

Buckley Powder Co.**BLAST REPORT**SERVICE SITE LOCATION: Louviers ORDER NO.: 7403766BLAST NUMBER: #1-02-2018 BLAST TIME: 12:45 pm BLAST DATE: 02/08/2018
CUSTOMER: MARTIN MARIETTA MINE: RED CANYON ADDRESS: Colorado Springs, CO
ROCK TYPE: Granite Tons/Yd3: 2.21 EXPECTED VIBRATION: 0.000 IPS**LOCATION OF BLAST**LOCATION OF BLAST IN MINE: North BENCH: Bench 6
BLAST GPS POINTS: N 038 36 24.78000 & W -104 56 43.44000**WEATHER**WEATHER: Partly Cloudy CEILING: Medium TEMPERATURE: 58 F WIND DIRECTION & SPEED: East 15 MPH**NEAREST NON-OWNED STRUCTURE**NAME: Front Entrance GPS Points: N 038 36 03.70020 & W -104 56 58.92000
DISTANCE: 2,465 (FT) DIRECTION: 209°**SEISMOGRAPH DATA**

LOCATION		DISTANCE	GPS POINTS		CALIBRATION DATE	
1	Front Entrance	2,465 (FT)	N 038 36 03.70020 & W -104 56 58.92000		04/13/2017	
	L (F)	T (F)	V (F)	AIR (db)	SEISMOGRAPH SERIAL	OPERATOR
1	0.180	7.5	0.023 6.2	0.010 9.1	118 VibraTech 10696	10696

BLAST DATA

NUMBER OF HOLES (EA)		75	EXPLOSIVES SIZE, TYPE & WEIGHT		
HOLE DIAMETER (IN)		4.5	SIZE	TYPE	WEIGHT
HOLE DEPTH (FT)		46 - 47	0.75	SPARTAN 350SR	112.5
FACE HEIGHT (FT)		43 - 44	BULK	TITAN 1000 XL	23,440
SUB DRILLING (FT)		3			
AVG. STEM FACE HOLES (FT)		13.221			
STEM OTHER HOLES (FT)		11.987			
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):					23,552.5

DETONATORS USED IN BLAST: Electronic MATS USED: No STEM TYPE: 3/4 x 1/2 CRUSHED TOTAL DRILL DEPTH: 3,471 (FT)

TYPE	MFG	DATE CODE	USED	TYPE	MFG	DATE CODE	USED
DIGISHOT DETONATOR 50FT	Dyno Nobel Global	25SE17	146	SPARTAN 350SR	Dyno Nobel Global	13AU17	146

CU YDS IN SHOT: 23,386 SCALED DISTANCE FACTOR: 97 % OF ANFO: 0TONS IN SHOT: 51,682 HOLES/DELAY: 2 FUEL OIL % (BULK): 0MAX LBS/DELAY: 645 AVERAGE LBS/HOLE: 315POWDER FACTOR (TONS/LB): 2.19 POWDER FACTOR POUNDS/YD3: 1.01BLASTERS NAME: Farmer, Jimmie BLASTERS NUMBER & STATE: 1-035-0748 ColoradoBLASTERS SIGNATURE: Jimmie Farmer SITE SAFETY INSPECTION PERFORMED: YesNUMBER OF PERSONNEL ON SITE: 6

REMARKS : Matt Klepfer Laid the pattern out for GPS drilling. Two days before the shot, Matt and I came and Boretracked the face holes and taped all of the holes, We had five that needed to be redrilled and Jon did this. We came back and did a pre load, and up loaded this to the truck. The day of the shot we had a meeting with Wayne and Jon and decided not to use the Blue Delta E hose because of the small 4.5" holes and softer rock. All holes had 2 to 40' of water and we did go down all holes. Shot has good breakage and very few larger rocks.

