

Applicant: Quality Coal Co., Inc.  
Mine Name: Sparks Branch Mine No. 2  
Permit Number: P-3947

PART III - OPERATION PLAN

Section C: Blasting Plan

Quality Coal Co., Inc.

Sparks Branch Mine No. 2

  
Alabama Certified Blaster Number 2035

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III. C. Blasting Plans

1. Ground vibrations and airblast control

(a) Check which of the following procedures will be used to limit ground vibration.

X Maximum Peak Particle Velocity

Distance from Shot to Site	Maximum Peak Velocity
0 - 300 feet	1.25 Inches/Sec.
301 - 5000 feet	1.00 Inches/Sec.
5001 - Beyond	0.75 Inches/Sec.

All shots must be seismographed.

       Scaled Distance Factor

Distance from Shot to Site	SD Factor
0 - 300 feet	50
301 - 5000 feet	55
5001 - Beyond	65

Seismograph Monitoring is not required.

       Modified Scale Distance Factor, approval from the Commission is required before this method can be used.

       Blasting-level chart, approval from the Commission is required before this method can be used.

\* Identify the structure used for measuring the scale distance.

Note: Quality Coal Co., Inc., will use the peak particle velocity method to limit ground vibrations caused by blasting operations at the Sparks Branch Mine No. 2. The Peak Particle Velocity method (seismographs) will be used for blasting operations to limit ground vibrations as outlined above. The regulatory authority will be notified as to the location of all blast monitoring sites.

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(b) Check which of the following maximum levels and corresponding microphone lower frequency limitation will be used.

- 105 dB peak - c-weighted - slow response \*
- 129 dB peak - 6 Hz or lower
- 133 dB peak - 2 Hz or lower
- 134 dB peak - 0.1 Hz or lower

Airblast monitoring will be on two consecutive blast starting with the first blast and will be performed on a two month spacing.

2. Describe what variations will be made in the blasting operations to control and correct adverse effects due to blasting.

Variations in burden, spacing, amount of explosives, delays, backfill and stemming will be made as necessary to correct adverse blasting effects. The stemming height and blasting schedule will also be adjusted, if necessary, to help reduce ground vibration. (See Attachment III.-C.-2. For additional variations).

3. Blast Monitoring.

(a) Describe the blast monitoring equipment to be used (make and model). Will it monitor ground vibrations, air blasts, or both?

NOMIS - 5000	2 Hz	Both
NOMIS - 5000	2 Hz	Both
NOMIS - 5000	2 Hz	Both
VME Model Log I	2 Hz	Both
Berger 1000D	2 Hz	Both

(b) How will monitoring equipment be installed and activated?

Equipment will be installed on a temporary basis for one individual shot or on a semi-permanent basis for 24 hour monitoring. The equipment will be activated by an individual or will be triggered by the ground vibrations or airblasts. - Transducers will be buried.

(c) Show the location of blast monitoring stations on the permit map or on a separate map with a scale of 1:24,000 or smaller.

See Attachment III-3-3(c).

\* Only with the approval of the Commission.

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4. Is blasting proposed to be conducted within 500 feet of an active underground mine? ( ) Yes (XXX) No

If yes, concurrence from MSHA is required.

5. Will blasting be conducted within 500 feet of an abandoned underground mine or within 1000 feet of an occupied dwelling, church, school, community or institutional building?  
(XX) Yes ( ) No

If yes, provide the following information, either as a part of the permit application or at a later date, but before reaching the distance given above. See Attachment III.-C.-5.

- (a) A sketch showing the drill patterns to be used; See Attachment III.-C.-5.
- (b) Critical dimensions, i.e., burden, spacing, stemming, drill hole diameter, etc.; See Attachment III.-C.-5.
- (c) Delay periods; See Attachment III.-C.-5.
- (d) Amount of decking; See Attachment III.-C.-5.
- (e) Type and amount of explosives to be used, including the loading weight (lbs. per foot of drill hole); See Attachment III.-C.-5.
- (f) Location and general description of the structures to be protected; The structures to be protected are those to the southwest and northwest of the permit area (See Permit Map). The structures include mobile homes, wood frame structures and brick veneer structures and concrete block structures.
- (g) Discuss the measures to be used in the blasting operations to protect the public from the adverse effects of blasting; Airblasts will be controlled by maintaining sufficient stemming. Prior to detonation of blasts the blast area will be patrolled, regulated and blocked off by employees to prevent unauthorized entry. Blast warnings will be given prior to each blast and all clear signals will be given after the blast when the blaster in charge determines that to be the case. See Attachment III.-C.-5.- (g)
- (h) The plans are to be prepared and signed by a Certified Blaster. See the sheet preceding the blasting plan.

