

Buckley Powder Co.**BLAST REPORT**SERVICE SITE LOCATION: LouviersORDER NO.: D7403861BLAST NUMBER: 5-04-2018 BLAST TIME: 11:04 am BLAST DATE: 04/26/2018CUSTOMER: MARTIN MARIETTA MINE: RED CANYON ADDRESS: Colorado Springs, COROCK TYPE: Granite Tons/Yd3: 2.20 EXPECTED VIBRATION: 0.000 IPS**LOCATION OF BLAST**LOCATION OF BLAST IN MINE: North BENCH: Bench 6BLAST GPS POINTS: N 038 36 28.50000 & W -104 56 42.48000**WEATHER**WEATHER: Partly Cloudy CEILING: Medium TEMPERATURE: 52 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: 1,085 (FT) DIRECTION: 124°**SEISMOGRAPH DATA**

LOCATION				DISTANCE		GPS POINTS			CALIBRATION DATE	
1	North Hillside			1,085 (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	0.033	11.9	0.043	10	0.038	29.4	114	VibraTech 7816	7816	

BLAST DATA

NUMBER OF HOLES (EA)	34	EXPLOSIVES SIZE, TYPE & WEIGHT		
HOLE DIAMETER (IN)	4.5	SIZE	TYPE	WEIGHT
HOLE DEPTH (FT)	43	0.75	SPARTAN 350SR	51
FACE HEIGHT (FT)	40	BULK	TITAN 1000 XL	8,980
SUB DRILLING (FT)	3			
AVG. STEM FACE HOLES (FT)	15			
STEM OTHER HOLES (FT)	12			
BURDEN FRONT ROW (FT)	13			
BURDEN OTHER ROWS (FT)	13			
SPACING FRONT ROW (FT)	15			
SPACING OTHER ROWS (FT)	15		TOTAL WEIGHT (LB):	9,031

DETONATORS USED IN BLAST: ElectronicMATS USED: No STEM TYPE: 3/4 x 1/2 CRUSHEDTOTAL DRILL DEPTH: 1,462 (FT)

TYPE	MFG	DATE CODE	USED	TYPE	MFG	DATE CODE	USED
DIGISHOT DETONATOR 50FT	Dyno Nobel Global	19MA18	68	SPARTAN 350SR	Dyno Nobel Global	13AU17	68

CU YDS IN SHOT: 9,822 SCALED DISTANCE FACTOR: 38 % OF ANFO: 0TONS IN SHOT: 21,609 HOLES/DELAY: 3 FUEL OIL % (BULK): 0MAX LBS/DELAY: 807 AVERAGE LBS/HOLE: 266POWDER FACTOR (TONS/LB): 2.39 POWDER FACTOR POUNDS/YD3: 0.92BLASTER'S NAME: Farmer, Jimmie BLASTER'S NUMBER & STATE: 1-035-0748 ColoradoBLASTER'S SIGNATURE: [Signature] SITE SAFETY INSPECTION PERFORMED: YesNUMBER OF PERSONNEL ON SITE: 3REMARKS : Matt Klepfer Profiled the shot for GPS Drilling. After drilling Jon sent the drill penetration rates to determine the hardness of the rock so we can load it. Shot is all dry and loaded good. The shot pulled out nice and has good breakage.

START TIME	END TIME	TOTAL TIME	TRUCK NUMBERS
7:30 AM	10:30 AM	03:00	5092

APPENDIX A

Burch - 6

Date: 9-26-17

Location: mm Red canyon

shot #: 5



BLASTER'S CHECKLIST

Must be filled out as you go!

yes / no / NA 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 Harnesses
☒	Seismographs
☒	Density Cup and Scales
☒	Two Way Radios / fully
☒	Wheel Chocks
☒	Harness & Lanyard / "T" post
☒	First Aid Kits

yes / no / NA PRESIFT 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/holes 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.

yes / no / NA TIE-IN CHECKLIST

☒	Shot tie inspected and signed off by two persons prior to shot including lead line (include names below)
☒	<u>JD</u> <u>TOMAS X</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

yes / no / NA 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

70 F

Seismic Analysis

Velocity Waveform Analysis

Serial Number: 7816
 Firmware Version: 0C-06.05
 Event Date: 04/26/2018 11:04:25 (UTC -06:00)
 Event number: 13
 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):	0.033	0.043	0.038
FREQ (HZ):	11.9	10	29.4
PD (.001"):	0.38	0.57	0.48
PPA (g):	0.02	0.02	0.026

