	13.5	12	No	SPARTAN 350SR	0.75
E	1	25.5	13.5	12	No	TITAN 1000 XL	149.730
E	2	25.5	13.5	12	No	SPARTAN 350SR	0.75
E	2	25.5	13.5	12	No	TITAN 1000 XL	149.730
E	3	25.5	13.5	12	No	SPARTAN 350SR	0.75
E	3	25.5	13.5	12	No	TITAN 1000 XL	149.730
E	4	25.5	13.5	12	No	SPARTAN 350SR	0.75
E	4	25.5	13.5	12	No	TITAN 1000 XL	149.730
E	5	25.5	13.5	12	No	SPARTAN 350SR	0.75
E	5	25.5	13.5	12	No	TITAN 1000 XL	149.730
E	6	25.5	13.5	12	No	SPARTAN 350SR	0.75
E	6	25.5	13.5	12	No	TITAN 1000 XL	149.730
F	1	25.5	10.5	15	No	SPARTAN 350SR	0.75
F	1	25.5	10.5	15	No	TITAN 1000 XL	120

F	2	25.5	13.5	12	No	SPARTAN 350SR	0.75
F	2	25.5	13.5	12	No	TITAN 1000 XL	149.730
F	3	25.5	13.5	12	No	SPARTAN 350SR	0.75
F	3	25.5	13.5	12	No	TITAN 1000 XL	149.730
F	4	25.5	13.5	12	No	SPARTAN 350SR	0.75
F	4	25.5	13.5	12	No	TITAN 1000 XL	149.730
F	5	25.5	13.5	12	No	SPARTAN 350SR	0.75
F	5	25.5	13.5	12	No	TITAN 1000 XL	149.730
G	1	25.5	13.5	12	No	SPARTAN 350SR	0.75
G	1	25.5	13.5	12	No	TITAN 1000 XL	149.730
G	2	25.5	13.5	12	No	SPARTAN 350SR	0.75
G	2	25.5	13.5	12	No	TITAN 1000 XL	149.730
G	3	25.5	13.5	12	No	SPARTAN 350SR	0.75
G	3	25.5	13.5	12	No	TITAN 1000 XL	149.730
G	4	25.5	13.5	12	No	SPARTAN 350SR	0.75
G	4	25.5	13.5	12	No	TITAN 1000 XL	149.730
G	5	25.5	10.5	15	No	SPARTAN 350SR	0.75
G	5	25.5	10.5	15	No	TITAN 1000 XL	120

Martin Marietta

Red Canyon Quarry, CO

#9-07-2018
July 17, 2018
JD Farmer



Summary

# Holes	51
Tonnage Blasted	19,043 tons
Explosives Weight	7,258.25 lbs
Powder Factor	2.62 tons / lb
Bulk Product Type	Titan 1000XL
Priming	DigiShot / Spartan 350SR
Hole Diameter	4.5"
Face Height	40'

