PIONEER

January 14, 2022

Tim Cazier
CO DRMS
1313 Sherman Street, Room 215
Denver, CO 80203

RE: J&J Stone Pit #1 Permit No. M-2011-004 TR-2
Response to Second Adequacy Review Dated January 11, 2022

Dear Mr. Cazier,

Please accept the revised blasting plan with the following addition information and clarifications:

Item A. Use of Explosives: Blasting notification was revised to include notification timing along with neighbors and agencies that will receive a notice.

Item B. Pre-Blast Survey: The pre-blast survey extent includes the structures identified by the Division and discussions to date with the structure owner.

Item C. Ground Vibration: 4Mile commits to the DRMS coal standard.

Item D. Limits on Air Blast: 4Mile commits to the DRMS coal standard.

Item E. Monitoring System: 4Mile incorporated Item C and Item D in the monitoring system and will require the blasting compliance demonstrate compliance.

Item F. Blast Design: The design includes diameter and spacing of holes along with amount of ANFO expected to be used in each hole.

Item G. Location of Blast Monitoring: 4Mile included a statement of commitment to demonstrate compliance to Division standards.

Item H. Blast Report: 4Mile included the requested items a-o in the blast report.

Please feel free to contact me directly with any further questions.

Respectfully submitted

Angela M. Bellantoni Ph.D.

CC: Mike Krauth

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4MILE SANDSTONE QUARRY BLASTING PLAN

a. Blast Schedule Notification:

a. Krauthco / Pioneer, 800 Garden Park Road, Canon City, Colorado, 719-371-1678
b. 800 Garden Park Road, Canon City, Colorado
c. Between 24 and 72 hours prior to the use of explosives, notifications will be made via phone, in person or electronically with confirmation of receipt to the following persons and agencies:

- Fremont County Sheriff's Office
- Canon City Fire Protection District
- John Waters (affected neighbor)
- 4Mile Inc. (affected neighbor)
- Stuart Phelps (affected neighbor)
- William Mosher (affected neighbor)
- D.J.Yeoman (affected neighbor)

Notification will include the expected date of a blast and the approximate time of the initiation (between the hours of). These mandatory notifications will be the responsibility of the quarry foreman and documented in the blast report.

d. Access will be restricted by use of locked gates, blocked vehicle traffic, and security personal conducting visual inspections for unauthorized persons or vehicles.
e. The explosives foreman will contact the quarry manager prior to commencement of an initiation by phone. All persons, on site will be notified to stop all activities and leave the area. A head-count and location will be performed by the quarry manager. The explosives foreman will give horn/air blasts for pre-initiation warning. The explosives foreman will sound an all clear, after successful initiation and when he determines the site is clear and safe.
f. 4Mile Quarry has one neighbor adjoining the property to the east, approximately one half mile (Figure 1). The quarry foreman always notifies the neighbor, days in advance, and prior to initiation of the limited use of explosives. Notifications to this neighbor will be in accordance with the protocols of this plan. All employees are notified by quarry manager and a review of emergency protocols is conducted. The pre-blast survey, of this site, suggests that explosive use should be minimum energy use, and use of delays, for the fracturing of stone to maximize the products and limit the air and sound vibrations. This method results in sound discharge similar to machine gun fire, which is often heard at the local gun range one-mile from this site. A notification to EMS and local officials is the responsibility of the explosives professional when necessary and or in accordance with any state and local guidelines.

Figure 1: John Waters residence and nearest structure

b. Pre-Blast Surveys:

a. A geologic survey of the site was conducted, in 2011, which gives a detailed snapshot into the formation, as to material composure, type, and strata. This detailed report shows a deposit and formation largely composed of quartz sand bound by clay and natural cemented particles. This deposit is layered on a horizontal plane with natural fracturing, on this plane. Energy absorption should traverse these planes fairly easy and vertical intersection of these planes at right angles (drill holes) should split the deposit targets with low yield of excess energy. (Appendix A: KrauthCo, J&J Stone Geological Reconnaissance Report by Randy Roberts-Geological Engineer conducted July of 2011)

b. Google imagery reveals five structures and wells, within approximate one-half mile radius, to the west. These locations are noted on Figure 2 Blast Point below. The following listed properties will be site inspected and surveyed, to document any pre-existing conditions or damages before any blasting is conducted at 4Mile Quarry. Current Google imagery shows these five locations at or less than one half mile from the blast point; however, the blast point is speculative and must be determined prior to each blast. Blasting is likely to move in a westerly direction in the future. This would extend the distance from the five locations and place some of the locations outside of one half mile. Prior to blasting, the GPS coordinates of the shot will be compared to existing structures within a one half radius and those identified will require an inspection and survey to be included in a pre-blast analysis. This analysis should be documented and included in the blast report. All of the owners of these residences, properties, wells, and other structures have been contacted and notified of the use of explosives on this site. 4Mile Quarry operates under the belief that the surrounding land owners and neighbors are stakeholders in our success. The quarry manager has maintained an open line of communication about all aspects of operation, to include blasting. Below is a description of current structure conditions obtained during previous pre-blast surveys and communications with the owner of the structure.

