IMPLEMENTATION OF DRILLING AND BLASTING FOR CLARKSON CONSTRUCTION COMPANY ON THE PARAGON STAR DEVELOPMENT PROJECT IN LEES' SUMMIT, MO

The direction of this implementation plan is to address any of the questions and requests for information as to the designed direction of the work to be done under sub-contract for drilling and blasting of the Limestone and other various rock formations which are expected to be encountered within PARAGON STAR DEVELOPMENT PROJECT IN LEES' SUMMIT, MO project areas.

This implementation plan will cover only the procedures of PEXCO Personnel and is directed towards the general mass excavation area and utility portion, under sub-contract to Clarkson Construction Company.

The PEXCO Company was formed for the express purpose of specialty drilling and blasting projects, such as this utility excavation project, located in Lees' Summit. With over 42 years of experience in explosives technology, consulting, and drilling & blasting activities, The PEXCO management team will be able to ensure an on-time completion and economizing conclusion to this project.

The quality of our professional work and our association with some of finest drilling and blasting personnel is enhanced through the implementation of our pre and post-blast programs. These programs include providing a project blast manager, (a licensed professional within the firm), to review the project and provide or request assistance to support the projects successful conclusion. As needed the insurance, regulatory requirements, drill & blast records, and schedules are all part of the Master Job/Project Documentation File and updated daily for our client's examination. Our program will also ensure that the appropriate seismic monitoring of the project is conducted and that all records are filed properly.

PEXCO specializes in the field of explosives technology and drill & blasting and the following is a partial list of our commitment to each and every blasting project undertaken, as well as this general mass excavation and utility excavation drilling and blasting project:

- Safety Officer provides continuous training, safety seminars and complete safety program
- Complete Workers Compensation Coverage
- $5,000,000 in General Liability Insurance
- Use of latest blasting techniques, products and drilling equipment
- Seismic monitoring using the latest technology with on-sight reporting
- OSHA compliant - Substance Abuse Program
- MSHA certification
- Guaranteed un-compromised quality
- The correct results the first time, on budget and on schedule

Blasting Limits and pre-blast surveys are not required and notifications have been done by Whit Seismology of Joplin, MO

Rock is basically in most all areas of the Mass grading and some trench on the project

This report details the implementation program for drilling and blasting of the utility excavation project:

Regarding and in response to the various requirements as specified in the more stringent U S Army Corps of Engineers EM 385-1-1 Section 29, the following shall be considered:

Modified Applicable Sections of EM 385-1-1

29.A.01 Prerequisites

a. This implementation guideline report shall and is being submitted to request formal written permission from Lees' Summit, MO to have commercial explosives products delivered to the

job site for the purpose of drilling and blasting on the excavation and utility portions of the project

b. This implementation guideline report and its attachments are also being submitted as the required blasting safety plan that is required under this section.

c. Names of personnel involved, and their qualifications as pertains to the use and handling of explosives products are as follows:

Russell N. Pilshaw - Kansas Explosives use permit #DGEBL006, Oklahoma Permit # 166, Tennessee Permit # 002608, West Virginia Permit # 81-0288, Missouri Licensed Blaster Permit # 224 - etc.

Robert Taylor — Kansas Explosives use permit #25EBS009 - Missouri Licensed Blaster Permit # 223 and per MODoT standards

Kyle Green — Kansas Explosives use permit #BEBF013 - MLPA – Missouri Licensed Blaster Permit # 497 and per MODoT standards

Others on staff that are fully trained and permitted for use and handling of explosive products will also be involved from time to time.

d Buckley Powder or Austin Powder will perform transportation of explosive materials to the job site and as they are licensed transports of explosive products they are and will be in compliance with all Federal, State and local regulations and laws governing the transportation of explosive products. As for the use and handling of such products on site and through the actual firing of the blast, all personnel will be required to follow the steps, procedures and guidelines as spelled out in the enclosed **Standard Operating Procedures - Sections 19 – 31**

29.A.02 - 29.J.07

All personnel associated with this project and the use and handling of any drilling and or explosive products on site and through the actual firing and post firing of the blast, will be required to follow the steps, procedures and guidelines as spelled out in the enclosed **Standard operating Procedures - Sections 19 - 31** - the following table of contents will describe the various sections.

