**Austin Powder West LLC**
**2178 Hilight Road**
**P O Box 3890,**
**Gillette, WY 82718**
**(307)464-1611**

# Blast Plan GCC Salt Canyon Gypsum Quarry

**Mine Location CO 115, Fremont County, CO**
**GPS- 38.5422095, -104.9688097**

Revision date: July 1, 2022

## Blast design specifics

- Hole diameter- 4.5”
- Drill pattern – 10’x11’
- Drill depth – 15’
- Total number of holes in shot- 200
- Charge weight per hole – 86.75
- Charge weight per delay- 260.25
- Total weight of explosives- 17,350 lbs.
- Total volume produced- 12,222 cy
- Primer - $^{3}/_{4}$ lb. cast primer
- Detonator – 30’ E-star electronic
- Surface delay programming- 21 ms on spacing, 67 ms on burden
- Initiation – E-star wireless remote
- Blasting agent – Hydromite 1,100 density- 1.25
- Stemming height- 5’
- Powder factor –1.42
- Projected PPV at 500’-. .99 i.p.s.
- Projected PPV at 1000’- .33 i.p.s.
- Nearest protected structure- 5,544 ft. (McCaffery property)

**Blast Schedule**

- Blasting will take place between hours of 9:00 am to 4:00 pm on weekdays
- No blasting will take place on weekends or holidays

**Pre-blast surveys**

- N/A (no known protected structures within .5 mile of mine site)

**Transport / Storage of Explosives**

- At no time will explosives be left unattended
- Pre and Post inventory checks will be done.
- Authorized Austin Powder personnel only will handle explosive material
- Blast area to be barricaded and signs posted to prevent unauthorized entry.
- All explosives will be delivered in D.O.T. approved vehicle. Driver will be licensed for transport of explosives.
- Any products not used in days blasting operation will be returned to storage magazines.

**Drill Logs**

- Drill log to be completed by driller for each hole drilled
- Drill log to be reviewed by blaster in charge prior to loading
- Any necessary changes to blast design/hole loads will be made after review of drill log

**Ground Vibration and Air Blast**

- Using scale distance factor of 55 and distance of 5,544' to closest protected structure, lbs. per delay not to exceed 10,160 lbs. Total lbs. per delay outlined in blast design of 260.25 lbs. is $1/40^{th}$ maximum allowable. Projected ppv also shown in blast design specifics.

- All blasting events to be monitored and readings recorded in blast report to include: peak particle velocity transverse, vertical, and longitudinal. Also to include peak sound pressure, time, date, and location of monitor. See attached seismic report example.

  From the Colorado blasting standards (7 C.C.R. 1101-9)

  (3) Over pressure (air blast) limitation. Air-over pressure at the nearest dwelling house, school, church, or otherwise occupied buildings shall not exceed 133 dB (0.0129 psi). Measuring air-over pressure is not required for all blasting operations. However, due to complaints or other circumstances, the Colorado Division of Oil and Public Safety may require blasters to monitor air-over pressure.

  Using the blasters handbook, ISEE, Robert Hopler (editor), 17th edition, 1998, p.631 "overpressure prediction equations"

  133 dbl
  Explosive weight per hole (unconfined) 400lbs (high)
  The minimum distance to a protected structure is 2854.9 feet

  Austin Powder will place seismograph at this location during blasts:
  38.11628 N
  104.60611 W

  **Blast Site Security/Safety**

- Blasters checklist to be completed during the shot loading process (see attached checklist)
- Prior to blasting all personnel will evacuate to muster point established by blaster in charge.
- All access roads will be blocked, and blaster in charge will maintain radio contact with blockers.
- Audible warning to be given prior to blast.
- Blaster in charge will check area to insure all persons and equipment are out of blast area.
- Blaster in charge will contact each blocker and get verbal confirmation that access is blocked, and area is clear prior to firing shot.
- After firing of shot, blast area is to remain evacuated until blaster in charge inspects the shot, deems it safe to re-enter and gives the "all clear".