START TIME	END TIME	TOTAL TIME	TRUCK NUMBERS
7:30 AM	11:30 AM	04:00	5093

APPENDIX A

Date: 2/8/2018

Location: MM Rd/Camp

shot #: 1-2-2018

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

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

✓	Drill Logs
✓	Shot reports
✓	Hold Harnesses
✓	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/ft 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)
✓	Blast area is cleared and blocked before attaching starter cap and lead line <u>Matt K</u> <u>Luke Reed</u>
✓	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

JP Farn

Seismic Analysis

Velocity Waveform Analysis

Serial Number: 10696
 Firmware Version: 0C-06.05
 Event Date: 02/08/2018 12:45:43 (UTC -07:00)
 Event number: 11
 Recording Time: 5 s
 Client: Martin Marietta
 Operation: Red Canyon Quarry
 Location: Front Entrance
 Distance:
 Operator: Vibra Tech
 Comment:
 Seismic Trigger: 0.02 in/s
 Sound Trigger: 133 dB

Additional Info:

j-GEO-16222
 N38 36 04 W104 56 59

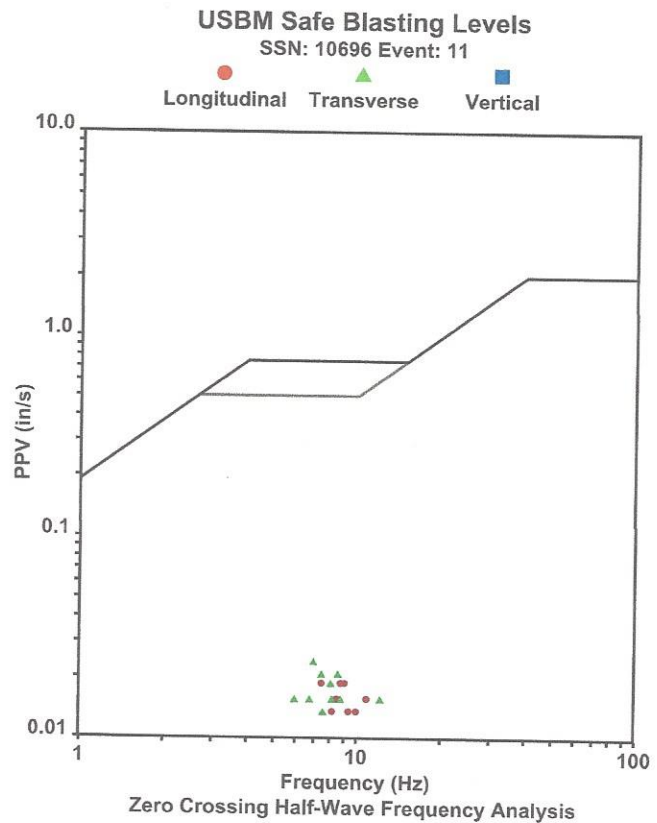
Summary Data

	L	T	V
PPV (in/s):	0.018	0.023	0.01
FREQ (HZ):	7.5	6.2	9.1
PD (.001"):	0.37	0.46	0.25
PPA (g):	0.013	0.013	0.013

Peak Vector Sum: 0.023 in/s
 Peak Air Pressure: 118 dB
 0.0023 psi @ 4.3 HZ

Shaketable Calibrated

On: 04/13/2017 (UTC -07:00)
 By: Vibra-Tech, Inc.
 2700 Holloway Road - Suite 113
 Louisville, KY 40203 U.S.A.

