

# **Blasting Plan**

GRCO, LLC.

(Overlook Mine)

## This Blasting Plan is prepared for:

Site Name: Overlook Mine/

Site Address: 2579 County Road 894  
Granby, Colorado

Date Prepared: 02/08/2023

## **Introduction:**

GRCO, LLC is proposing a change to the way that crushed stone aggregate is extracted at the Overlook Mine in Grand County, located approximately 4 miles southeast of downtown Granby. The site is located approximately 2.5 miles east of US Highway 40E. mine will develop approximately 33 acres of the parcel known as Overlook Mine, Parcel Identification No: 145104300098.

## **Purpose:**

Prior to any explosive work beginning at the Overlook Mine, this blasting plan has been developed which outlines the procedures and methods that will be used for all blasting work. It is of utmost importance to the Overlook Mine and GRCO, LLC to complete all blasting activities safely and with minimal disruption. It is with this regard that only people who are trained and certified in the handling of explosives will be allowed to do so. Access to all working areas and particularly those within the impact radius of each blast will be strictly controlled. Only qualified personnel will be allowed to enter for the purpose of executing each blast. Details in this Blasting Plan are prepared in accordance with *MSHA CFR 30 Part 56 Section 63: Control of blasting operations*.

Included in this plan are:

- Licensed Blaster
- Blast Pattern Design and Drilling
- Types of Explosives Used
- Storage of Explosives
- Dates and Times of Blasting
- Transportation of Explosives
- Loading of Explosives
- Signage
- Communications
- Blast Area Clearing and Firing Procedures
- Post Blast Inspection Procedures
- Misfire Procedures
- Blast Monitoring Procedures

Copies of this Blasting Plan will be kept on file in the following locations:

- Overlook Mine Administration Office
- Aggregates Manager
- Safety Director - The initial Blast Plan is included as an appendix in the published mine permit and Overlook Mine Operations Plan. If changes to the Blast Plan are needed, the current Blast Plan will be amended in the locations listed above.

## **PreBlasting Survey**

Currently all improved property within a half mile (1/2) radius of the Overlook Mine is owned by GRCO LLC or its affiliates. Therefore, we will not be conducting PreBlasting Surveys. If at a future date improved property with ownership other than GRCO LLC or its affiliates falls within the half mile (1/2) radius of the Overlook Mine, GRCO LLC will, at that time, update its Blasting Plan to include a PreBlasting Survey.

## **Blasting Procedure:**

### **Blasting Sub Contractor –**

The Overlook Mine will use a U.S. Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) licensed third party blasting contractor to conduct all blasting activities onsite. GRCO, LLC will evaluate qualified Blasting Sub Contractors and will contract with one or more of these qualified vendors to support development and production of the mine.

### **Blast Pattern Design and Drilling –**

Personnel at the Overlook Mine will clear and prepare each area to be drilled and blasted according to the established quarry development sequence. The mine manager, in consultation with the qualified blasting contractor, will design an appropriate drill pattern to ensure safe and efficient production in a given area of the mine. This includes the burden and spacing design, hole depth, number of holes, explosive densities, initiation sequencing pattern, stemming and other factors included in general blasting practice.

Typical blast pattern designs anticipated are listed below:

- Initial sink shot(s) 3 ½ in. diameter drill hole with burden and spacing of 6 ft. x 6 ft.
- 3 ½ in. diameter drill hole with burden and spacing of 8 ft. x 8 ft.
- 3 ½ in. diameter drill hole with burden and spacing of 8 ft. x 9 ft.
- 3 ½ in. diameter drill hole with burden and spacing of 9 ft. x 9 ft.
- Hole depth ranges from 20 ft. to 30 ft. up to 3 ft. of sub drill depending on ground conditions and where the hole is located.
- Typically the blast holes will be drilled in a vertical orientation. Holes will be angled as needed to construct the final bench geometry and for specific design features.
- The number of holes on each pattern will vary depending on the size of the area cleared and what the current needs of the operation are.

Figure 1 below shows the typical blast pattern design layout as it corresponds with the description above of typical blast pattern designs.