6. At what times will blasting operations be conducted?

Blasting will be conducted between 6:00 a.m. and 7:30 p.m., Daylight Savings Time, during daylight hours, Monday through Saturday of each week. This schedule will be valid for the year following its advertisement in a newspaper of local circulation.

7. Will blasting operations be conducted within 300 feet of an occupied dwelling, church, school, community or institutional building?  
( ) Yes (XXX) No

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Attachment III.-C.-5.-(g)

Measures to be employed in an effort to protect the public from adverse affects due to blasting will include the following:

Airblasts will be minimized by (1) Covering all surface detonating cords with earthen material to confine their blasts. (2) By maintaining a stemming of a minimum of twelve (12) feet. The stemming material will consist of the cuttings from the borehole. Where the twelve (12) foot minimum can not be maintained, stemming material will be changed to crushed stone ranging in diameter from no less than 1/4 to 1/2 inch, and the Ash Formula (.7 X burden) used as the minimum stemming distance. (3) Burden distance will be maintained as designed to ensure no face blowouts occur causing airblasts. (4) Drill patterns will be drilled accurately ensuring that the proper burden and spacing is maintained. (5) Blasting during times of temperature inversions such as early morning and late afternoon will be limited. (6) Delays will be varied to allow for longer delays between the rows than holes.

Ground vibrations will be minimized by (1) Maintaining the designed blasthole patterns. (2) Limiting the charge weight by the scaled distance factor or through the data obtained from the seismograph. (3) Maintaining the proper delays between rows and blastholes in the rows. (4) The delay sequence will be adjusted as needed to control ground vibrations.

Fly rock from a blast will be minimized by (1) Maintaining the stemming of a blasthole at a minimum of twelve (12) feet. When possible the stemming material will consist of the cuttings from the borehole. Where the twelve (12) foot minimum can not be maintained, stemming material will be changed to crushed stone ranging in diameter from no less than 1/4 to 1/2 inch, and the Ash Formula (.7 X burden) used as the minimum stemming distance. (2) Burden distance will be maintained to the designed amount to prevent face blowout due to the burden distance being too small and to prevent blasthole blowout due to the burden distance being too great. (3) Prior to drilling a blast pattern, the bench will be inspected to determine if any geologic inconsistencies are present which could result in weaker zones which might cause a blowout and flyrock. The drill pattern will be altered as needed to avoid such zones if they are present. (4) Prior to the charging of a blast pattern, the drill operator will be consulted to determine if any inconsistencies were encountered during the drilling of the blast pattern. If inconsistencies are found, the charging sequence will be varied to stem through these inconsistencies to prevent blowouts. (5) The charge column of the blasthole will be closely monitored to ensure that the amount of blasting agents are not in excess of the allowable design maximum. (6) The delay sequence will be adjusted as needed to control flyrock. (7) Prior to detonation of blasts the blast area will be patrolled, regulated

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and blocked off by employees to prevent unauthorized entry. People occupying houses within 500 feet of a blast pattern will be given verbal warning, in addition to the normal audible warning, well in advance of detonation of a blast and will be asked to vacate to a safe location until the all clear signal is given. Blast warnings will be given prior to each blast and all clear signals will be given after the blast when the blaster in charge determines that to be the case. Each blast will be visibly monitored to determine whether or not flyrock occurred.

Where this relationship is utilized to determine weight charge per delay within 500 hundred feet of a residence all blasts will be monitored utilizing a seismograph and charge weights will be adjusted based on blast efficiency and ground vibrations to achieve the desired results while remaining within the limitations established by the regulatory authorities.

The closest that any blasting will occur to an occupied dwelling is 300 ft. If blasting occurs within 300 ft. of an occupied dwelling, an amendment will be submitted to the ASMC for review prior to any blasting.

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Variations in the blasting operations which may be employed to control and correct adverse effects due to blasting will include the following:

For a 4" bore hole the pound per foot will range from 4.63 to 6.81. For a 6 3/4" bore hole the pound per foot will range from 13.0 to 20.76, for a 7 7/8" bore hole the pound per foot will range from 17.92 to 28.25.

The burden for each drill hole will be 2-3 times the bore hole diameter converted from inches to feet. Spacing will be 1 -1.5 times the burden. The minimum stemming will be according to the Ash Formula of 0.7 times the burden.

Diameter of bore holes: 4 inch - 7 7/8 inch  
Explosive Density in pounds per linear foot:

Example for a 4" diameter drill hole the burden will be 10.0 feet to 16 feet, spacing will be 10.0 feet to 16 feet.

Example for a 6 3/4" diameter drill hole the burden will be 10.0 feet to 16 feet, spacing will be 10.0 feet to 16 feet.

Example for a 7 7/8" diameter drill hole the burden will be 15.75 feet to 23 feet, spacing will be 15.75 feet to 34 feet.

