CEDAR LAKE MINING, INC.

LITTLE SPRING CREEK-EAST MINE, P-39____

ALABAMA SURFACE MINING COMMISSION

SURFACE MINING PERMIT APPLICATION

PART III - C

BLASTING PLAN

PREPARED BY:

_____

A Certified Blaster will submit Plan during Review

III. C. Blasting Plan

1. Ground vibration and air blast control

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

☐ Maximum Peak Particle Velocity

Distance from Shot to Site	Maximum Peak Velocity
0- 300 Feet	1.25 Inches/Second
301-5,000 Feet	1.00 Inches/Second
5,001- Beyond	0.75 Inches/Second

All Shots must be Seismographed.

☒ Scaled Distance Factor

Distance from Shot to Site*	SD Factors
0- 300 Feet	50
301-5,000 Feet	55
5,001- Beyond	65

Seismograph Monitoring is not Required.

☐ Modified Scaled 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: (Little Spring Creek-East Mine), will use the Scaled Distance Factor method to limit ground vibrations caused by blasting operations. If blasting is done within 500 feet of an occupied dwelling the Maximum Peak Particle Velocity method will be used. Blast monitoring equipment as shown in Part III-C-(a) will be used.

III. C. <u>Blasting Plan</u> (Cont'd)

1. Ground vibration and air blast control (cont'd)

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

   [ ] 105 dB peak -c-weighted - slow response *

   [ ] 129 dB peak - 6 Hz or lower

   [X] 133 dB peak - 2 Hz or lower

   [ ] 134 dB peak - 0.1 Hz or lower *

* Only with the approval of the Commission.

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

   SEE ATTACHMENT III-C-2

ATTACHMENT III-C-2

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

Air Blasts and Flyrock will be minimized by:

(1) Covering all surface-detonating cords with earthen material to confine their blasts.

(2) Maintaining a stemming that will control the fly rock and air blast. 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 fly rock is controlled.

(3) Burden distance will be maintained at the designed amount to ensure no face blowouts occur causing air blasts.

(4) Drill patterns will be drilled accurately ensuring that the proper burden and spacing is maintained.

(5) Blasting during times of temperature inversions during the early morning and late afternoons will be limited.

(6) Delays will be varied to allow for good fragmentation with minimum air blasts and no fly rock.

(7) 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 fly rock. The drill pattern will be altered as needed.

(8) 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 these inconsistencies to prevent blowouts.

(9) The charge column of the blast hole will be closely monitored to ensure that the amount of blasting agents are not in excess of the allowable design.

(10) 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; three longs for a five (5) minute warning, two (2) longs for a shooting signal, one (1) long for 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 fly rock occurred. All public roads within 1000 feet of the blast will be blocked prior to detonation of the blast.

ATTACHMENT III-C-2(cont.)

Ground Vibrations will be minimized by:

(1) Maintaining the designed blast hole patterns.
(2) Limiting the charge weight by the scaled distance factor.
(3) Maintain the proper delays between rows and blast holes.
(4) The delay sequence will be adjusted as needed to control ground vibrations.

III. C. <u>Blasting Plan</u> (Cont'd)

3. Blast Monitoring

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

Nomis 5200 - 2 Hz - Both or Equal Equipment
Nomis 5300 - 2 Hz - Both or Equal Equipment
SSU 1000 D - 2 Hz - Both or Equal Equipment

(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 air blasts. 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 1:24000 or smaller.

The seismograph will be located at the nearest occupied dwelling when shots are being monitored.

4. Is blasting proposed to be conducted within 500 feet of an active underground mine?

( ) YES (X) NO

If <u>yes</u>, concurrence from MSHA is required.

III. C. <u>Blasting Plan</u> (Cont'd)

5. Will blasting be conducted within 500 feet of an abandoned underground mine or within 1,000 feet of an occupied dwelling, church, school, community or institutional building?

   (X) YES ( ) NO

   If <u>yes</u>, provide the following information, either as a part of the permit application or at a later date, but before reaching the distance given above.

   (a) A sketch showing the drill patterns to be used;

   (b) Critical dimensions, i.e., burden, spacing, stemming, drill hole diameter, etc.;

   (c) Delay periods;

   (d) Amount of decking;

   (e) Type and amount of explosives to be used, including the loading weight (lbs. per foot of drill hole);

   (f) Location and general description of the structures to be protected;

   (g) Discuss the measures to be used in the blasting operations to protect the public from the adverse effects of blasting;

   (h) The plans are to be prepared and signed by a Certified Blaster.