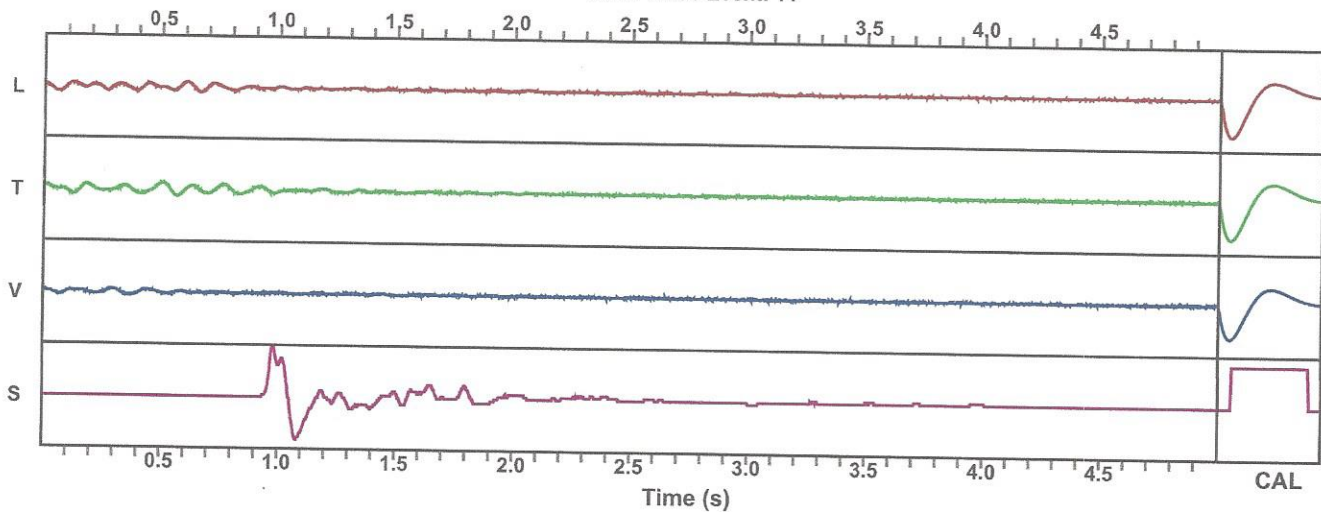


Waveform Graph Scale

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

Velocity Waveform

SSN: 10696 Event: 11



Seismic Analysis

Velocity Waveform Analysis

Serial Number: 7816
 Firmware Version: 0C-06.05
 Event Date: 02/08/2018 12:45:58 (UTC -07:00)
 Event number: 4
 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

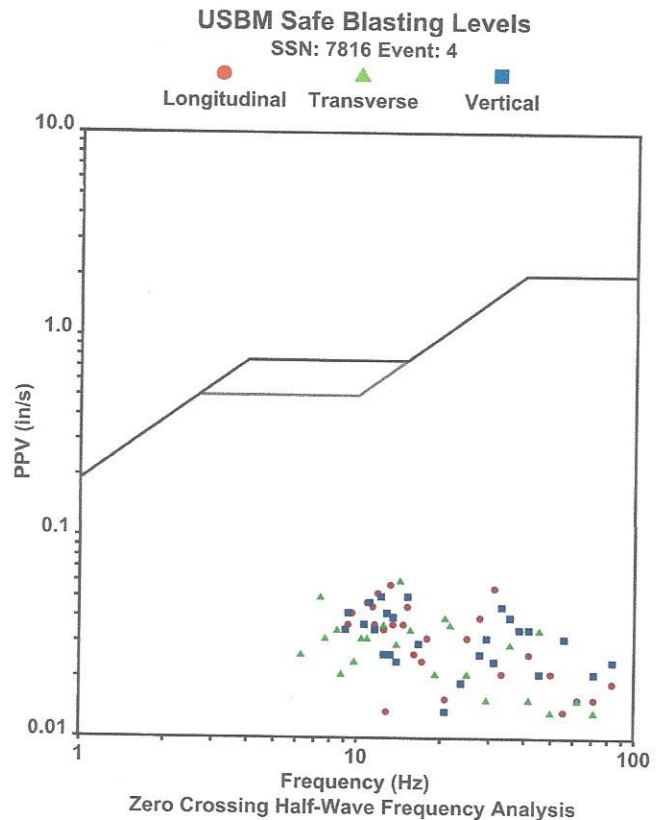
Summary Data

	L	T	V
PPV (in/s):	0.055	0.058	0.048
FREQ (HZ):	13.2	14.3	15.2
PD (.001"):	0.68	0.75	0.68
PPA (g):	0.026	0.033	0.033

Peak Vector Sum: 0.068 in/s
 Peak Air Pressure: 116 dB
 0.0019 psi @ 3.3 HZ

Shaketable Calibrated

On: 09/02/2017 (UTC -07:00)
 By: Vibra-Tech, Inc.
 2700 Holloway Road - Suite 113
 Louisville, KY 40203 U.S.A.