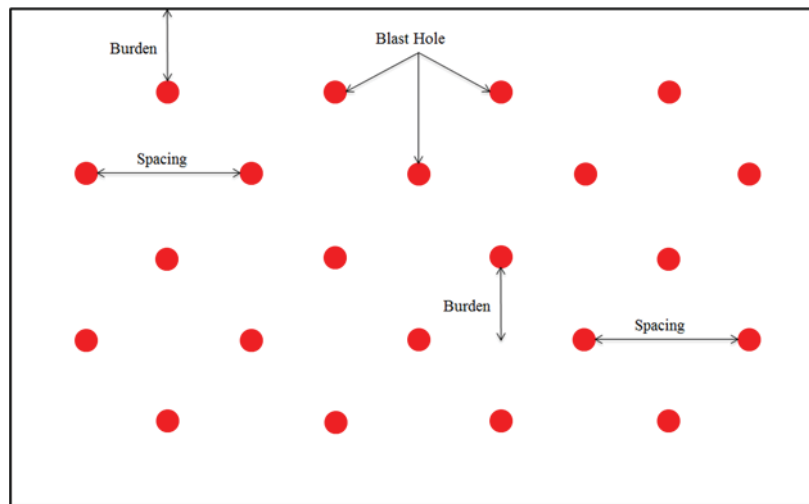


FIGURE 1: Typical Blast Pattern Layout

### Types of Explosives Used –

The explosives to be used at the Overlook Mine will be of the NONEL type, meaning the blasting accessories used will be of the non electric variety. Below is a list of the typical blasting products to be used:

- Pourable Explosives
  - ANFO – Ammonium Nitrate and Fuel Oil, a typical pourable explosive used in blasting
  - Blastex - 2 3/4 x 16, wet hole product
- Blasting Accessories
  - Blasting Caps –NONEL blasting cap.
  - Boosters – Hole size appropriate cast boosters.
  - Any other products deemed necessary by the Blasting Sub Contractor

### Storage of Explosives –

At no time will explosives be stored onsite at the Overlook Mine. All bulk explosives and explosive accessories will be brought to the site the day of the blast by the third party blasting contractor. Any unused quantities of bulk explosives and explosive accessories will be taken off site at the end of the blast by the same contractor that brought it to site. While on site, all explosives will be closely monitored and supervised by qualified personnel.

### Dates and Times of Blasting –

After a pattern is drilled the mine manager will contact the third party blasting contractor with the number of holes, hole diameter, pattern dimensions, hole depths, and condition of the holes. From this information the volume of explosives and blasting accessories will be determined. The Mine Manager and the manager of the third party blasting contractor will schedule the blast for the following day (weather permitting). Blasting will occur between the hours of 10:00 AM and 4:00 PM. The mine manager will make every effort to schedule all blasts Monday through Friday, however a weekend blast may be necessary from time to time to keep the mine producing as necessary.

### Transportation of Explosives –

The transportation of explosives to and from the Overlook Mine will be handled by the same licensed third party blasting contractor conducting the blasting on site. On the day of the scheduled blast, the pre-determined amount of bulk explosives and blasting accessories will be transported to Overlook Mine in vehicles that are specifically designed and equipped to carry explosives from site to site. After a blast is loaded and shot, any product not consumed in the day's blast are inventoried, volumes of bulk explosives and accessories used and unused will be documented, and surplus materials are transported back to the secure location in the same vehicles used to transport the explosive materials to the Overlook Mine.

### **Loading of Explosives –**

On the day of a scheduled blast, the third party blast crews and trucks arrive at the Overlook Mine with explosives and blasting accessories.

- A NONEL blasting cap and cast booster are placed into each hole with the down hole lead line being secured at the collar or top of the hole.
- With the cap and booster securely in the hole, the explosives are loaded using the following techniques based on hole condition.
  - If the hole is wet, Blastex will be used in place of Anfo.
  - If the holes are dry ANFO will be used.
- By design the explosive will not fully fill the blast hole. The remaining open portion of each hole will be filled with stemming (3/8 in crushed stone) to contain the explosive.
- The final step to the loading procedure is for the Blaster In Charge to connect each of the down hole lead lines together according to the blast timing design to provide a sequential blast.

A final walk through check will be made by someone on the blasting crew other than the Blaster In Charge to ensure that nothing was overlooked.

Figure 2 below shows how a typical drill hole is loaded with explosives prior blasting.