**Blast report and documentation**

- All blasting events will be documented in blast report
- Blast report will contain all criteria listed in DRMS "Key Elements of a Blasting Plan"
- See attached blast report example
- Blast reports to be completed within 24 hours of blasting event

# AUSTIN POWDER COMPANY and Subsidiaries
# AUSTIN POWDER COMPANY BLAST REPORT
Customer Name and Address

Blast No.: 220330 | Blast Type: Stone Quarry/Stone Mine - Other I-B Yellow | Customer: Customer (276686-002)

Date/Time: 03/30/2022 15:42 | Pit/Permit: Pit | Location:

## ENVIRONMENT

Method Used: Decimal Degrees | Weather: Light Snow | Wind From: WNW

Temperature: 21 °F | Terrain: Mountainous | Wind Velocity: 15-20 M/h

Blast Lat./Long.: 41.4671° N -105.4834° W

## PROTECTED STRUCTURES

No protected structures specified

## LAYOUT

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Hole Depth: | 5.0-30.0 ft | Material Blasted: | Sandstone | Total Drilling Footage: | 3,230.0 ft |
| No. of Holes: | 116 | Subdrilling: | 0.0 ft | Burden: | [See Below] | Water Depth: | 0.0 ft min |
| No. of V.P. † Holes: | 106 | Face Height: | 5.0-30.0 ft | Spacing: | [See Below] | Stem Length: | 4.9 ft [See Below] |
| No. of Rows: | [See Below] | Drilling Angle: | [See Below] | Back Fill Depth: | 0.0 ft | Area Type: | |
| Diameter: | [See Below] | Mats Used: | No | Stem Type: | mine crushed | Method: | [See Below] |

† V.P. = Volume Producing

## WEIGHTS

| | | | | | |
|---|---|---|---|---|---|
| Initiation: | Electronic | Max. Wt. of Expl. in Overlapped Decks: | 1,371.7 lb | Volume Produced: | 21,255.0 yd³ |
| Firing Device: | E*Star Blasting Machine (WRFD) | Max. Wt. of Expl. Per 8 ms Interval: | 1,371.7 lb | Weight Produced: | 44,635.5 t |
| | | Max. No. of Holes Per 8 ms Interval: | 16.8 | Powder Factor 1: | 2.189 t/lb |
| Other Method: | | Max. Wt. of Explosive Per Hole: Max. | 216.3 lb | Powder Factor 2: | 0.959 lb/yd³ |
| Mfg and Model: | dbm1600-2-rc | Allow. Chg. Wt. per 8 ms w/o Seis.: | 29,720.6 lb | Rock Density: | 2.100 t/yd³ |
| Initiation Settings: | | Actual Scaled Distance Factor: | 269.97 | Scaled Distance Factor Used: | D/W$^{1}/_{2}$=58 |
| Series Resistance (ohms): | | | | | |

## SEISMOGRAPHS

No seismographs specified

## CREW

Blast occurred other than scheduled time: No | Misfire Occurred: No | Protective Cover: Distance

| Last Name | First Name | License / Cert | 2nd License / Cert | In Charge | Tied In | Chk. Tie-In | Driller | Layout |
|---|---|---|---|---|---|---|---|---|
| GORHAM | MATTHEW , W * | WY - WS 1537-22 [4/22/2024] | | Yes | Yes | Yes | No | Yes |
| CARL | JOHN, J | | | No | No | No | No | No |
| CLARK | EUGENE, R | | | No | No | No | No | No |

## PRODUCTS AND SERVICES

| Number | Product Description | Quantity | Weight ( lb ) |
|---|---|---|---|
| 15102 | Eagle 340 Booster | 117.00 ea | 87.75 |
| 15001 | 24' E*STAR Detonator - QM | 10.00 ea | 0.00 |
| 15003 | 40' E*STAR Detonator - QM | 107.00 ea | 0.00 |
| 15161 | E*Star Duplex HDPE Bus Wire - 1312' | 1.00 sp | 0.00 |
| 05155 | HEET 130 Bulk | 20,300.00 lb | 20,300.00 |
| 07062 | Stemlock Gas Bags - GB8 - 6103 | 22.00 ea | 0.00 |
| | | Total Weight of Explosives (Include Primers) ( lb ): | 20,387.75 |

## COMMENTS / EXPLANATIONS

Blast No.: 220330

Blast Type: Stone Quarry/Stone Mine - Other I-B
Yellow

Customer: Customer

(276686-002)

Date/Time: 03/30/2022 15:42

Pit/Permit: Pit

Location:

Signature of Blaster in Charge

| | | | | | |
|---|---|---|---|---|---|
| Blast No.: | 220330 | Blast Type: | Stone Quarry/Stone Mine - Other I-B Yellow | Customer: | Customer |
| Date/Time: | 03/30/2022 15:42 | Pit/Permit: | Pit | Location: | (276686-002) |