6. At what times will blasting operations be conducted?

   Monday through Saturday - 7:00 AM to 7:00 PM

   During daylight hours only based on seasonal variations to determine actual AM and PM times.

7. Will basting operations be conducted within 300 feet of an occupied dwelling, church, school, community or institutional building?

   ( ) YES (X) NO

ATTACHMENT III-C-5

Typical Blast Design
Inside 1000 Feet

Diameter of boreholes: 6-3/4 inches, 7-3/8 inches and 7-7/8 inches

Explosives: ANFO with average density of 0.82 (12.70 lbs/ft up to 17.31 lbs/ft)
25/75 blend density of 1.12
40/60 blend density of 1.34
50/50 blend density of 1.32
BLENDS with density up to 1.34 (20.76 lbs/ft up to 28.26 lbs/ft)

Size of drill patterns will vary from as small as fifty (50) feet to as much as four hundred (400) feet in length. Width of the bench will typically be one hundred (100) feet. Burden distances will be between eight (8) and fifteen (15) feet and spacing will be between ten (10) and twenty (20) feet for overburden less than twenty (20) feet. Burdens will between twelve (12) and twenty (20) feet and spacing will range from fourteen (14) to twenty-four (24) feet for overburden in excess of twenty (20) feet and up to forty (40) feet. Overburden in excess of forty (40) feet, the burden will range from fourteen (14) to twenty-five (25) feet and spacing will range from sixteen (16) to twenty-eight (28) feet. If at all possible, the hole depth to burden ratio will be kept above 1.5 to 1.0.

Stemming will be calculated using the ash formula of (0.7 to 1.3) X the burden. Example 16B X 0.7 = (11'2" minimum stemming), if the ash formula is not used then 85% of the borehole will be inherit material.

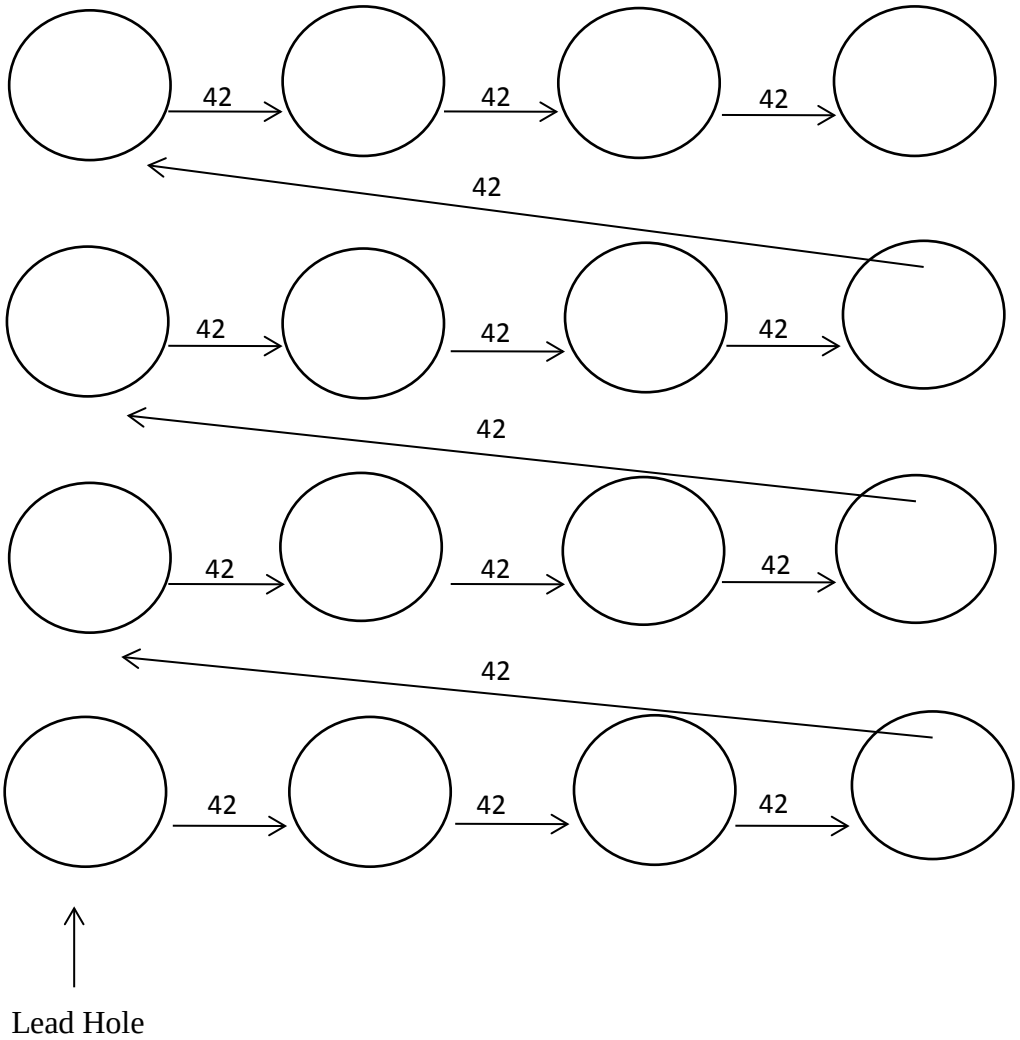
Insert Decking will range from five (5) to Eight (8) feet of inert material.