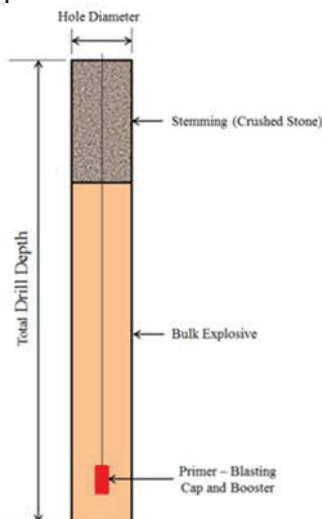


FIGURE 2: Typical Drill Hole Profile Shown as Loaded With Explosives

### **Signage –**

A blast notification sign will be placed at the entrance to the Overlook Mine to notify the customers, as well as the neighbors, of the blast schedule. If there is a blast scheduled, the sign will also display the time the blast is scheduled for. These signs will

also communicate the blasting audible signal guide including length of audible signal relating to the timeline before or after the blast.

### **Communication –**

At least 10 day but not more than 20 days prior to the first day of blasting GRCO LLC will place a notification in the newspaper of general circulation in Granby Colorado of the planned blasting schedule. Additionally, GRCO LLC will distribute the planned blasting schedule by mail to local governments and public utilities in accordance with 4.08.3(1a) and (1b). On the day of the blast, the scheduled blast time will be communicated to all personnel onsite. Scale house and reception personnel will inform customers, visitors, and vendors of the scheduled blast time and times when they are expected to leave the mining area. The primary notification regarding planned dates and times for blasting will be signs at each entrance to the property. GRCO, LLC will notify emergency service providers on the day of the blast and attempt to coordinate with emergency service providers so that emergency vehicles can pass through the mine area unimpeded. As the mine operation develops, GRCO will make good faith efforts to provide further notification of blast schedules to those in the immediate vicinity of the mine.

### **Blast Area Clearing and Firing Procedures –**

Prior to a blast being initiated, all Overlook Mine personnel, visitors, vendors, and customers will be:

- Removed from the mining, plant, and shop areas and stationed at the scale house/office building.
- The site manager or lead blaster will inspect the mining, plant and shop areas to confirm all personnel have cleared from the blast area.
- Blast guards will be posted along County Road 894 adjacent to the mining area to make sure this neighbor access corridor is secure during the blast process.
  - Blast guards will be in contact with the lead blaster via cellphone, 2 way radio or line of sight. Blast guards will have the authority to stop the blast at any time, up to the time when the blast is initiated.
  - In the case of an emergency blast guards will notify the lead blaster and stop the blast until the emergency situation is resolved.
  - The access corridor will only be secured for the length of time needed to successfully complete the blast. A typical length for a blast is less than 30 minutes.
  - At the completion of the blast, the access corridor will be released for normal use.
  - The length of time the access corridor will be secured and guarded will be kept to a minimum and only done so to ensure the safety of all persons using them.
- Audible blast signals, originating from a vehicle mounted siren, will be utilized according to the following schedule:
  - 5 minutes before the blast – 3 long horns
  - 1 minute before blast – 2 long horns
- Once all personnel are accounted for, all blast guards are in place, and the blast area has been confirmed to be clear, the lead blaster will initiate the blast.

## **Post Blast Inspection Procedures –**

After the blast is completed the lead blaster will re-enter the blast area and inspect the entire blast to make sure all holes were detonated. No one will be allowed back into the mining, plant, or shop areas until the lead blaster has inspected the blast and confirmed that it is safe to resume work. At this time:

- The All Clear audible signal will sound – 1 long horn
- Blast guards will release their blocks and the neighbor corridor will be open again for travel.
- Personnel are allowed back to work.
- Business returns to normal.

## **Misfire Procedures –**

A misfire is the complete or partial failure of a blast hole to detonate as planned. With advancements in product quality and blast technology, misfires rarely happen, however in the event of a misfire the lead blaster will:

- Not release the immediate blast area for return to work.
- Wait 30 minutes before completing a more thorough investigation of the cause of the misfire.
  - Depending on the location of the blast, the lead blaster, at his discretion, can release areas not in the immediate area of the blast while waiting the required 30 minutes. This may include the access corridor and other facilities on the site.
- If the investigation reveals the detonator can be re-used and re-shot, the blast area will be cleared again, blast guards reestablished, and the blast warning procedure will be reinitiated and the detonator blasted.
- If the detonator cannot be re-used and blasted, the area will be secured and all mining personnel warned of the hazard. The area will be carefully excavated under the supervision of the lead blaster or mine manager until the blasting cap and booster are located.