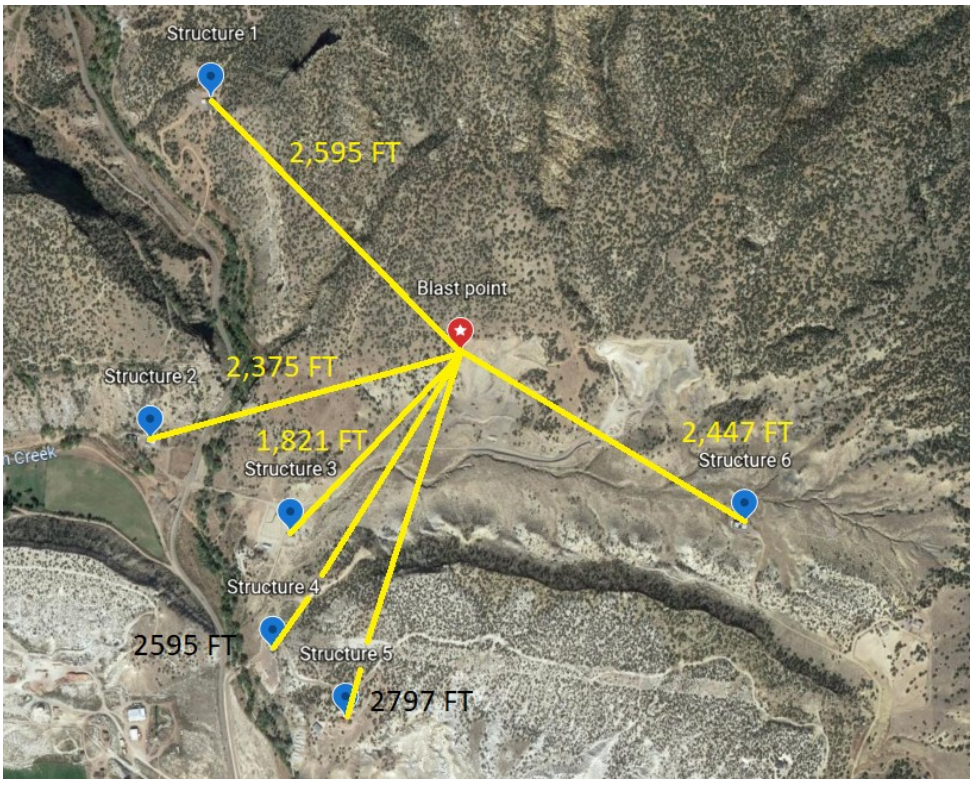

Figure 2: Structures within a 1/2 mile radius of Blast Point

Structure #1 - William Mosher residence and well is 2,595' from blast point (45' inside the outside radius). The quarry manager and production manager have both talked numerous times with Mr. Mosher about operations at Fourmile. Previous blasts have placed his property outside the blast point. To initiate a pre-blast survey, however, any future blasts will require a documented pre-blast survey to be included with the blast report. There have been no complaints or issues reported by Mr. Mosher and the use of explosives to date.

Structure #2 - D.J. Yeoman residence and well. 2,375' from blast point (265' inside the outside radius). The quarry manager has had numerous conversations with the owner about the operations. Mr. Yeoman has a detached garage and carport and lives in an RV at this location. Previous blasts have placed this location outside of the distance to require a pre-blast survey. Any future blasts however, will require a documented pre-blast survey to be included in the blast report. Mr. Yeoman has made no complaints or had any issues with the use of explosives to date.

Structure #3 - 4Mile Inc. owns the structures and well at this location. Mike and Jason Krauth, owners of this company, are the permit holders and have never had any damage to structures or well as a result of the use of explosives, to date.

Structure #4 - Stewart Phelps carport and boxcar. These uninhabited structures are portable storage structures. 2595' from blast point (45' inside the outside radius). Mr. Phelps is familiar with operations at Fourmile. Previous blasts have placed this location outside of the pre-blast survey. Any future blasts however, will require documented pre-blast survey to be included in the blast report. Mr. Phelps has had no issues or

complaints regarding use of explosives to date.

Structure #5 - Stewart Phelps residence and well. 2797' from blast point (157' outside the outer radius). Mr. Phelps has not been included in any pre-blast survey but is familiar with operations at Fourmile. Any future blasts will require a documented pre-blast survey to be included in the blast report. Mr. Phelps has had no issues or complaints regarding use of explosives to date.