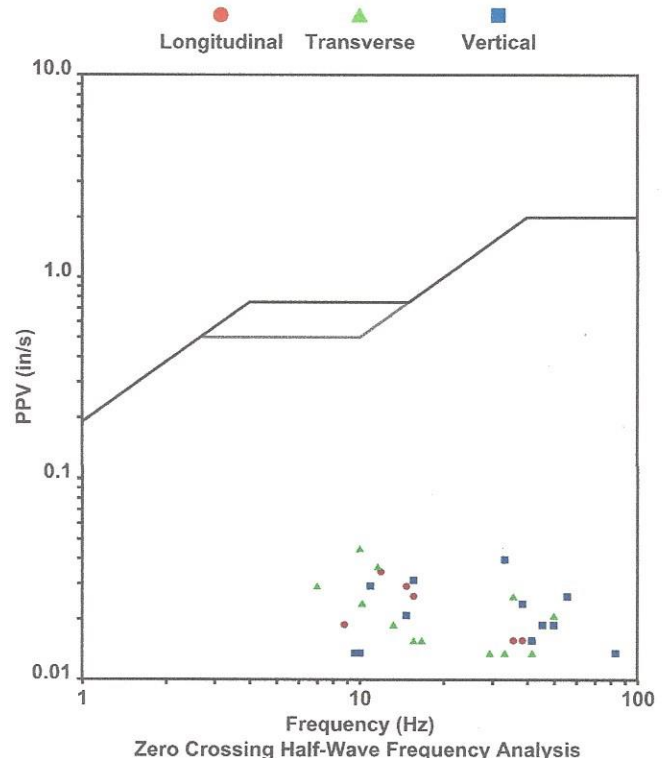
Peak Vector Sum: 0.048 in/s
 Peak Air Pressure: 114 dB
 0.0016 psi @ 10.2 HZ

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: 13



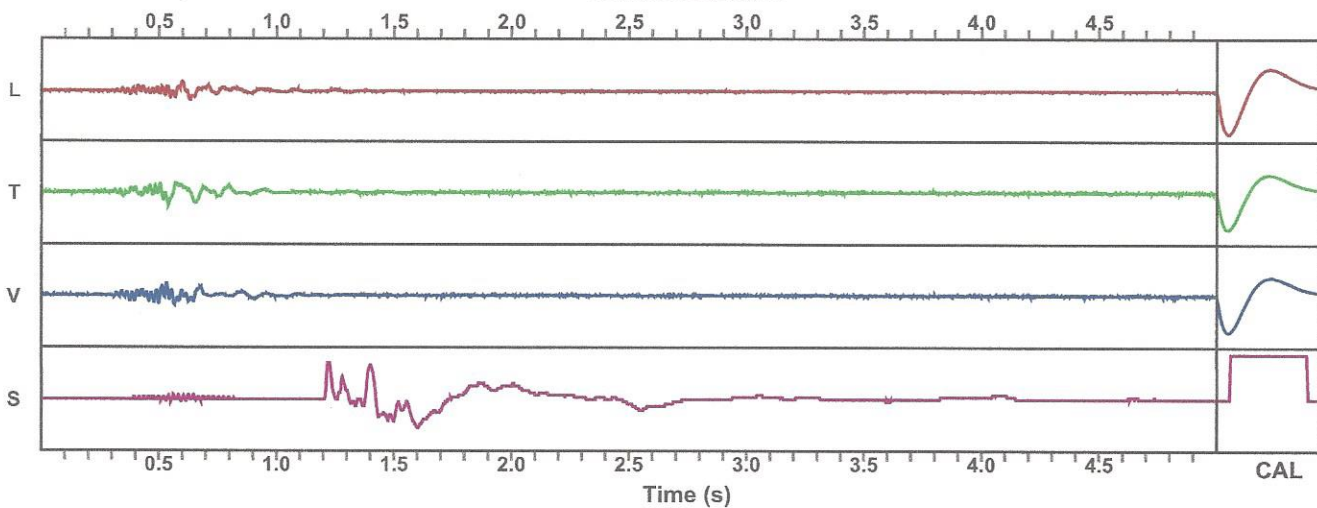
Zero Crossing Half-Wave Frequency Analysis