## **Blast Monitoring Procedures –**

As part of the Overlook Mine's blasting plan, all blasts will be monitored using several methods. They are as follows:

- Blasts will be video recorded, if weather conditions permit.
- Seismic instrument(s) will be used to measure ground vibration and peak particle velocity. The proposed maximum peak particle velocity will be 2 inches per second measured at the seismic instrument set up nearest to the Granby Ranch Golf Clubhouse. All attempts will be made to keep peak particle velocities well below the proposed maximum allowable limits. Monitoring equipment will have a frequency range of 2 to 250 Hz.
- Microphone(s) will be used to measure air over pressure (air blast) and noise. The proposed maximum decibel (dB) level for air over pressure will be 130 dB measured at the seismic instrument set up nearest to the closest structure. Industry standard for air over pressure maximum (dB) level is 133 dB. All attempts will be made to keep air over pressure levels well below the proposed maximum allowable limits. Monitoring equipment will have a frequency range of 2 to 250 Hz.

All blasts will be monitored with two separate monitoring units made up of a



seismograph, geophone (seismic unit), and a microphone. The locations for these units are described below:

- One stationary unit will be located at the southern edge of the property in the location of the Granby Ranch Golf Course Clubhouse.
- The second relatively stationary unit will be located at the south wall of the pit near the access road.

Blast monitoring will be completed by a blasting consulting firm that specializes in blast monitoring. Monitoring records will be kept onsite for each blast and will include:

- The name of the person and monitoring firm recording and analyzing the seismographic record.
- The type and manufacturer of the instrument
- Sensitivity of the instrument
- The date and certification of the last calibration of the instrument
- The exact location of the instrument including the date, time, and distance from the blast
- The recorded value of the peak particle velocity and air over pressure.

### **Flyrock Control Plan:**

Flyrock is defined as dirt, mud, stone, or fragmented rock that is propelled from the blasting area by the force of the blast. Flyrock is never expected in a blast, but due to the nature of explosives it can happen. Flyrock can be minimized and eliminated by following the basic blasting guidelines below. GRCO LLC adheres to these guidelines for all blasting completed onsite.

- Proper blast pattern design including proper burden and spacing based on hole size and by ensuring there is adequate space in front of the pattern to allow fractured material to move horizontally.
- Proper blast hole loading, ensuring hole quality is adequate and explosive column height and stemming material heights meet calculated requirements for safety.
- Setting up blast patterns so that the direction of the blast will be away from permanent manmade structures, and away from adjacent permit boundaries.
- Using appropriate blast pattern timing sequences so the pattern is shot systematically and in proper order.

### **Documentation:**

The third party blasting contractor will prepare a paper record of each blast that is completed. Copies of each blast report will be kept on file in the scale house/office building for reference. All records, including blast statistics and blast monitoring, will be kept on file for a minimum of 3 years. Forms to be used for data collection will be the same or similar to the example form shown on the following pages.

## AWS Drilling &amp; Blasting Inc. - Blast Report

Shot# \_\_\_\_\_ Customer: \_\_\_\_\_

Date \_\_\_\_\_ Job Location \_\_\_\_\_

Time \_\_\_\_\_ Blast Station \_\_\_\_\_ Type of Blast \_\_\_\_\_

[illegible]

Height of Face \_\_\_\_\_ Ft.      Size of Hole \_\_\_\_\_ In.      Sub-Drilling \_\_\_\_\_ Ft.      Horizontal \_\_\_\_\_      Vertical \_\_\_\_\_

Cap Mfg. \_\_\_\_\_ Length of Wire / Tube \_\_\_\_\_ No. of Series \_\_\_\_\_ No. Caps Each Series \_\_\_\_\_

Weather Conditions \_\_\_\_\_ Temperature \_\_\_\_\_ Wind Direction \_\_\_\_\_ Speed \_\_\_\_\_

Blaster \_\_\_\_\_ License Number \_\_\_\_\_ After Blast (all detonated &amp; checked) \_\_\_\_\_

Fill out this report completely. Use back for shot diagram. SIGNATURE \_\_\_\_\_

Scale distance - Maximum Weight of Explosives / Delay = (Distance in Ft/50) <sup>2</sup> = \_\_\_\_\_

Type of Blasting Cap      Electric ( )      Nonel (XX)

No. Delays Used \_\_\_\_\_: Maximum Lbs per Delay \_\_\_\_\_: Max No. Holes per Delay \_\_\_\_\_

Blast Direction &amp; Location \_\_\_\_\_

Distance from Nearest Dwellings, Buildings \_\_\_\_\_ Highways or Railroads \_\_\_\_\_

Were mats used? Yes \_\_\_\_\_ No \_\_\_\_\_ Quantity \_\_\_\_\_ Type of Mat \_\_\_\_\_

Seismograph location, direction to the blast site.