Structure #6 - John Waters residence and well. 2447' from blast point (193' inside the outside radius). Mr. Waters is familiar with operations at Fourmile. The quarry manager was made aware by Mr. Waters of several settling issues resulting in structural cracking several years ago and prior to any use of explosives. Mr. Waters has mitigated the damage and repairs with engineers and it includes ongoing monitoring, and ongoing repairs. The quarry manager has visually inspected the damage and been made aware of these issues. The quarry manager considers Structure #6 as the most sensitive to issues concerning the use of explosives. The quarry manager monitors the conditions and keeps the owners informed of operations at Fourmile. A pre-blast survey will be conducted at this location and documented and included with the blast report. Mr. Waters has reported to the quarry manager,that the noise and vibration have been loud on one occasion at which time I visited the residence. I did not observe any damage and none has ever been reported by Mr. Waters. I have since required any explosives professionals conducting blasting operations at 4Mile Quarry to use additional delays in patterns to reduce noise. No complaints of damage to property from the use of explosives have ever been made or reported. No structures or contents were identified as sensitive to blasting.

c. For all future blasting operations, a Google imagery reconnaissance will take place to identify any and all residences, structures, and wells from the GPS coordinates of the proposed blasting point to a one half-mile radius. This reconnaissance will identify all structures requiring a pre-blast survey. Once identified, the reconnaissance document and a site specific survey will be conducted at all identified locations. The quarry manager will arrange to meet the owners, identify any items that could be damaged by blasting operations, flyrock-dust and noise concerns. The blast survey will document and mitigate any issues prior to blasting, inform the owners of upcoming blasting operations and forecast the projected time frame and best notification method. Once completed, all pre-blast surveys will be provided to the blasting professional and must be included with the blast report and kept on file The quarry manager will require that measurements are provided for ground vibration and air blast, for each event. These measurements will be recorded and documented to ensure compliance with not to exceed limits set forth in recommended DRMS coal air blast limits and recommended DRMS coal ground vibration limits. at the quarry.

d. Blast Plan:

a. **Ground vibration** is measured in several ways including, particle displacement, particle velocity, particle acceleration and particle frequency. Ground vibration controls are regulated by a measured calculation of the four principles and applied to blast plan to remain under the threshold of recommended blast induced thresholds by the U.S. Bureau of Mines. Site and blast specific calculations will be prepared by the licensed blasting

contractor and presented to 4Mile prior to execution of the contract. 4Mile accepts the not-to-exceed ground vibrations standards posed by the DRMS Coal regulations in Table 1.

Table 1 - DRMS Coal Ground Vibration Limits

Distance (D) from the Blasting Site (in feet)	Maximum Allowable Peak Particle Velocity (V max) for Ground Vibration (in inches/secondH)	Scaled-Distance Factor to be Applied without Seismic Monitoring (DsI)
0 to 300	1.25	50
301 to 5000	1.00	55
5001 and beyond	0.75	65

H Ground velocity shall be measured as the particle velocity. Peak particle velocities shall be recorded in three mutually perpendicular directions from the blasting site. The maximum peak particle velocity shall be the largest of any of the three measurements.

I Applicable to the scaled-distance equation of paragraph 4.08.4(10)(c)(i)

b. **Limits on air blast**, commonly referred to as "air-overpressure", are determined by several factors, and must be calculated by the blasting professional to insure that thresholds set by the Colorado Department of Labor regulations not to exceed charge weight and distance to nearest structure. Site and blast specific calculations will be prepared by the licensed blasting contractor and presented to 4Mile prior to execution of the contract. 4Mile accepts the not-to-exceed ground vibrations standards posed by the DRMS Coal regulations in Table 2.

Table 2 - DRMS Coal Air Blast Limits

Lower Frequency Limit of Measuring System, Hz (3dB)	Maximum Level in dB
0.1 Hz or lower – flat response[1]	134 peak
2 Hz or lower -- flat response	133 peak
6 Hz or lower -- flat response	129 peak
C-weighted, slow response	105 C

[1] Only when approved by the Division

c. It is critical to identify and monitor any **adverse effects** of the blasting. At the 4Mile Quarry, the site is relatively sheltered and isolated from public roadways, water sources, commerce, and urban areas. The primary concern is the John Waters property and residence, located approximately one-half mile to the east of site. Ground vibration, noise, and dust or fly-rock potential must be calculated, by the blasting professional and accommodated for in the blasting pattern and weight to not approach in regulatory thresholds. The quarry manager has reviewed the information provided by the blasting professional to include but not

limited to credentials, insurances, experience, site specific conditions, geological reports, technical revisions and recommendations of the U.S. Bureau of Mines, MSHA., A.T.F., and the CO DRMS. A pre and post-blasting meeting with the land and structure owner will be conducted by the quarry manager.