Waveform Graph Scale

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

Velocity Waveform

SSN: 7816 Event: 13



Seismic Analysis

Velocity Waveform Analysis

Serial Number: 7229
 Firmware Version: 0C-06.05
 Event Date: 04/26/2018 11:04:26 (UTC -06:00)
 Event number: 5
 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):	0.02	0.018	0.01
FREQ (HZ):	6.8	8.2	7.1
PD (.001"):	0.43	0.35	0.21
PPA (g):	0.013	0.013	0.013

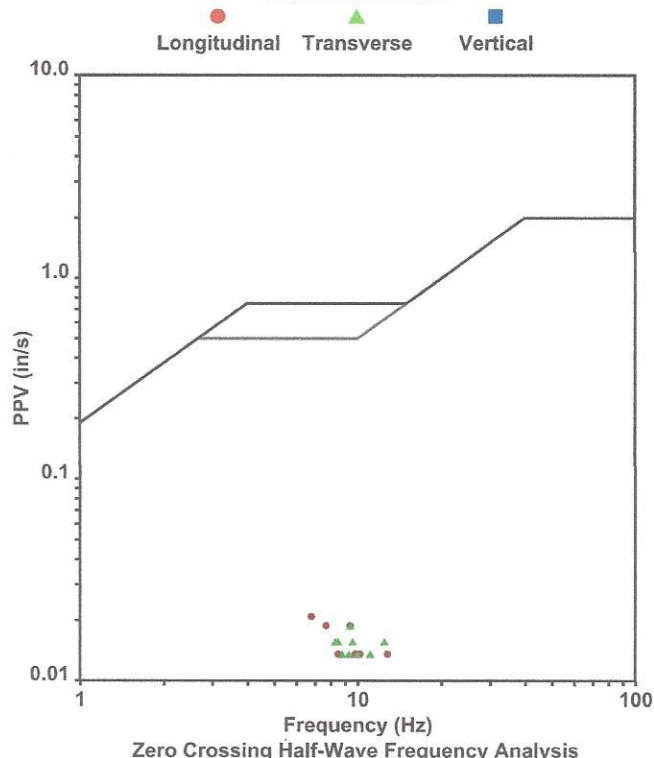
Peak Vector Sum: 0.023 in/s
 Peak Air Pressure: 111 dB
 0.001 psi @ 3.4 HZ

Shaketable Calibrated

On: 01/24/2018 (UTC -06:00)
 By: Vibra-Tech, Inc.
 2700 Holloway Road - Suite 113
 Louisville, KY 40203 U.S.A.