*Pattern: 1*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| No. of Holes: | 90 | Hole Depth: | 30.0 ft | Burden: | 14.0 ft | Area Type: | Conventional |
| No. of V.P.† Holes: | 90 | Diameter: | 5 in | Spacing: | 15.0 ft | Method: | Deepest Hole Load |
| No. of Rows: | | Subdrilling: | 0.0 ft | | | | |
| Drilling Angle: | 0 ° | Face Height: | 30.0 ft | | | Total volume for pattern: | 21,000.0 yd³ |
| † V.P. = Volume Producing | | | | | | Total weight for pattern: | 44,100.0 t |

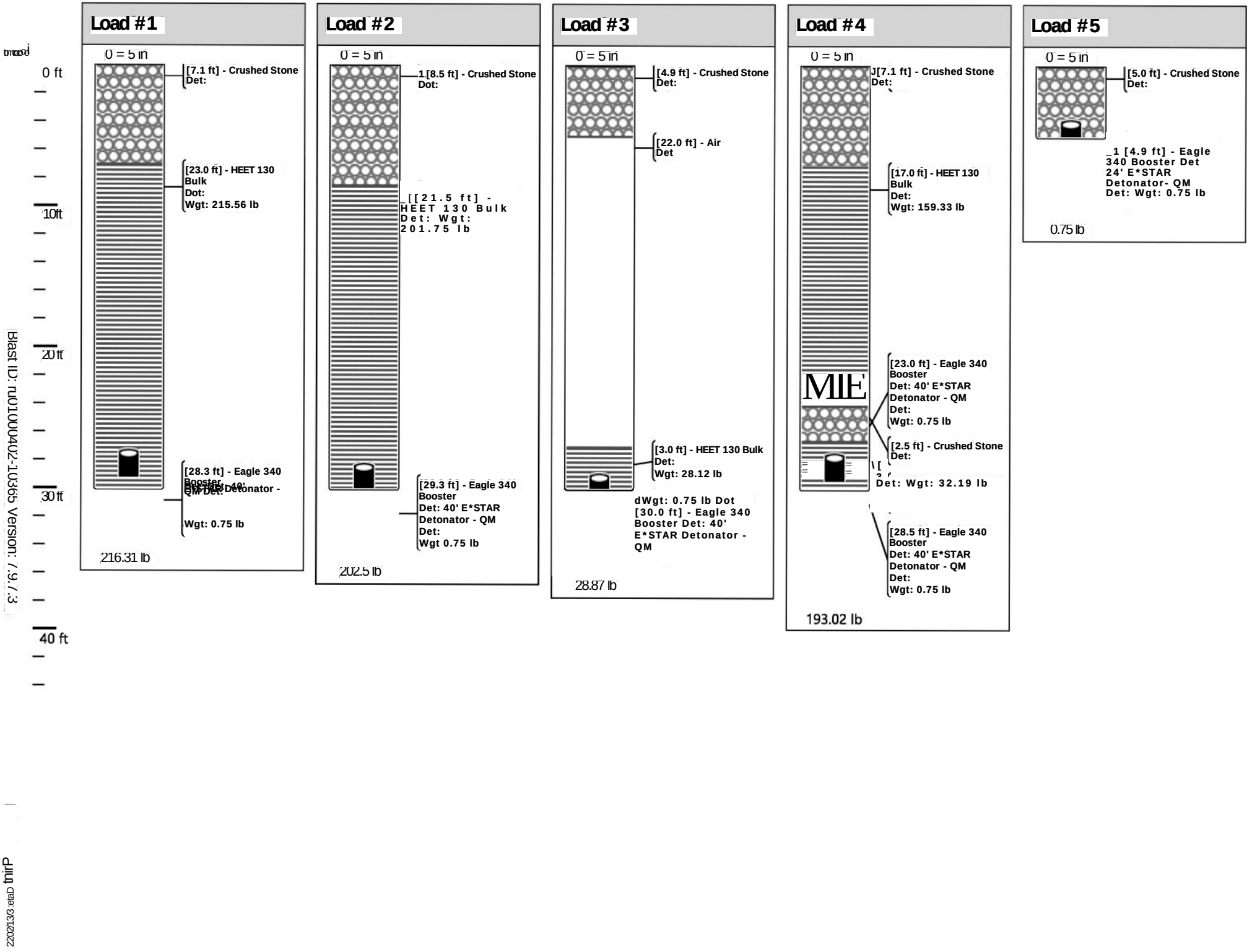
*Pattern: 2*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Hole Depth: | 30.0 ft | Burden: | 5.0 ft | Area Type: | Conventional |
| No. of V.P.† Holes: | 16 | Diameter: | 5 in | Spacing: | 8.0 ft | Method: | Deepest Hole Load |
| No. of Rows: | 16 | Subdrilling: | 0.0 ft | | | | |
| Drilling Angle: | 0 ° | Face Height: | 30.0 ft | | | Total volume for pattern: | 711.1 yd³ |
| † V.P. = Volume Producing | | | | | | Total weight for pattern: | 1,493.3 t |