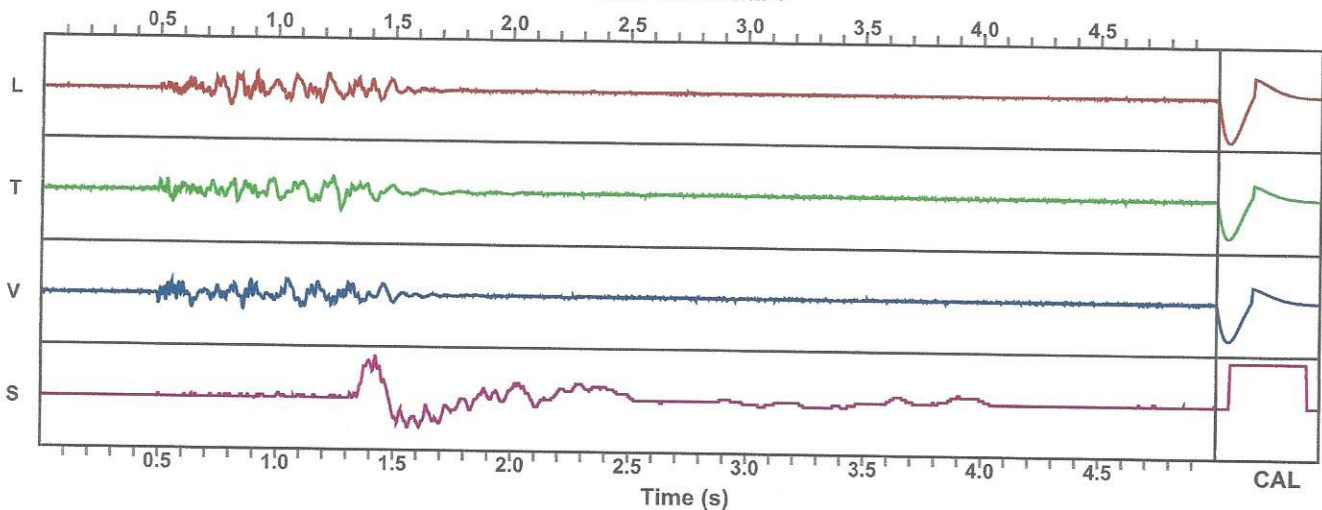


Waveform Graph Scale

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

Velocity Waveform

SSN: 7816 Event: 4

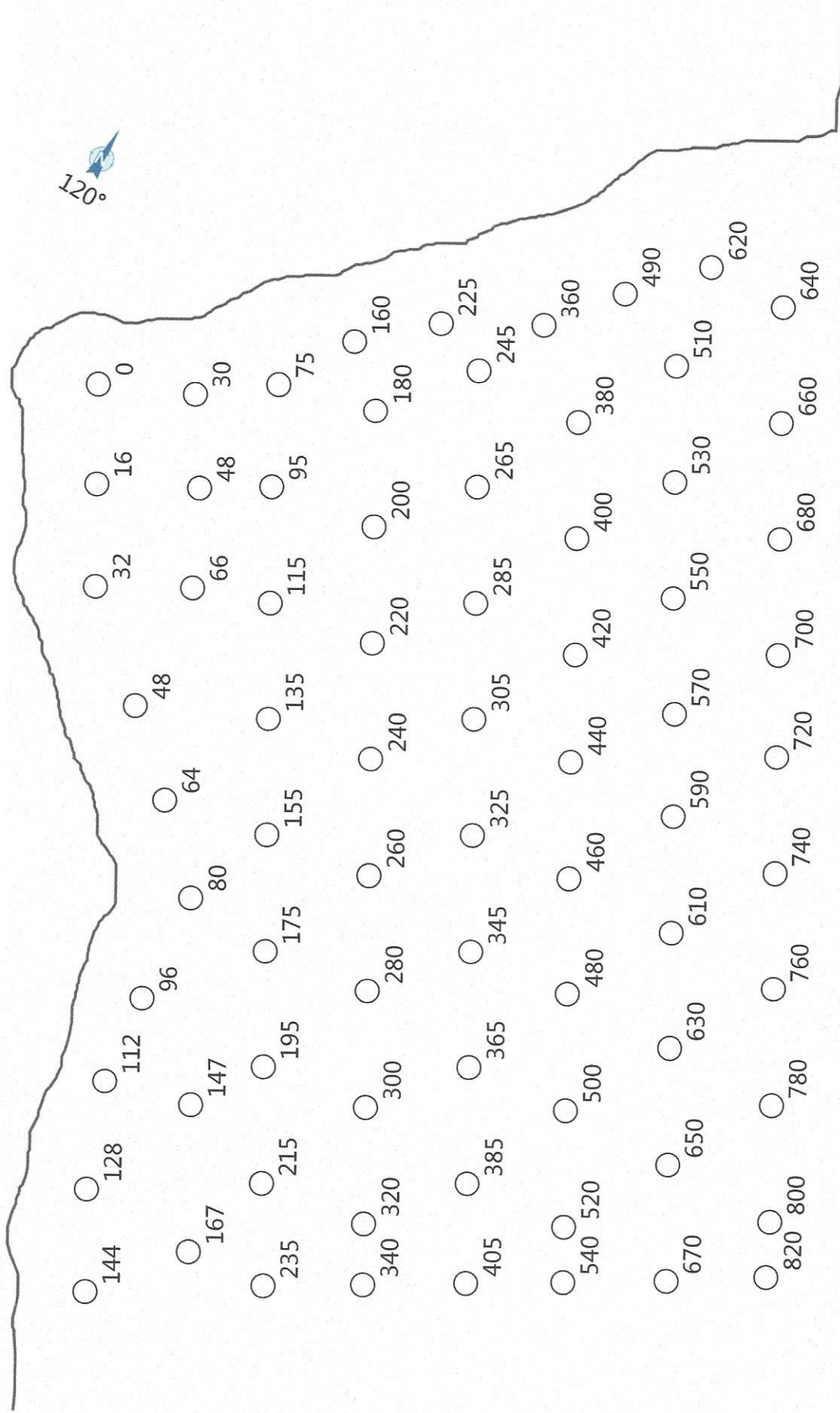


Buckley Powder Co.

CUSTOMER NAME: RED CANYON
BENCH: Bench 6
BLASTER'S NAME: Farmer, Jimmie

DIAGRAM

BLAST DATE: 02/08/2018
BLAST NUMBER: #1-02-2018



Shot: #1-02-2018

Bench: Bench 6

Customer: MARTIN MARIETTA

Site: Louviers

Load Sheet Report



Mine: RED CANYON	Shot: #1-02-2018	Date: 2/8/2018	Time: 12:45PM
Blaster: Farmer, Jimmie	License: 1-035-0748	Material: Granite	Holes: 75
Diameter: 4.5 (IN)	Burden: 13 (FT)	Spacing: 15 (FT)	Primers: 150
Exp. Vibration: 0.00 IPS	Fr. Burden: 14 (FT)	Fr. Spacing: 14 (FT)	Total Exp.: 23,553 (LB)
Fuel: 0 (LB)	AN: 0 (LB)	ANFO: 0 (LB)	Emulsion: 23,440 (LB)
Depth: 46 - 47 (FT)	YD3: 23,386	Tons: 51,682	Tons/Lb: 2.19
Max Lbs/Delay: 645 (LB)	Holes / 8ms: 2	Location: N 038 36 24.78000	& W -104 56 43.4400
Temperature: 58° F	Wind Dir: East	Wind Speed: 15 MPH	Ceiling: Medium
Conditions: Partly Cloudy	Method of Detonation: Electronic		
Pre-Blast Inspection Performed: ☒ Yes / ☐ No	Initiation: Remote		
Load Started: 7:30 AM	Load Ended: 11:30 AM	Total Load Time: 04:00	
Comments: Matt Klepfer Laid the pattern out for GPS drilling. Two days before the shot, Matt and I came and Boretracked the face holes and taped all of the holes, We had five that needed to be redrilled and Jon did this. We came back and did a pre load, and up loaded this to the truck. The day of the shot we had a meeting with Wayne and Jon and decided not to use the Blue Delta E hose because of the small 4.5" holes and softer rock. All holes had 2 to 40' of water and we did go down all holes. Shot has good breakage and very few larger rocks.			