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### **PROTECTIVE MEASURES**

In order to protect structures or the public from the adverse effects of blasting, certain measures will be taken to ensure safety in those areas that are: within 500 feet of an occupied dwelling, church, school, community or institutional building; adjacent to structures such as utilities, towers, pipelines, impoundments, or underground mines; adjoining a public road system. These measures consist of:

#### **Minimizing Airblast and Flyrock by:**

- (1) Maintaining a stemming that will control the flyrock and airblast. The stemming material will consist of the cuttings from the borehole or crushed stone. Critical areas will be surveyed and adjustments will be made to ensure flyrock is controlled.
- (2) Burden distance will be maintained at the designed amount to ensure no face blowouts occur causing airblasts exceedences.
- (3) Drill patterns will be drilled accurately ensuring that the proper burden and spacing is maintained.
- (4) Blasting during times of temperature inversions during the early morning and late afternoons will be limited.
- (5) Delays will be varied to allow for good fragmentation with minimum airblast and no flyrock.
- (6) Prior to drilling a blast pattern, the bench will be inspected to determine if any geologic inconsistencies are present which could result in weaker zones thus causing a blowout and flyrock. The drill pattern will be altered as needed.
- (7) Prior to the charging of a blast pattern, the drill operator will be consulted to determine if any inconsistencies were encountered during the drilling of the blast pattern. If inconsistencies are found, the charging sequence will be altered to accommodate those inconsistencies to prevent blowouts.
- (8) The charge column of the blasthole will be closely monitored to ensure that the amount of blasting agents is not in excess of the allowable design.
- (9) Prior to denotation of blasts the blast area will be patrolled , regulated and blocked off by employees to prevent unauthorized entry. Blast warnings will be given prior to each blast: Three (3) long horns for a five minute warning; Two (2) long horns for a denotation signal; One (1) long horn for an all clear signal once the blaster in charge determines that to be the case. Each blast will be visibly monitored to determine whether or not flyrock occurred.

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**Minimizing Ground Vibrations by:**

- (1) Maintaining the design blasthole patterns.
- (2) Monitoring all blasts with seismograph(s).
- (3) Maintaining the proper delay between rows and blastholes.
- (4) Adjusting the delay sequence as needed to control ground vibrations.

**Procedures - Blasting Safety For Hillard Loop Road**

The cut sequence will be such that no open face will be directed toward Deans Ferry Road. No rock will be cast toward Hillard Loop Road.

- 1) A certified Blaster-in-Charge, having a minimum of five (5) years of recent experience in surface coal mine blasting utilizing current and best technology and being at a supervisory level, will design, inspect and conduct any blast.
- 2) Stemming heights will not be less than  $0.70 \times \text{Burden}$ .
- 3) Blast initiation progression will be such as to ensure that the main direction of movement shall not be towards Hillard Loop Road. In the event of having a secondary face toward Hillard Loop Road, burden will be twice the distance of the Primary Face.
- 4) The topography between Hillard Loop Road and the blasting site is such that peak displacement of material at Hillard Loop Road will be practically nil, ensuring that no damage to the roadbed can occur.

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The general orientation of pits and the directions of mining of each increment at the Sparks Branch Mine No. 2 are as follows:

Mining will commence within Increment No. 1 along the existing highwall on the Mary Lee Seam in the SW/NE and SE/NE of Section 15, Township 14 South, Range 8 West, Walker County, Alabama. Pits will generally align east to west with advancement to the south. Spoil material from cut no. 1 and a portion of cut no. 2 will be placed in the previously mined open highwall and if needed will be spread out over the previously mined area north and west of cut no. 1. The remaining portion of cut no. 2 and subsequent cuts will be spoiled within the open highwall and subsequent open pits. Mining will continue in this manner until the limits of the increment are reached.

Mining within Increment No. 2 will be a continuation of mining of Increment No. 1. Pits will generally align east to west with advancement to the south. Spoil material will be placed within the open highwall of Increment No. 1 and subsequent open pits. Mining will continue in this manner until the limits of the increment are reached.

Mining within Increment No. 3 will be a continuation of mining of Increment No. 2 with cuts no. 1 through no. 5. Pits will generally align east to west with advancement to the south. Spoil material will be placed within the open highwall of Increment No. 2 and subsequent open pits. Cut no. 6 will commence along the existing highwall and Blue Creek Coal Seam as shown on Attachment III-A-1 within the SE/SW and SW/SE of Section 15. Pits will generally align east to west with advancement to the south. Spoil material will be placed within the open highwall and subsequent open pits. Mining will continue in this manner until the limits of the increment are reached. Cuts no. 1 through no. 5 will mine the Mary Lee Seam only, cuts no. 6 through no. 14 will encounter the Mary Lee and Blue Creek Seams.