USBM Safe Blasting Levels

SSN: 7229 Event: 5

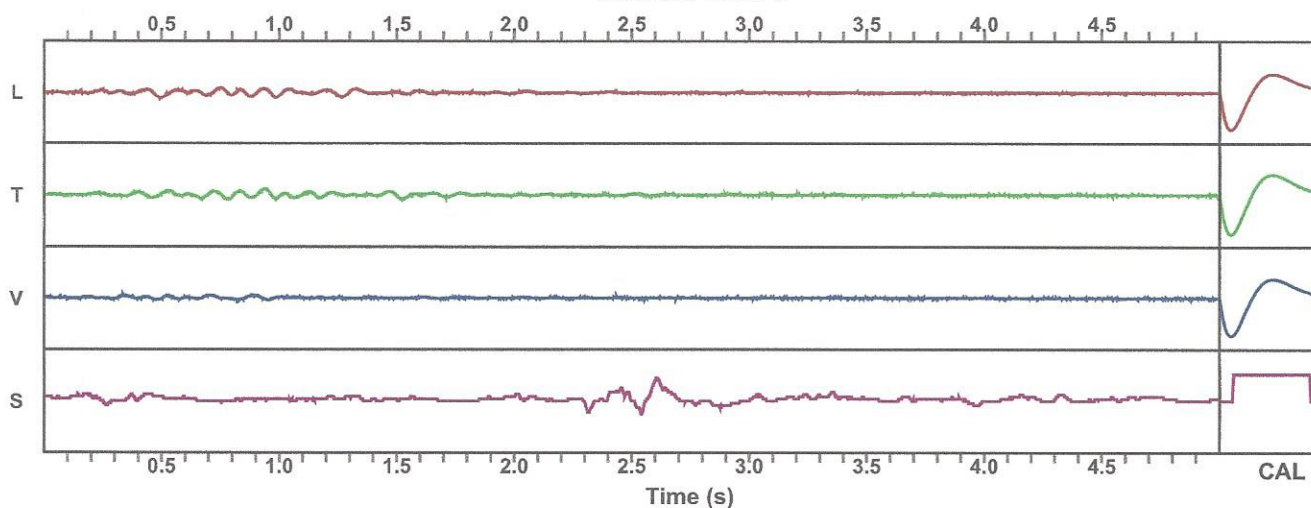


Waveform Graph Scale

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

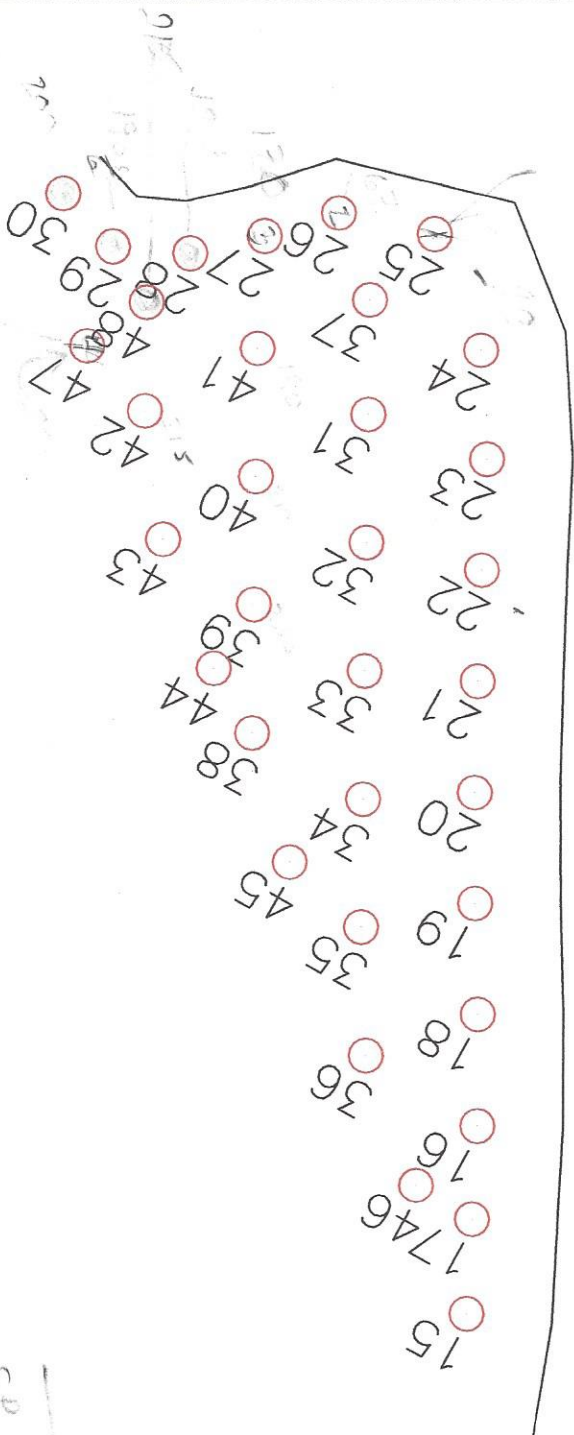
Velocity Waveform

SSN: 7229 Event: 5



13 x 15 4.5" @ 43

3' sub



SP 8

F 17-

~~4318~~ 4318
~~4602~~ 4602

89 ~~8980~~ 8980 #

244
244

Buckley Powder Co.