d. **Monitoring** systems are the responsibility of the blasting professional and are mandatory. The quarry manager will require that measurements are provided for ground vibration and air blast, for each event. These measurements will be recorded and documented to ensure compliance with not to exceed limits set forth in recommended DRMS coal air blast limits and recommended DRMS coal ground vibration limits. Based on the highly technical calculations and liabilities of the blasting professional, each blast must be calculated and determination of the thresholds be made. It is the responsibility of the blasting professional to absolutely insure that if a threshold will not be exceeded and the blast will be monitored. The unique nature of this particular quarry is that a relatively low volume of energy is required to simply loosen and crack, or simply relieve the existing natural shear planes of the deposit. Previous use of fracturing agents such as expansive mortar (DEXPAN) and low-yield explosives (Sierra blasting systems), as well as hydraulic breakers confirm the nature of this deposit under pressure, over the last decade of mining. Explosive use events have only been employed annually or bi-annually over the last few years, to increase the mining volume, when necessary. The other methods of loosening or fracturing the deposit are the primary methods to maximize the highest yields of dimensional stone and boulders.

e. **Blasting protocols and procedures** are a concerted, combinative effort of the quarry manager and blasting professional to ensure that the safety of all human life, property, and the environment are protected from injury or damage. Similar to the blast radius, the protocols start at the center of blasting area. It is the responsibility of the blasting professional to calculate the minimum amount of agents necessary to complete the task, to determine the equipment and materials necessary to complete the desired result, and to do so within the limitations and regulations set forth by all regulatory agencies to do so. It will always be the responsibility of the quarry manager to shadow the blasting professionals and his/her decisions as to how they may impact persons, property, and environmental assets within the blasting radius. This information will be discussed between the parties and any concerns from either party will be mitigated, prior to initiation. Once blasting procedures commence, the blasting radius will be controlled by the explosives professional. Only in the event of a pre-initiation emergency, such as a health emergency or unsafe condition being detected. The Quarry manager will notify the explosives professional who has sole control of initiation. Everyone on-site will remain in place until the site is deemed safe by the explosives professional.

f. **Anticipated typical blast design** for the 4Mile Quarry will be to drill patterns and depths for use of ANFO, small boosters, and ignitable primers that can maximize a splitting effect of the dimensional sandstone. It has been recommended by a blasting professional to delay each line and to lift and heave at each row towards the relief portion of the first initiation point. The expected product should be a large quantity of loosened material, left in situ, that has simply been relieved on the vertical drill holes and horizontal natural planes. The target product of the blast should be boulders and rubble size material. The number of holes and depth will likely be only 10-12’ foot holes, averaging 75-100 holes per event, average

diameter of 3.5", and spaced in a 7'x7' pattern. Approximately 8' of 1/4" minus sand will be used to stem every hole. 16 lbs. of ANFO and 18 grains of detonation cord will be used in each hole.25/42ms delays on surface.

g. **Blast monitoring** will be conducted with each blasting campaign, regardless of expected impacts. Blasting contractors will be required to demonstrate compliance with the DRMS ground vibration and air blast limits. As with the liability, it will be the responsibility of the blasting professional to conduct monitoring and provide documentation to 4Mile.

h. **A blasting report** will be required by the blasting professional for each blasting campaign and will be retained in mine file for at least 3 years and will be available for inspection by the DRMS on demand. The blasting plant will contain the following information:
    a. Location date and time of blast;
    b. Name, signature and license number of blaster-in-charge;
    c. Identification, direction and distance in feet from the nearest blast hole to the nearest potentially affected structure, such as any dwelling, school, church, or community or institutional building either:
        i. not located in the permit area; or
        ii. Not owned nor leased by the person who conducts the mining operations.
    d. Weather conditions, including: temperature, wind direction, and approximate velocity;
    e. Type of material blasted;
    f. Sketches of the blast pattern including number of holes, burden spacing, and delay pattern. Sketches will also show decking, if holes are decked to achieve different delay times within a hole;
    g. Diameter and depth of holes;
    h. Types of explosives used;
    i. Total weight of explosives used per hole and maximum weight of explosives used per 8- millisecond period;
    j. Initiation system;
    k. Type and length of stemming;
    l. Mats or other protections used;
    m. Type of delay detonator and delay periods used;
    n. Number of persons in the blasting crew; and
    o. Seismographic records where required including:
        i. Type of instrument sensitivity and the calibration signal of the gain setting or certification of annual calibration;
        ii. Exact location of instrument, the blast date and time, and the instrument distance from the blast;
        iii. Name of the person and firm taking the reading;
        iv. Name of the person and firm analyzing the seismographic record; and
        v. The vibration level recorded