At the present time the leases for the James E. Davis property are not granted, however if leases are granted upon the bonding and mining of Increment No. 3, Increment No. 5 will be bonded and mined simetaneously with Increment No. 3. Beginning with cut no. 8 within Increment No. 3, cut no. 1 within Increment No. 5 both increments will be mined simetaneously. Mining will continue in this manner through cut no. 14 within Increment No. 3 and cut no. 7 within Increment No. 5.

Mining within Increment No. 4 will be a continuation of mining of Increment No. 3. Pits will generally align east to west with advancement to the south. Spoil material will be placed in the open highwall and subsequent open pits. Mining will continue in this manner until the limits of the increment are reached.

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If leases are granted for the James E. Davis property upon the bonding and mining of Increment No. 4, Increment No. 5 will be bonded and mined simultaneously with Increment No. 4. Beginning with cut no. 1 within Increment No. 4, cut no. 8 within Increment No. 5 will both increments be mined simultaneously. Mining will continue in this manner through cut no. 3 within Increment No. 4 and cut no. 10 within Increment No. 5.

Mining within Increment No. 5 will recommence with cut no. 11 along the Mary Lee outcrop located southeast of Basin 024P within the SW/SW of Section 14, Township 14 South, Range 8 West, Walker County, Alabama. Pits will generally align southwest to northeast with advancement to the southeast. Spoil material from the cut no. 1 will be placed north of Basin 024 and will be transported via mobile equipment and spread out over the previously mined area. The spoil material from the following cuts will be spoiled within the pits created by the previous cuts. Mining will continue in this manner through cut no. 23.

Beginning with cut no. 24 mining will be a continuation of mining of the southwest portion of cut no. 21. Pits will generally align southwest to northeast with advancement to the southeast. Spoil material will be placed in the open pit of the southwest portion of cut no. 21 and subsequent open pits. Mining will continue in this manner through cut no. 28.

Beginning with cut no. 29 mining will be a continuation of mining of the northeast portion of cut no. 22. Pits will generally align southwest to northeast with advancement to the southeast. Spoil material will be placed in the open pit of the northeast portion of cut no. 22 and subsequent open pits. Mining will continue in this manner until the limits of the increment are reached.

A delay in contemporaneous reclamation will be requested from the Director for the southwest portion of cut no. 21 and northeast portion of cut no. 22.

Mining of Increment No. 5 will mine through and not reconstruct two existing pre-law final cut water impoundments within P-3687. The impoundments will be dewatered prior to commencement of mining by pumping the impounded water into a certified sediment basin.

Along with coal recovery, the fire clay that lies below the Mary Lee Coal Seam will be recovered by Burton Industries, LLC. Clay recovery will commence following coal removal within a cut. After the clay is removed the next cut be drilled and shot. This dual mining sequence will not cause any delays in mining or reclamation. The clay will either be stockpiled within the permit boundary or transported offsite via contract trucker.

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Attachment III.-C.-5.-(g)

BLASTING SCHEDULE  
Quality Coal Co., Inc.  
Sparks Branch Mine No. 2

In accordance with Section 880-X-10C-.32(2)(a), of the regulations of the Alabama Surface Mining Commission, notice is hereby given that Quality Coal Co., Inc., P.O. Box 2705 Jasper, AL 35502-2705, Telephone (205) 384-6300, will conduct blasting operations, at it's Sparks Branch Mine No. 2 located near McCollum, Alabama, in Sections 14, 15, 22, and 23, Township 14 South, Range 8 West, Walker County, Alabama. Blasting will be conducted between the hours of sunrise and sunset, Monday through Saturday of each week. Emergency situations which may cause variation from this schedule include, but are not limited to, the following: Equipment breakdowns, Unauthorized work stoppages, or Weather conditions such as rain, lightning, or thunderstorms. All entrance roads to the mining area will be marked with signs reading "Blasting Area" or "Warning Explosives in Use", which list audible warning signals. Prior to each blast, all access roads will be blocked until the "All Clear" signal is given. A horn will be used to give audible warning before a shot is fired and to indicate "All Clear".