The scale distance formula will be utilized on all shots to determine the amount of explosives detonated in any eight (8) millisecond time frame.

(1) 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.
(2) 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 these inconsistencies to prevent blowouts.
(3) The charge column of the blast hole will be closely monitored to ensure that the amount of blasting agents are not in excess of the allowable design.
(4) 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; three longs for a five (5) minute warning, two (2) longs for a shooting signal, one (1) long for 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 fly rock occurred. All public roads within 1000 feet of the blast will be blocked prior to detonation of the blast.

ATTACHMENT III-C-5

Typical Drill Pattern/and Delay Pattern



Firing will be Non-Electric. The typical surface delays for shots will be 9, 17, 42 or 100 ms delays. The typical in hole delay will be Nonel down lines 400, 425, 450, 475 or 500 ms delays as needed. Other delay patterns in the Ensign Bickford delay book may be used is a different delay pattern is needed. Rows of holes and number of holes will vary depending on pit widths and burden and spacing.

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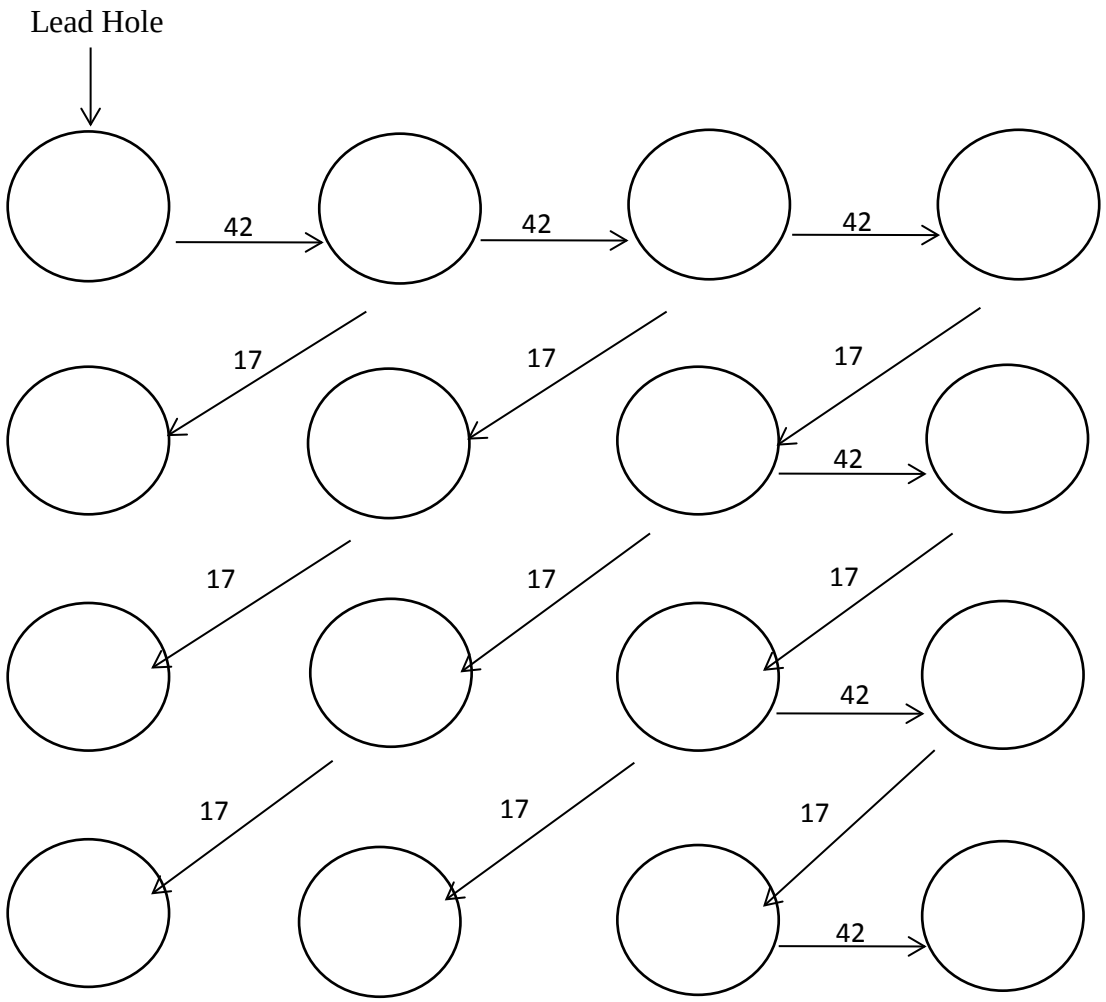