Crew

Name	Hours	Name	Hours
Daniel Stephens	7	Luke Reel	7
Luke Swearingen	5	Matt Klepfer	8
Rod Schuch	8		

Trucks Used: 5093

Inventory

Description	Date Code	Out	Description	Date Code	Out
SPARTAN 350SR	13AU17	146	DIGISHOT DETONATOR 50FT	25SE17	146

Services

Service	Quantity	Service	Quantity
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Product Totals

Product	Total (LB)
SPARTAN 350SR	112.5
TITAN 1000 XL	23,440

Row	Col	Depth	Rise	Stem	Wet?	Product	Hole Total (LB)
A	1	46	32	14	No	SPARTAN 350SR	1.5
A	1	46	32	14	No	TITAN 1000 XL	288.5
A	2	46	32	14	No	SPARTAN 350SR	1.5
A	2	46	32	14	No	TITAN 1000 XL	288.5
A	3	46	32	14	No	SPARTAN 350SR	1.5
A	3	46	32	14	No	TITAN 1000 XL	288.5
A	4	46	32	14	No	SPARTAN 350SR	1.5
A	4	46	32	14	No	TITAN 1000 XL	288.5
A	5	46	32	14	No	SPARTAN 350SR	1.5
A	5	46	32	14	No	TITAN 1000 XL	288.5
A	6	46	32	14	No	SPARTAN 350SR	1.5
A	6	46	32	14	No	TITAN 1000 XL	288.5
A	7	46	32	14	No	SPARTAN 350SR	1.5
A	7	46	32	14	No	TITAN 1000 XL	288.5
A	8	46	32	14	No	SPARTAN 350SR	1.5
A	8	46	32	14	No	TITAN 1000 XL	288.5
A	9	46	32	14	No	SPARTAN 350SR	1.5
A	9	46	32	14	No	TITAN 1000 XL	288.5
A	10	46	32	14	No	SPARTAN 350SR	1.5
A	10	46	32	14	No	TITAN 1000 XL	288.5
B	1	46	34.25	11.75	No	SPARTAN 350SR	1.5
B	1	46	34.25	11.75	No	TITAN 1000 XL	320.962
B	2	46	34.25	11.75	No	SPARTAN 350SR	1.5
B	2	46	34.25	11.75	No	TITAN 1000 XL	320.962
B	3	46	34.25	11.75	No	SPARTAN 350SR	1.5
B	3	46	34.25	11.75	No	TITAN 1000 XL	320.962
B	4	46	34.25	11.75	No	SPARTAN 350SR	1.5
B	4	46	34.25	11.75	No	TITAN 1000 XL	320.962
B	5	46	34.25	11.75	No	SPARTAN 350SR	1.5
B	5	46	34.25	11.75	No	TITAN 1000 XL	320.962
C	1	46	34.25	11.75	No	SPARTAN 350SR	1.5
C	1	46	34.25	11.75	No	TITAN 1000 XL	320.962
C	2	46	34.25	11.75	No	SPARTAN 350SR	1.5
C	2	46	34.25	11.75	No	TITAN 1000 XL	320.962
C	3	46	34.25	11.75	No	SPARTAN 350SR	1.5
C	3	46	34.25	11.75	No	TITAN 1000 XL	320.962
C	4	46	34.25	11.75	No	SPARTAN 350SR	1.5
C	4	46	34.25	11.75	No	TITAN 1000 XL	320.962
C	5	46	34.25	11.75	No	SPARTAN 350SR	1.5
C	5	46	34.25	11.75	No	TITAN 1000 XL	320.962
C	6	46	34.25	11.75	No	SPARTAN 350SR	1.5