Warning Signals:

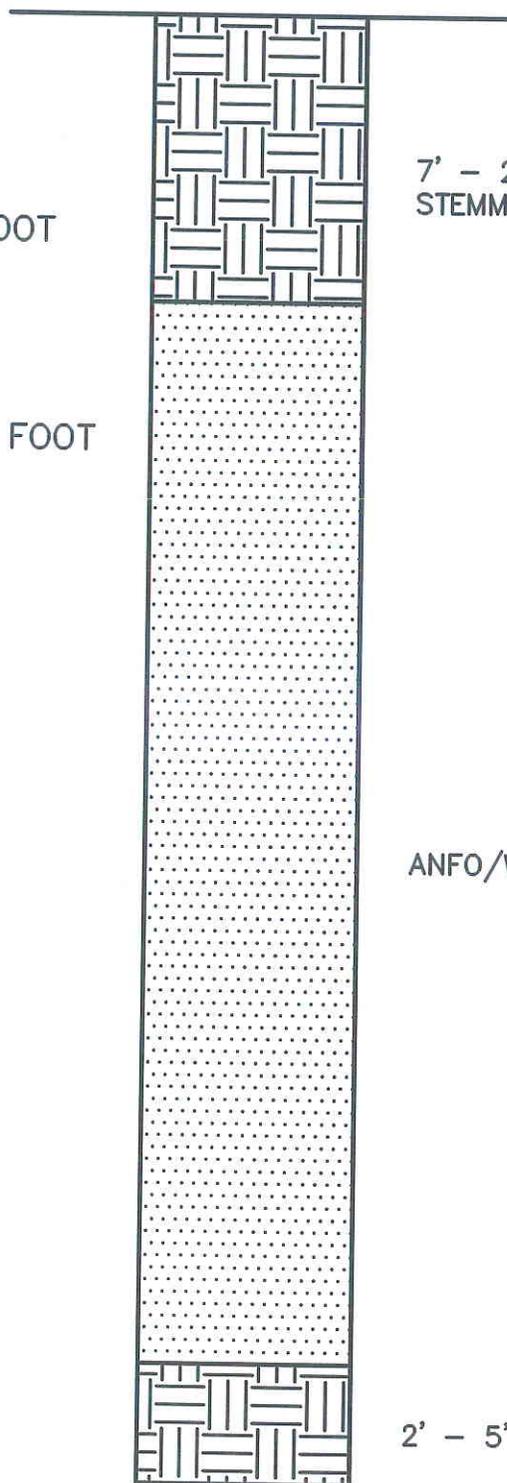
Five (5) minutes prior to blast	----	3 long blasts of a horn.
Immediately prior to the blast	----	2 long blasts of a horn.
All Clear	----	1 long blast of a horn.

# TYPICAL BOREHOLE for BLASTS 300 FEET to 1000 FEET

ANFO  
±4.63 POUNDS PER  
CUBIC FOOT IN 4" BOREHOLE  
OR ±7.1 POUNDS PER CUBIC FOOT  
IN A 6 3/4" BORE HOLE

ANFO 50/50 BLEND  
±4.63 POUNDS PER  
CUBIC FOOT IN 4" BOREHOLE  
OR ±20.50 POUNDS PER CUBIC FOOT  
IN A 6 3/4" BORE HOLE

HOLE DIAMETER: 4" TO  
6 3/4" DRILL



7' - 20'  
STEMMING

ANFO/WET HOLE PRODUCT

2' - 5' BACKFILL

**NOTE:**  
THE NUMBER OF DECKS ARE DETERMINED AS CONDITIONS REQUIRE.

# TYPICAL BOREHOLE for BLASTS BETWEEN 1000 FEET and OVER

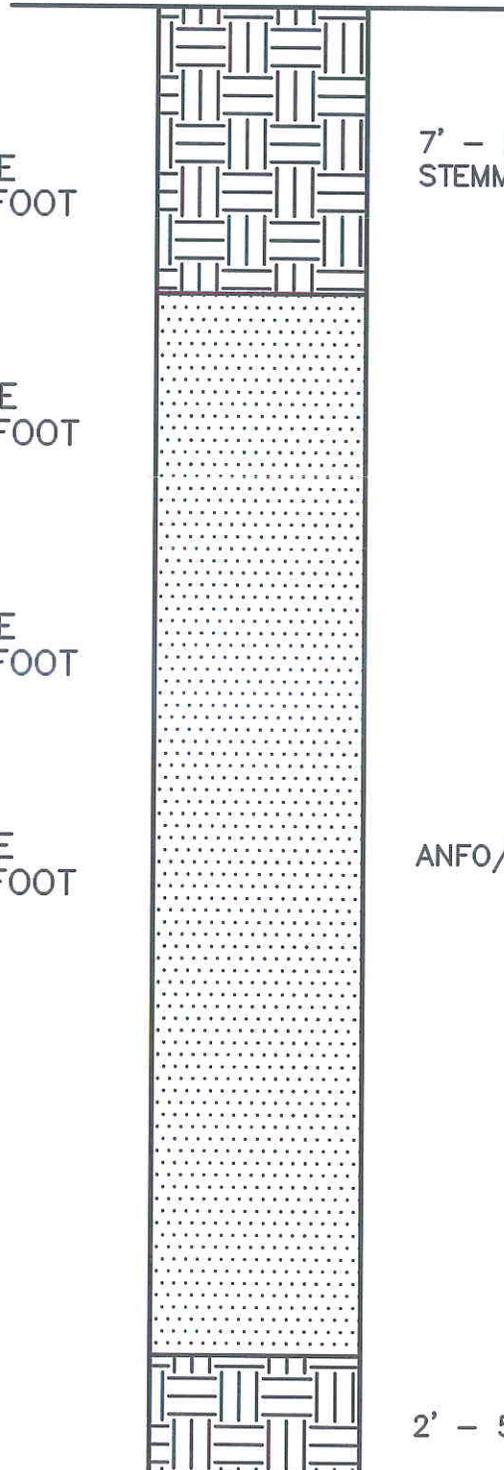
ANFO  
±13.50 POUNDS PER  
CUBIC FOOT IN 6 3/4" BOREHOLE  
OR ±18.00 POUNDS PER CUBIC FOOT  
IN A 7 7/8" BORE HOLE