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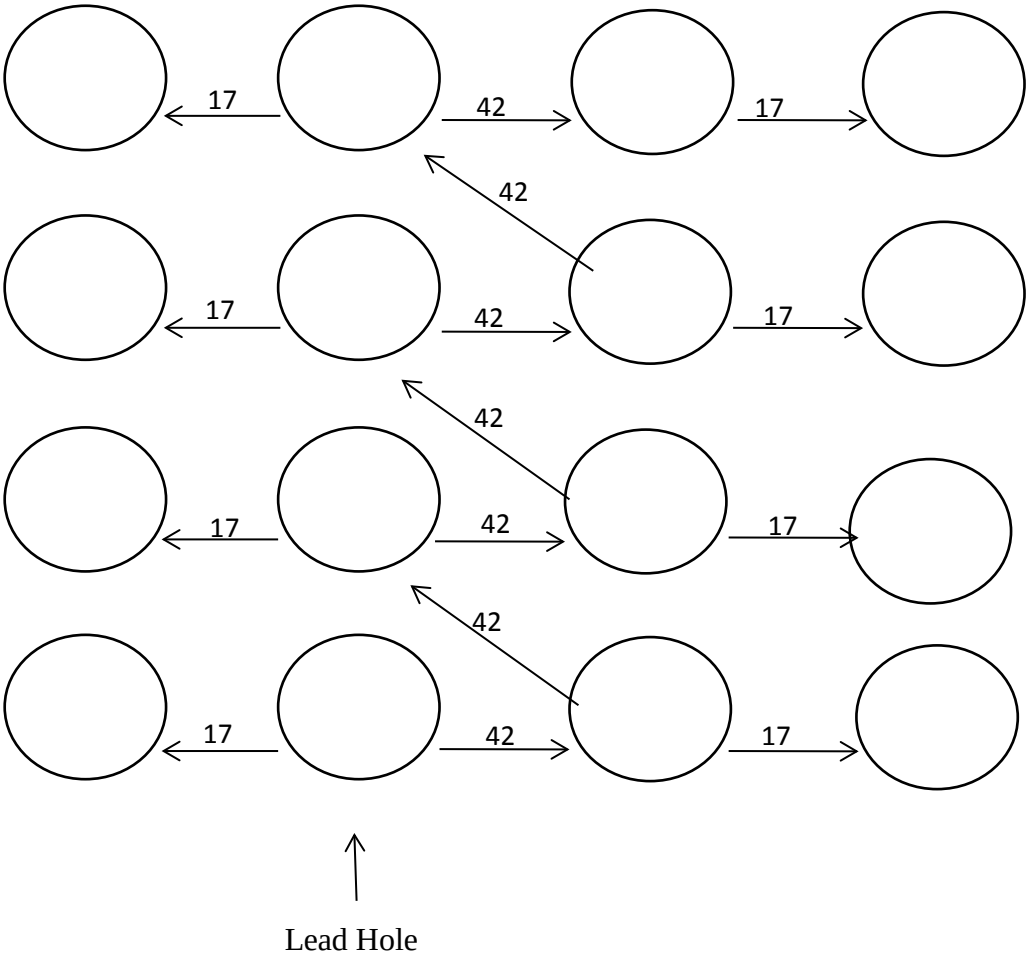