CUSTOMER NAME: RED CANYON

BENCH: Bench 6

BLASTER'S NAME: Farmer, Jimmie

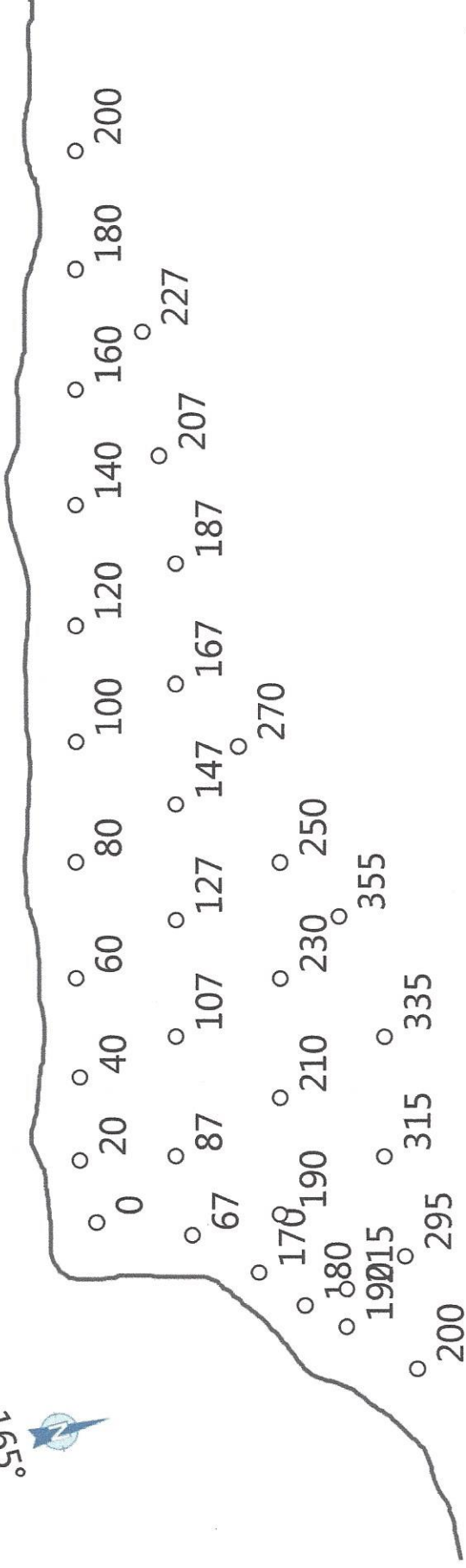
DIAGRAM

BLAST DATE: 04/26/2018

BLAST NUMBER: 5-04-2018



169°



Shot: 5-04-2018

Bench: Bench 6

Customer: MARTIN MARIETTA

Site: Louviers

Load Sheet Report



Mine: RED CANYON		Shot: 5-04-2018		Date: 4/26/2018		Time: 11:04AM	
Blaster: Farmer, Jimmie		License: 1-035-0748		Material: Granite		Holes: 34	
Diameter: 4.5 (IN)		Burden: 13 (FT)		Spacing: 15 (FT)		Primers: 68	
Exp. Vibration: 0.00 IPS		Fr. Burden:13 (FT)		Fr. Spacing: 15 (FT)		Total Exp.: 9,031 (LB)	
Fuel: 0 (LB)		AN: 0 (LB)		ANFO: 0 (LB)		Emulsion: 8,980 (LB)	
Depth: 43 (FT)		YD3: 9,822	Tons: 21,609	Tons/Lb: 2.39	Gallons of Fuel: 0		
Max Lbs/Delay: 807 (LB)		Holes / 8ms: 3		Location: N 038 36 28.50000		& W-104 56 42.4800	
Temperature: 52° F		Wind Dir: North		Wind Speed: 7 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: 10:30 AM		Total Load Time: 03:00			
Comments: Matt Klepfer Profiled the shot for GPS Drilling. After drilling Jon sent the drill penetration rates to determine the hardness of the rock so we can load it. Shot is all dry and loaded good. The shot pulled out nice and has good breakage.							

Crew

Name	Hours	Name	Hours
Eric Kossman	4	Matt Klepfer	5
Thomas Stocker	4		

Trucks Used: 5092

Inventory

Description	Date Code	Out	Description	Date Code	Out
SPARTAN 350SR	13AU17	68	DIGISHOT DETONATOR 50FT	19MA18	68

Services

Service	Quantity	Service	Quantity
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Product Totals