ANFO 25/75 BLEND  
±18.00 POUNDS PER  
CUBIC FOOT IN 6 3/4" BOREHOLE  
OR ±24.25 POUNDS PER CUBIC FOOT  
IN A 7 7/8" BORE HOLE

ANFO 40/60 BLEND  
±19.50 POUNDS PER  
CUBIC FOOT IN 6 3/4" BOREHOLE  
OR ±26.50 POUNDS PER CUBIC FOOT  
IN A 7 7/8" BORE HOLE

ANFO 50/50 BLEND  
±20.50 POUNDS PER  
CUBIC FOOT IN 6 3/4" BOREHOLE  
OR ±27.80 POUNDS PER CUBIC FOOT  
IN A 7 7/8" BORE HOLE

HOLE DIAMETER: 6 3/4" TO  
7 7/8" DRILL



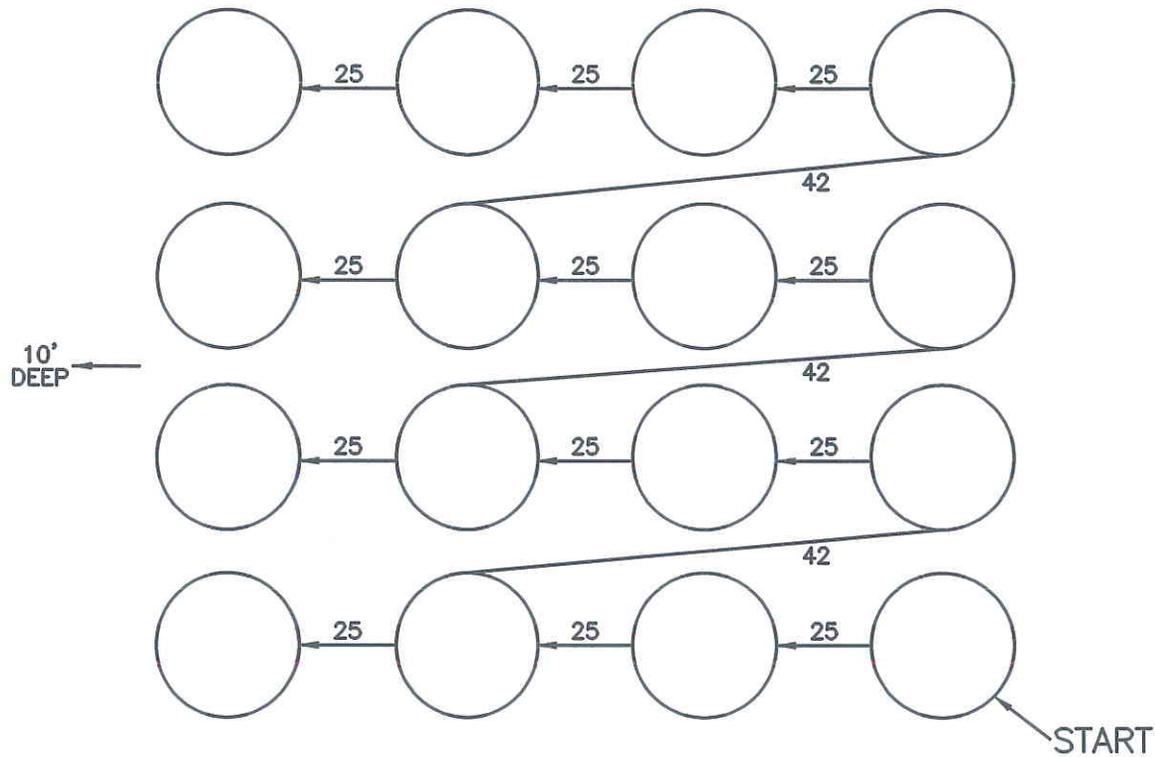
7' - 20'  
STEMMING

ANFO/WET HOLE PRODUCT

2' - 5' BACKFILL

**NOTE:**

THE NUMBER OF DECKS ARE SUBJECT TO CHANGE AS CONDITIONS REQUIRE.