C	6	46	34.25	11.75	No	TITAN 1000 XL	320.962
C	7	46	34.25	11.75	No	SPARTAN 350SR	1.5
C	7	46	34.25	11.75	No	TITAN 1000 XL	320.962
C	8	46	34.25	11.75	No	SPARTAN 350SR	1.5
C	8	46	34.25	11.75	No	TITAN 1000 XL	320.962
C	9	46	34.25	11.75	No	SPARTAN 350SR	1.5
C	9	46	34.25	11.75	No	TITAN 1000 XL	320.962
D	1	46	34.25	11.75	No	SPARTAN 350SR	1.5
D	1	46	34.25	11.75	No	TITAN 1000 XL	320.962
D	2	46	34.25	11.75	No	SPARTAN 350SR	1.5
D	2	46	34.25	11.75	No	TITAN 1000 XL	320.962
D	3	46	34.25	11.75	No	SPARTAN 350SR	1.5
D	3	46	34.25	11.75	No	TITAN 1000 XL	320.962
D	4	46	34.25	11.75	No	SPARTAN 350SR	1.5
D	4	46	34.25	11.75	No	TITAN 1000 XL	320.962
D	5	46	34.25	11.75	No	SPARTAN 350SR	1.5
D	5	46	34.25	11.75	No	TITAN 1000 XL	320.962
D	6	46	34.25	11.75	No	SPARTAN 350SR	1.5
D	6	46	34.25	11.75	No	TITAN 1000 XL	320.962
D	7	46	34.25	11.75	No	SPARTAN 350SR	1.5
D	7	46	34.25	11.75	No	TITAN 1000 XL	320.962
D	8	46	34.25	11.75	No	SPARTAN 350SR	1.5
D	8	46	34.25	11.75	No	TITAN 1000 XL	320.962
D	9	46	34.25	11.75	No	SPARTAN 350SR	1.5
D	9	46	34.25	11.75	No	TITAN 1000 XL	320.962
D	10	46	34.25	11.75	No	SPARTAN 350SR	1.5
D	10	46	34.25	11.75	No	TITAN 1000 XL	320.962
E	1	46	34.25	11.75	No	SPARTAN 350SR	1.5
E	1	46	34.25	11.75	No	TITAN 1000 XL	320.962
E	2	46	34.25	11.75	No	SPARTAN 350SR	1.5
E	2	46	34.25	11.75	No	TITAN 1000 XL	320.962
E	3	46	34.25	11.75	No	SPARTAN 350SR	1.5
E	3	46	34.25	11.75	No	TITAN 1000 XL	320.962
E	4	46	34.25	11.75	No	SPARTAN 350SR	1.5
E	4	46	34.25	11.75	No	TITAN 1000 XL	320.962
E	5	46	34.25	11.75	No	SPARTAN 350SR	1.5
E	5	46	34.25	11.75	No	TITAN 1000 XL	320.962
E	6	46	34.25	11.75	No	SPARTAN 350SR	1.5
E	6	46	34.25	11.75	No	TITAN 1000 XL	320.962
E	7	46	34.25	11.75	No	SPARTAN 350SR	1.5
E	7	46	34.25	11.75	No	TITAN 1000 XL	320.962
E	8	46	34.25	11.75	No	SPARTAN 350SR	1.5
E	8	46	34.25	11.75	No	TITAN 1000 XL	320.962