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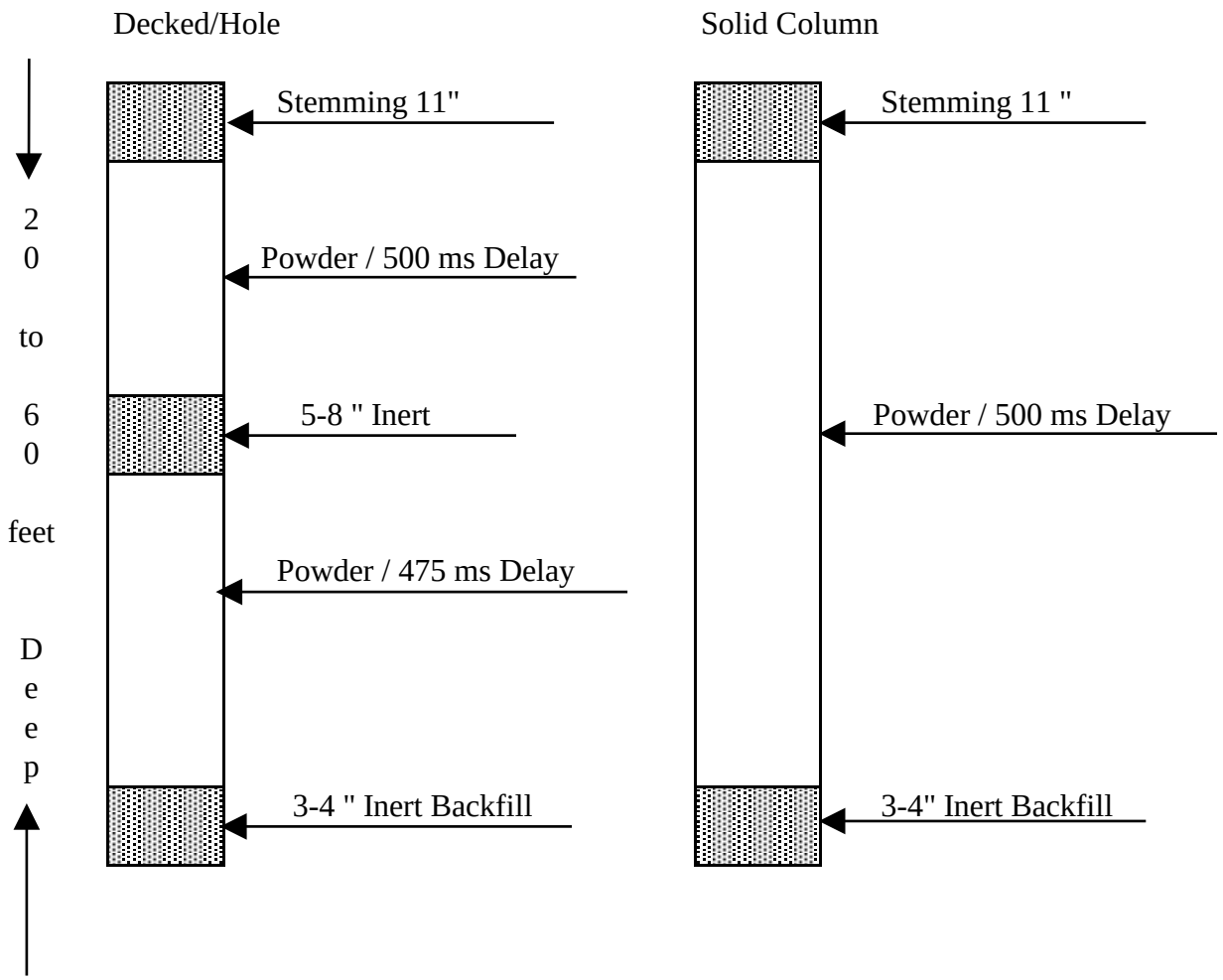
ATTACHMENT III-C-5

Typical Borehole



If holes have over three charges in them we will initiate the holes from the top down to help on vibration.