## Typical 25/350ms E-Z det Shot Delay No Scale

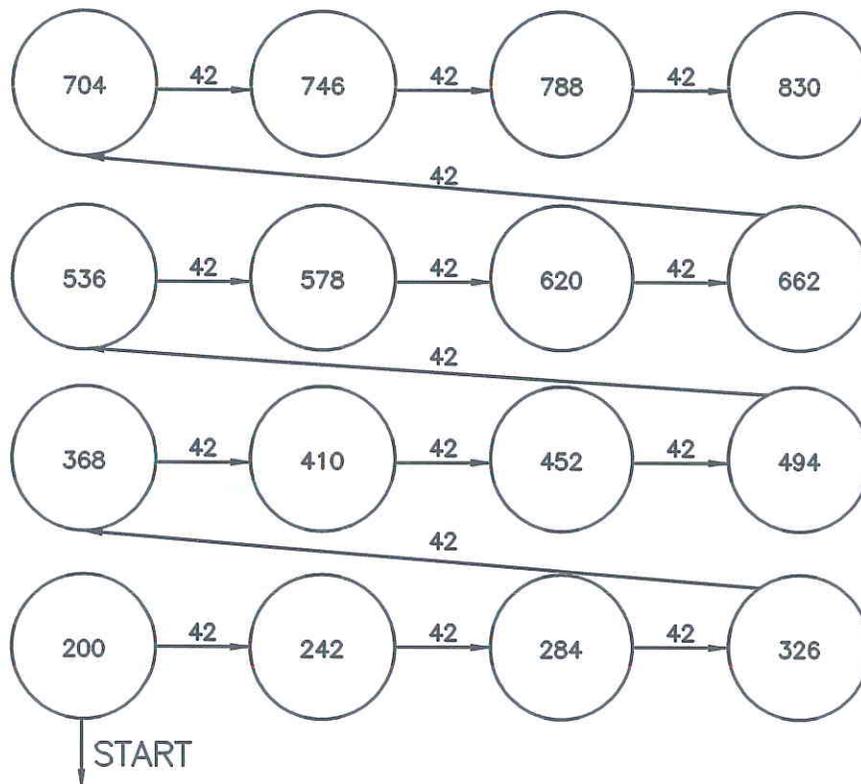
Firing will be NON-ELECTRIC. The primary surface delays for shots will be 9 ms, 17 ms, 67 ms, and 84 ms, with E-Z dets 25/350 ms in the hole or equal. E-Z Dets, Snap Dets, or equal will be used only when there are no decks. For shots with two (2) or more decks the delay patterns in the ensign Bickford book or equal, on delays will be used. Decks will use a combination of downline delays of 500ms, 475ms, 450ms, 400ms, 375ms, and 350ms, or some combination thereof where necessary. In the event that deviations are required the following surface delays may be used: 25 ms, 75 ms, 100 ms, and 200 ms with E-Z Dets 25/350 ms in the hole or equal.

Burden will be determined by multiplying the borehole diameter in feet times 2 to 3. Spacing will be determined by multiplying the burden times 1 to 1.5.

Hole Diameter is 4" – 7 7/8" inches depending on conditions & location.  
7 7/8 " Hole not allowed within 1000' feet.

Mary Lee, New Castle, and Blue Creek Coal Seam Areas:  
Drill hole depths range between Twenty (20) and One Hundred Twenty-Five(125) feet above the Mary Lee, New Castle, and Blue Creek Coal Seams.

Airblast will be controlled by maintaining sufficient stemming.  
Prior to detonation of the blasts area will be patrolled, regulated and blocked by employees to prevent unauthorized entry.  
Blast warnings will be given prior to each blast and all clear signals will be given after the blast and after the blaster in charge determines that is the case.  
The above are typical and may vary as conditions dictate.



## Typical Drill Pattern Between 300 Feet and 1000 Feet

### No Scale

Firing will be NON-ELECTRIC. The primary surface delays for shots will be 9 ms, 17 ms, 67 ms, and 84 ms, with E-Z dets 25/350 ms in the hole or equal. E-Z Dets, Snap Dets, or equal will be used only when there are no decks. For shots with two (2) or more decks the delay patterns in the ensign Bickford book or equal, on delays will be used. Decks will use a combination of downline delays of 500ms, 475ms, 450ms, 400ms, 375ms, and 350ms, or some combination thereof where necessary. In the event that deviations are required the following surface delays may be used: 25 ms, 75 ms, 100 ms, and 200 ms with E-Z Dets 25/350 ms in the hole or equal.