Total blast volume: 21,711.1 yd³
Total weight produced: 45,593.3 t

| Hole | Load | Surface Delay | Deck 1 Delay |
|---|---|---|---|
| A1 | Load #1 | 0 | 359 |
| A2 | Load #1 | 0 | 322 |
| A3 | Load #1 | 0 | 285 |
| A4 | Load #1 | 0 | 248 |
| A5 | Load #1 | 0 | 211 |
| A6 | Load #1 | 0 | 174 |
| A7 | Load #1 | 0 | 137 |
| A8 | Load #1 | 0 | 100 |
| A9 | Load #1 | 0 | 137 |
| A10 | Load #1 | 0 | 174 |
| A11 | Load #1 | 0 | 211 |
| A12 | Load #1 | 0 | 248 |
| A13 | Load #1 | 0 | 285 |
| A14 | Load #1 | 0 | 322 |
| A15 | Load #2 | 0 | 359 |
| B1 | Load #1 | 0 | 417 |
| B2 | Load #1 | 0 | 380 |
| B3 | Load #1 | 0 | 343 |
| B4 | Load #1 | 0 | 306 |
| B5 | Load #1 | 0 | 269 |
| B6 | Load #1 | 0 | 232 |
| B7 | Load #1 | 0 | 195 |
| B8 | Load #1 | 0 | 158 |
| B9 | Load #1 | 0 | 195 |
| B10 | Load #1 | 0 | 232 |
| B11 | Load #1 | 0 | 269 |
| B12 | Load #1 | 0 | 306 |
| B13 | Load #1 | 0 | 343 |
| B14 | Load #1 | 0 | 380 |
| B15 | Load #2 | 0 | 417 |
| C1 | Load #1 | 0 | 475 |
| C2 | Load #1 | 0 | 438 |
| C3 | Load #1 | 0 | 401 |
| C4 | Load #1 | 0 | 364 |
| C5 | Load #1 | 0 | 327 |
| C6 | Load #1 | 0 | 290 |
| C7 | Load #1 | 0 | 253 |
| C8 | Load #1 | 0 | 216 |
| C9 | Load #1 | 0 | 253 |
| C10 | Load #1 | 0 | 290 |
| C11 | Load #1 | 0 | 327 |
| C12 | Load #1 | 0 | 364 |
| C13 | Load #1 | 0 | 401 |
| C14 | Load #1 | 0 | 438 |
| C15 | Load #2 | 0 | 475 |
| D1 | Load #1 | 0 | 533 |