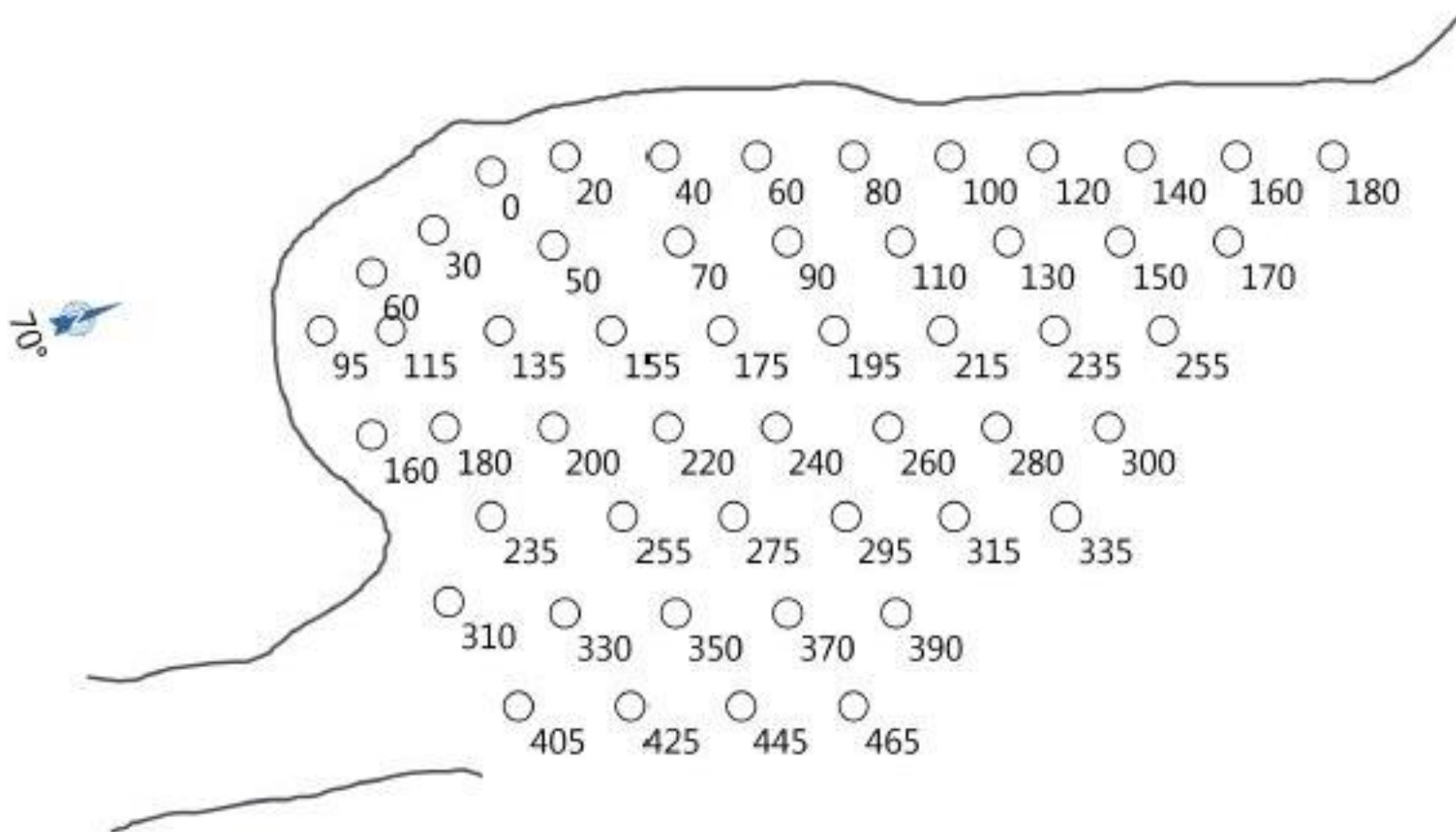
	Main Shot (ft)	Face Row (ft)
Burden x Spacing	13 x 15	15 x 13
Hole Depth	25.5	25.5
Subdrill	2'	3'
Stemming	12'	15'



Summary (continued)

- **Performance**
 - The Shot has good breakage
- **Loading Notes**
 - All of the holes are wet
 - Going to the bottom of every hole
 - Cup Density 1.15
 - Face hole stemming at 15'
 - Main hole Stemming at 12'
- **Maximum Air Blast**
 - 118 dB at North Hill Side





Blast diagram





looking South East





West Face Red arrow is at the opening hole.





Lower West face





Lower South face





Blast Video





Post Blast





Backbreak



Seismic Analysis

Velocity Waveform Analysis

Serial Number: 7816
 Firmware Version: 0C-06.05
 Event Date: 07/17/2018 11:27:23 (UTC -06:00)
 Event number: 20
 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):	0.07	0.063	0.065
FREQ (HZ):	31.3	27.8	38.5
PD (.001"):	0.54	0.52	0.36
PPA (g):	0.039	0.039	0.039

Peak Vector Sum: 0.08 in/s
 Peak Air Pressure: 118 dB
 0.0025 psi @ 1.5 HZ

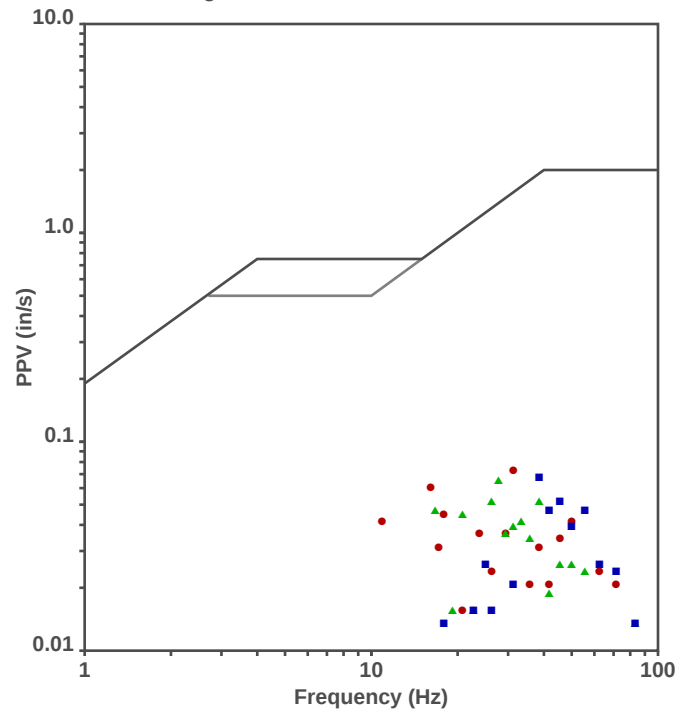
Shaketable Calibrated

On: 09/02/2017 (UTC -06:00)
 By: Vibra-Tech, Inc.
 2700 Holloway Road - Suite 113
 Louisville, KY 40203 U.S.A.