Product	Total (LB)
SPARTAN 350SR	51
TITAN 1000 XL	8,980

Row	Col	Depth	Rise	Stem	Wet?	Product	Hole Total (LB)
A	1	43	28	15	No	SPARTAN 350SR	1.5
A	1	43	28	15	No	TITAN 1000 XL	254
A	2	43	28	15	No	SPARTAN 350SR	1.5
A	2	43	28	15	No	TITAN 1000 XL	254
A	3	43	28	15	No	SPARTAN 350SR	1.5
A	3	43	28	15	No	TITAN 1000 XL	254
A	4	43	28	15	No	SPARTAN 350SR	1.5
A	4	43	28	15	No	TITAN 1000 XL	254
A	5	43	28	15	No	SPARTAN 350SR	1.5
A	5	43	28	15	No	TITAN 1000 XL	254
A	6	43	28	15	No	SPARTAN 350SR	1.5
A	6	43	28	15	No	TITAN 1000 XL	254
A	7	43	28	15	No	SPARTAN 350SR	1.5
A	7	43	28	15	No	TITAN 1000 XL	254
A	8	43	28	15	No	SPARTAN 350SR	1.5
A	8	43	28	15	No	TITAN 1000 XL	254
A	9	43	28	15	No	SPARTAN 350SR	1.5
A	9	43	28	15	No	TITAN 1000 XL	254
A	10	43	28	15	No	SPARTAN 350SR	1.5
A	10	43	28	15	No	TITAN 1000 XL	254
A	11	43	28	15	No	SPARTAN 350SR	1.5
A	11	43	28	15	No	TITAN 1000 XL	254
B	1	43	28	15	No	SPARTAN 350SR	1.5
B	1	43	28	15	No	TITAN 1000 XL	254
B	2	43	31	12	No	SPARTAN 350SR	1.5
B	2	43	31	12	No	TITAN 1000 XL	274.235
B	3	43	31	12	No	SPARTAN 350SR	1.5
B	3	43	31	12	No	TITAN 1000 XL	274.235
B	4	43	31	12	No	SPARTAN 350SR	1.5
B	4	43	31	12	No	TITAN 1000 XL	274.235
B	5	43	31	12	No	SPARTAN 350SR	1.5
B	5	43	31	12	No	TITAN 1000 XL	274.235
B	6	43	31	12	No	SPARTAN 350SR	1.5
B	6	43	31	12	No	TITAN 1000 XL	274.235
B	7	43	31	12	No	SPARTAN 350SR	1.5
B	7	43	31	12	No	TITAN 1000 XL	274.235
B	8	43	31	12	No	SPARTAN 350SR	1.5
B	8	43	31	12	No	TITAN 1000 XL	274.235
B	9	43	31	12	No	SPARTAN 350SR	1.5
B	9	43	31	12	No	TITAN 1000 XL	274.235
C	1	43	28	15	No	SPARTAN 350SR	1.5

C	1	43	28	15	No	TITAN 1000 XL	254
C	2	43	31	12	No	SPARTAN 350SR	1.5
C	2	43	31	12	No	TITAN 1000 XL	274.235
C	3	43	31	12	No	SPARTAN 350SR	1.5
C	3	43	31	12	No	TITAN 1000 XL	274.235
C	4	43	31	12	No	SPARTAN 350SR	1.5
C	4	43	31	12	No	TITAN 1000 XL	274.235
C	5	43	31	12	No	SPARTAN 350SR	1.5
C	5	43	31	12	No	TITAN 1000 XL	274.235
C	6	43	31	12	No	SPARTAN 350SR	1.5
C	6	43	31	12	No	TITAN 1000 XL	274.235
D	1	43	31	12	No	SPARTAN 350SR	1.5
D	1	43	31	12	No	TITAN 1000 XL	274.235
D	2	43	31	12	No	SPARTAN 350SR	1.5
D	2	43	31	12	No	TITAN 1000 XL	274.235
D	3	43	31	12	No	SPARTAN 350SR	1.5
D	3	43	31	12	No	TITAN 1000 XL	274.235
D	4	43	31	12	No	SPARTAN 350SR	1.5
D	4	43	31	12	No	TITAN 1000 XL	274.235
E	1	43	28	15	No	SPARTAN 350SR	1.5
E	1	43	28	15	No	TITAN 1000 XL	254
E	2	43	28	15	No	SPARTAN 350SR	1.5
E	2	43	28	15	No	TITAN 1000 XL	254
E	3	43	28	15	No	SPARTAN 350SR	1.5
E	3	43	28	15	No	TITAN 1000 XL	254
E	4	43	28	15	No	SPARTAN 350SR	1.5
E	4	43	28	15	No	TITAN 1000 XL	254