| Hole | Load | Surface Delay | Deck 1 Delay | Deck 2 Delay |
|---|---|---|---|---|
| D2 | Load #1 | 0 | 496 | |
| D3 | Load #4 | 0 | 459 | 0 |
| D4 | Load #1 | 0 | 422 | |
| D5 | Load #1 | 0 | 385 | |
| D6 | Load #1 | 0 | 348 | |
| D7 | Load #1 | 0 | 311 | |
| D8 | Load #1 | 0 | 274 | |
| D9 | Load #1 | 0 | 311 | |
| D10 | Load #1 | 0 | 348 | |
| D11 | Load #1 | 0 | 385 | |
| D12 | Load #1 | 0 | 422 | |
| D13 | Load #1 | 0 | 459 | |
| D14 | Load #1 | 0 | 496 | |
| D15 | Load #2 | 0 | 533 | |
| E1 | Load #1 | 0 | 591 | |
| E2 | Load #1 | 0 | 554 | |
| E3 | Load #1 | 0 | 517 | |
| E4 | Load #1 | 0 | 480 | |
| E5 | Load #1 | 0 | 443 | |
| E6 | Load #1 | 0 | 406 | |
| E7 | Load #1 | 0 | 369 | |
| E8 | Load #1 | 0 | 332 | |
| E9 | Load #1 | 0 | 369 | |
| E10 | Load #1 | 0 | 406 | |
| E11 | Load #1 | 0 | 443 | |
| E12 | Load #1 | 0 | 480 | |
| E13 | Load #1 | 0 | 517 | |
| E14 | Load #1 | 0 | 554 | |
| E15 | Load #2 | 0 | 591 | |
| F1 | Load #2 | 0 | 749 | |
| F2 | Load #2 | 0 | 712 | |
| F3 | Load #2 | 0 | 675 | |
| F4 | Load #2 | 0 | 638 | |
| F5 | Load #2 | 0 | 601 | |
| F6 | Load #2 | 0 | 564 | |
| F7 | Load #2 | 0 | 527 | |
| F8 | Load #2 | 0 | 490 | |
| F9 | Load #2 | 0 | 527 | |
| F10 | Load #2 | 0 | 564 | |
| F11 | Load #2 | 0 | 601 | |
| F12 | Load #2 | 0 | 638 | |
| F13 | Load #2 | 0 | 675 | |
| F14 | Load #2 | 0 | 712 | |
| F15 | Load #2 | 0 | 749 | |
| G16 | Load #3 | 0 | 1 | |
| H16 | Load #3 | 0 | 1 | |


Load #1
0 = 5 in
[7.1 ft] - Crushed Stone Det:
[23.0 ft] - HEET 130 Bulk Dot:
Wgt: 215.56 lb
[28.3 ft] - Eagle 340 Booster
Det: 40' E*STAR Detonator - QM Det:
Wgt: 0.75 lb
216.31 lb
Load #2
0 = 5 in
1[8.5 ft] - Crushed Stone Dot:
[[21.5 ft] - HEET 130 Bulk Det: Wgt: 201.75 lb
[29.3 ft] - Eagle 340 Booster
Det: 40' E*STAR Detonator - QM
Det:
Wgt 0.75 lb
202.5 lb
Load #3
0 = 5 in
[4.9 ft] - Crushed Stone Det:
[22.0 ft] - Air Det
[3.0 ft] - HEET 130 Bulk Det:
Wgt: 28.12 lb
dWgt: 0.75 lb Dot
[30.0 ft] - Eagle 340 Booster Det: 40' E*STAR Detonator - QM
28.87 lb
Load #4
0 = 5 in
J[7.1 ft] - Crushed Stone Det:
[17.0 ft] - HEET 130 Bulk Det:
Wgt: 159.33 lb
[23.0 ft] - Eagle 340 Booster
Det: 40' E*STAR Detonator - QM
Det:
Wgt: 0.75 lb
[2.5 ft] - Crushed Stone Det:
Det: Wgt: 32.19 lb
[28.5 ft] - Eagle 340 Booster
Det: 40' E*STAR Detonator - QM
Det:
Wgt: 0.75 lb
193.02 lb
Load #5
0 = 5 in
[5.0 ft] - Crushed Stone Det:
_1 [4.9 ft] - Eagle 340 Booster Det
24' E*STAR Detonator- QM
Det: Wgt: 0.75 lb
0.75 lb
0 ft
10ft
20 ft
30 ft
40 ft
Blast ID: ru01000402-10365 Version: 7.9.7.3

Record: jvq 7-5-22.dtb
Number: 016
Seismograph: Mini-Seis
Type of Record: Waveform
Date: 7/5/2022 11:43:00
AM SN: 4135 Duration:
4.50 Seconds Sample
Rate: 1024 Pre-Trigger:
0.5 Seconds Seismic
Trigger: 0.0400 in/s
Acoustic Trigger: 142.1 dB
Voltage: 7.0

| Peaks and Frequencies | Graph Information |
|---|---|
| PPV Maximum: 0.0550 in/s | Time Range: -0.500 s to 4.00 s |
| Acoustic: 118.1 dB @ 3.0 Hz (1.95 s) | Acoustic Scale: 0.0800 Mb/div |
| Radial: 0.0500 in/s @ 13.4 Hz (0.184 s) | Seismic Scale: 0.0275 in/s/div |
| Vertical: 0.0500 in/s @ 14.6 Hz (0.0498 s) | Time Intervals: 0.450 Seconds |
| Transverse: 0.0550 in/s @ 13.4 Hz (0.0166 s) Last Calibration Date: 4/18/2022 | |