Burden will be determined by multiplying the borehole diameter in feet times 2 to 3. Spacing will be determined by multiplying the burden times 1 to 1.5.

Hole Diameter is 4" - 6 3/4" inches depending on conditions & location.  
7 7/8 " Hole not allowed within 1000' feet.

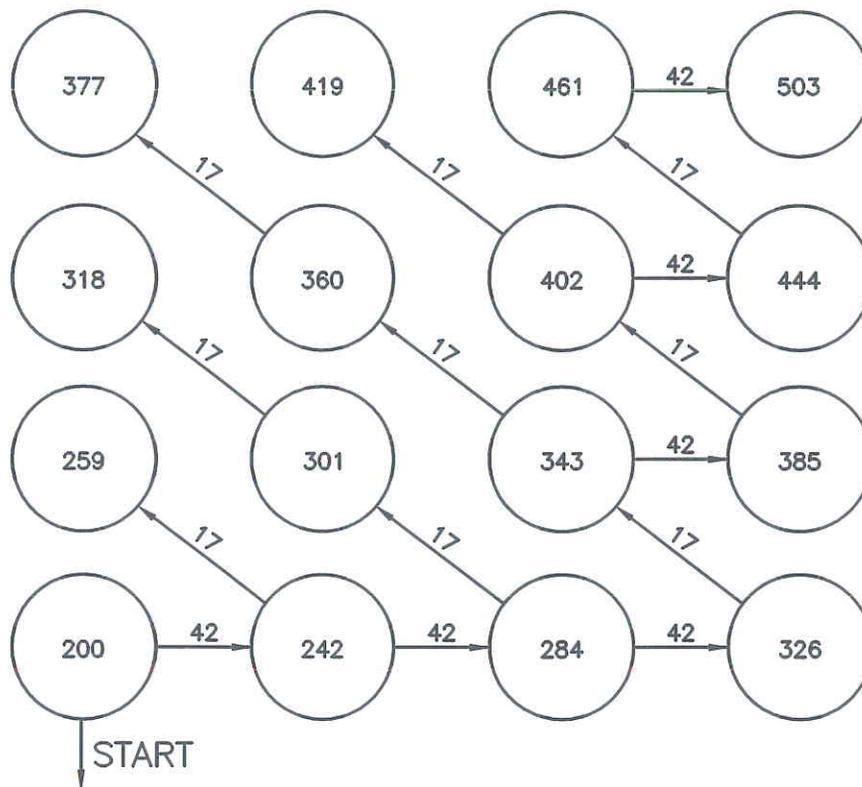
Mary Lee, New Castle, and Blue Creek Coal Seam Areas:

Drill hole depths range between Twenty (20) and One Hundred Twenty-Five (125) feet above the Mary Lee, New Castle, and Blue Creek Coal Seams.

Airblast will be controlled by maintaining sufficient stemming.

Prior to detonation of the blasts area will be patrolled, regulated and blocked by employees to prevent unauthorized entry.

Blast warnings will be given prior to each blast and all clear signals will be given after the blast and after the blaster in charge determines that is the case. The above are typical and may vary as conditions dictate.



## Typical Drill Pattern Between 1000 Feet and Over

### No Scale

Firing will be NON-ELECTRIC. The primary surface delays for shots will be 9 ms, 17 ms, 67 ms, and 84 ms, with E-Z dets 25/350 ms in the hole or equal. E-Z Dets, Snap Dets, or equal will be used only when there are no decks. For shots with two (2) or more decks the delay patterns in the ensign Bickford book or equal, on delays will be used. Decks will use a combination of downline delays of 500ms, 475ms, 450ms, 400ms, 375ms, and 350ms, or some combination thereof where necessary. In the event that deviations are required the following surface delays may be used: 25 ms, 75 ms, 100 ms, and 200 ms with E-Z Dets 25/350 ms in the hole or equal.

Burden will be determined by multiplying the borehole diameter in feet times 2 to 3. Spacing will be determined by multiplying the burden times 1 to 1.5.

Hole Diameter is 4" – 7 7/8" inches depending on conditions & location.

Mary Lee, New Castle, and Blue Creek Coal Seam Areas:

Drill hole depths range between Twenty (20) and One Hundred Twenty-Five (125) feet above the Mary Lee, New Castle, and Blue Creek Coal Seams.

Airblast will be controlled by maintaining sufficient stemming.

Prior to detonation of the blasts area will be patrolled, regulated and blocked by employees to prevent unauthorized entry.

Blast warnings will be given prior to each blast and all clear signals will be given after the blast and after the blaster in charge determines that is the case. The above are typical and may vary as conditions dictate.