Exact Location of seismograph \_\_\_\_\_ House # \_\_\_\_\_ Street \_\_\_\_\_

\*Seismograph Model \_\_\_\_\_ S/N \_\_\_\_\_ Operator \_\_\_\_\_

Calibration Date \_\_\_\_\_ Seismic Readings T \_\_\_\_\_ V \_\_\_\_\_ L \_\_\_\_\_

Trigger Level \_\_\_\_\_ Frequency \_\_\_\_\_

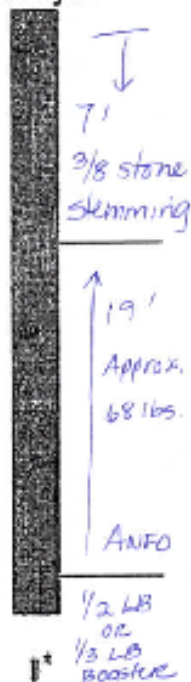
Distance to Blast \_\_\_\_\_ Peak Overpressure \_\_\_\_\_ dB



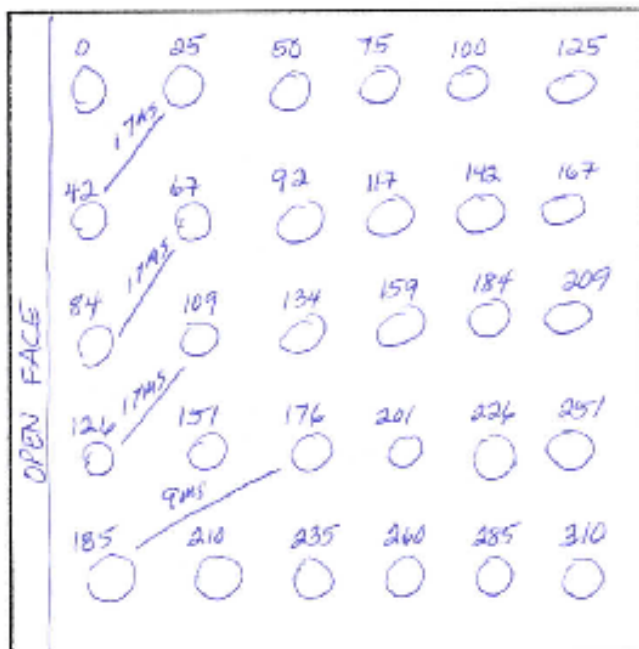
# AWS Drilling & Blasting Date: 02/09/2023 Blast Plan

Project name: Overlook MINE QUARRY  
Project Address: Granby Colorado  
Nearest Structure: 375 Max lbs/Delay: 136  
Scaled Distance: 32 Burden: 8 Spacing: 8  
Rock Type: Decomposed Granite Hole Diameter: 3 1/2"  
# of Holes: 50-75 Hole Depth: 26 AVG.

Bore Hole Diagram



Timing Diagram



Prepared By: Angen Wells CB Lic # 1-059-10515  
Signature: Angen Wells

Note: Per State of Colorado Regulation 4.08.4(10)(c)(i)(b), Seismic:

The Division may allow a variance from the maximum peak particle velocity limits if it determines that the structure is owned by the person conducting the surface coal mining operations, and the structure is not leased to another party, or if leased to another party, that a written waiver by the lessee is submitted to the Division prior to blasting.

\*Details in this Blasting Plan are prepared in accordance with MSHA CFR 30 Part 56 Section 63: Control of blasting operations and Explosives Regulations of The Colorado State Division of Oil and Public Safety 7 C.C.R. 1101-9.

## **Emergency and Company Contact Information:**

Should an emergency situation arise, consult the Emergency Response Plan that accompanies the mining permit.

- Emergency phone Numbers:
  - Fire Department: 911
  - Paramedics: 911
  - Ambulance: 911
  - Police: 911
  - Non Emergency: Grandy County Sheriff – 970-725-3311
  
- GRCO Contact Phone Numbers:
  - Site Security Office: Number to be determined and updated at a later date
  - Scale House Phone Number: Number to be determined and updated at a later date
  - Site Manager: Brett Stuart - 970-393-0522
  - Aggregate Manager: Brett Stuart - 970-393-0522
  - Safety Director: Brett Stuart - 970-393-0522
  - GRCO Main Office: : 314-865-5700