USBM Safe Blasting Levels

SSN: 7816 Event: 20

● Longitudinal ▲ Transverse ■ Vertical



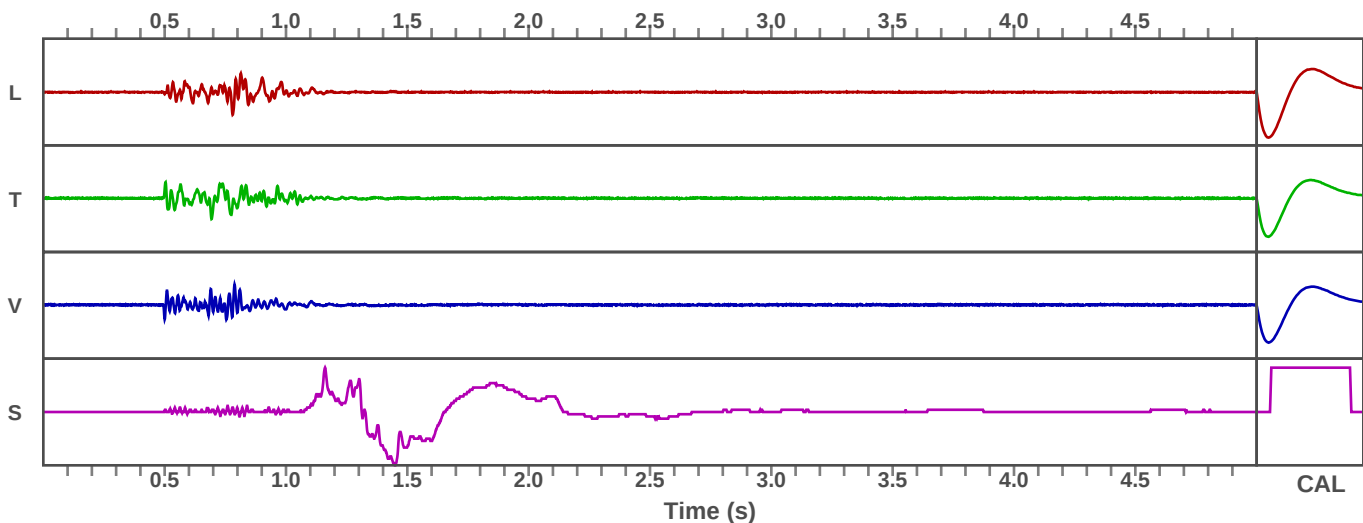
Zero Crossing Half-Wave Frequency Analysis

Waveform Graph Scale

Time Scale: 0.1 s
 Seismic Scale: +/- 0.16 in/s
 Sound Scale: +/- 0.0024 psi

Velocity Waveform

SSN: 7816 Event: 20



Seismic Analysis

Stop Event Report

Serial Number:	7229 0C-06.05	Begin Date:	07/17/2018 05:01:07 (UTC -06:00)
Client:	Martin Marietta	End Date:	07/17/2018 22:00:00 (UTC -06:00)
Operation:	Red Canyon Quarry	Events Over Trigger:	0
Location:	Front Entrance	Record Time:	5 s
Operator:	Vibra Tech	Seismic Trigger:	0.02 in/s
Comment:		Sound Trigger:	133 dB
		Battery:	8.5 volts
Additional Info:			
	j-GEO-16222	Shaketable Calibrated:	
	N38 36 04 W104 56 59	On:	01/24/2018 (UTC -06:00)
		By:	Vibra-Tech, Inc.
			2700 Holloway Road - Suite 113
			Louisville, KY 40203 U.S.A.

Dynamic Calibration Graph:





STATE OF
COLORADO

Cazier - DNR, Tim <tim.cazier@state.co.us>

Blast report for shot #10/ 7-2018

1 message

Wayne Stoughton <Wayne.Stoughton@martinmarietta.com>

Mon, Jul 30, 2018 at 6:51 AM

To: Tim Cazier - DNR <tim.cazier@state.co.us>

Good Morning Tim,

I was off last Thursday and Friday so I do apologize for taking so long to get this blast report to you. If you have any questions or concerns please feel free to contact me.

Wayne Stoughton

Manager, Red Canyon Quarry| Rocky Mountain Agg District

Martin Marietta

3131 Barrett Road, Colorado Springs, CO 80926

t. (719) 629-8372

e. wayne.stoughton@martinmarietta.com

www.martinmarietta.com

4 attachments



MM Red Canyon #10-07-2018.pptx

11976K



Blaast report #10 7-2018.pdf

3776K



N hill side pd07_Rb0VrL.pdf

99K



Red Canyon Front Entrance.pdf

9K