E	9	46	34.25	11.75	No	SPARTAN 350SR	1.5
E	9	46	34.25	11.75	No	TITAN 1000 XL	320.962
E	10	46	34.25	11.75	No	SPARTAN 350SR	1.5
E	10	46	34.25	11.75	No	TITAN 1000 XL	320.962
F	1	46	34.25	11.75	No	SPARTAN 350SR	1.5
F	1	46	34.25	11.75	No	TITAN 1000 XL	320.962
F	2	46	34.25	11.75	No	SPARTAN 350SR	1.5
F	2	46	34.25	11.75	No	TITAN 1000 XL	320.962
F	3	46	34.25	11.75	No	SPARTAN 350SR	1.5
F	3	46	34.25	11.75	No	TITAN 1000 XL	320.962
F	4	46	34.25	11.75	No	SPARTAN 350SR	1.5
F	4	46	34.25	11.75	No	TITAN 1000 XL	320.962
F	5	46	34.25	11.75	No	SPARTAN 350SR	1.5
F	5	46	34.25	11.75	No	TITAN 1000 XL	320.962
F	6	46	34.25	11.75	No	SPARTAN 350SR	1.5
F	6	46	34.25	11.75	No	TITAN 1000 XL	320.962
F	7	46	34.25	11.75	No	SPARTAN 350SR	1.5
F	7	46	34.25	11.75	No	TITAN 1000 XL	320.962
F	8	46	34.25	11.75	No	SPARTAN 350SR	1.5
F	8	46	34.25	11.75	No	TITAN 1000 XL	320.962
F	9	46	34.25	11.75	No	SPARTAN 350SR	1.5
F	9	46	34.25	11.75	No	TITAN 1000 XL	320.962
F	10	46	34.25	11.75	No	SPARTAN 350SR	1.5
F	10	46	34.25	11.75	No	TITAN 1000 XL	320.962
G	1	46	34.25	11.75	No	SPARTAN 350SR	1.5
G	1	46	34.25	11.75	No	TITAN 1000 XL	320.962
G	2	46	34.25	11.75	No	SPARTAN 350SR	1.5
G	2	46	34.25	11.75	No	TITAN 1000 XL	320.962
G	3	46	34.25	11.75	No	SPARTAN 350SR	1.5
G	3	46	34.25	11.75	No	TITAN 1000 XL	320.962
G	4	46	34.25	11.75	No	SPARTAN 350SR	1.5
G	4	46	34.25	11.75	No	TITAN 1000 XL	320.962
G	5	46	34.25	11.75	No	SPARTAN 350SR	1.5
G	5	46	34.25	11.75	No	TITAN 1000 XL	320.962
G	6	46	34.25	11.75	No	SPARTAN 350SR	1.5
G	6	46	34.25	11.75	No	TITAN 1000 XL	320.962
G	7	47	34	13	No	SPARTAN 350SR	1.5
G	7	47	34	13	No	TITAN 1000 XL	297.308
G	8	47	34	13	No	SPARTAN 350SR	1.5
G	8	47	34	13	No	TITAN 1000 XL	297.308
G	9	47	34	13	No	SPARTAN 350SR	1.5
G	9	47	34	13	No	TITAN 1000 XL	297.308
G	10	47	34	13	No	SPARTAN 350SR	1.5

G	10	47	34	13	No	TITAN 1000 XL	297.308
H	1	46	34.25	11.75	No	SPARTAN 350SR	1.5
H	1	46	34.25	11.75	No	TITAN 1000 XL	320.962
H	2	46	34.25	11.75	No	SPARTAN 350SR	1.5
H	2	46	34.25	11.75	No	TITAN 1000 XL	320.962
H	3	47	34	13	No	SPARTAN 350SR	1.5
H	3	47	34	13	No	TITAN 1000 XL	297.308
H	4	47	34	13	No	SPARTAN 350SR	1.5
H	4	47	34	13	No	TITAN 1000 XL	297.308
H	5	47	34	13	No	SPARTAN 350SR	1.5
H	5	47	34	13	No	TITAN 1000 XL	297.308
H	6	47	34	13	No	SPARTAN 350SR	1.5
H	6	47	34	13	No	TITAN 1000 XL	297.308
H	7	47	34	13	No	SPARTAN 350SR	1.5
H	7	47	34	13	No	TITAN 1000 XL	297.308
H	8	47	34	13	No	SPARTAN 350SR	1.5
H	8	47	34	13	No	TITAN 1000 XL	297.308
H	9	47	34	13	No	SPARTAN 350SR	1.5
H	9	47	34	13	No	TITAN 1000 XL	297.308
H	10	47	34	13	No	SPARTAN 350SR	1.5
H	10	47	34	13	No	TITAN 1000 XL	297.308
H	11	47	34	13	No	SPARTAN 350SR	1.5
H	11	47	34	13	No	TITAN 1000 XL	297.308