If any procedures within this Implementation Plan, the supporting documentation or the SOPs differ from those as spelled out in EM 385-1-1 Section 29, Section 29 of EM 385-1-1 shall prevail unless prior approval from the General Contractor or Government's designated authority has been granted

226.J

Although no underground blasting will be undertaken on this project the use and handling of any drilling and or explosives products on site and through the actual firing and post firing of the blast, will be required to follow the steps, procedures and guidelines as spelled out in the enclosed **Standard Operating Procedures - Sections 19 - 31**

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Security Measures for Storage and Transportation of Explosives Onsite:

1. Explosives products will be delivered and picked up on a daily basis and construction of berms to contain the explosives magazine area need not be completed as required under this initial implementation plan. Austin Powder and or Buckley Powder Company of Greenwood, MO will perform transportation of explosive materials to the job site IME-DOT approved storage magazines. Austin and Buckley personnel will be returning any unused products back to their originating magazine locations daily. As Austin and Buckley and PEXCO are licensed to transport of explosives products they are and will follow all Federal, State and local regulations and laws governing the transportation of explosives products.

Section 02210(LW)

1.6.

1. The purpose of this implementation report is to qualify and quantify the blasting operations of this project to assure both the contracting authorities and the public that this project will not interfere with the daily routines of others or damage and or endanger persons or property. Ground vibrations and those that can be expected are covered in later sections of this proposal.

2. All applicable regulations and laws of a federal, state, and local nature will be followed under this implementation guidelines report.

3. (a.) Prior to commencement of this proposed drilling and blasting plan the Contractor appointed "Point of Contact" personnel will be contacted, consulted, and advised as to the drilling and blasting program and impact that it may have on any road control procedures/closures as well as the impact on other Contractor or Subcontractor work. (b) Prior to commencement of this proposed drilling and blasting plan the Government appointed "Point of Contact" personnel will be contacted, consulted, and advised as to the drilling and blasting program and impact that it may have on any buildings, structures, and infrastructure systems. (c) Prior to commencement of this proposed drilling and blasting plan other parties of interest to this contract with an appointed "Point of Contact" personnel will be contacted, consulted and advised as to the drilling and blasting program and impact that it may have on any of their operations within the area.

   Investigation as to Pre-blast surveys of structures within a 500-ft area surrounding the proposed blasting site have been done on this project and the maximum calculated and expected PPVs will not exceed the State of Missouri maximum PPV of movement. Vibration monitoring will be carried out using an I.M.E. approved machine manufactured for blast vibration monitoring. There will be at least one reading of each blast and the results of those readings shall be included in the master job history file if required.

4. As the blasting contractor we shall assume full responsibility for any damages or claims resulting from blasting.

DETAILS OF BLASTING PLAN

This blasting project is a utility trench single bench blasting operation within the excavation limits of this project. The estimated hard rock excavation project calls for the drilling and blasting of approximately 250,000 cubic yards of mass area drilling and blasting as well as the unknown linear feet of trench. The closest structures to the blasting area will be outside a 500 ft. area. The area and utility excavation drilling and blasting project involve the drilling and blasting of limestone, as well as other possible blasting in shale and other rock formations.

ESTIMATED EXPLOSIVES QUANTITIES - Mass area D & B Project.

PRODUCT	AMOUNT IN POUNDS OR UNITS	
# of holes drilled	**4,500**	
3/4 lb cast primers or 2*16 Unimax	**4,500**	
Anfo or Titan 1000	**250,000**	
In Hole Delays	**4,500**	~
Surface Delays	**450**	~

Operation	Cubic yards of material blasted		AVG. Depth	Drill Footage
Project Quantities - Lcubic yards	250,000	100%	15.00	67,500
				-
TOTALS	250,000	100%		67,500

The depths of the blast hole drilling will range from 8 ft. to 25 ft. deep, with the rock ranging in thickness from 8 ft. to 25 ft. deep.

The blasting program will include but is not limited to the following:

- Bench preparation, drill accuracy and borehole loading.
- Distributions of delay detonators to take best advantage of timing, drill patterns and noise & vibration control.
- Wet Hole Materials and Use Of Air Bag Technology
- Decking via the use of either air spaces (using air bags) or the conventional method of using drill cuttings and 1/2" crushed stone to separate explosive columns or decks, if needed.
- The use of seismograph machines and Public Relations

Through the cooperation of both the management and field personnel of the General Contractor and PEXCO drilling and blasting crews, this blasting program has been specifically designed for the access road drilling and blasting project.

We feel the implementation of this blasting program will be a success but will require continued follow up by both field and management personnel.

As the process of drilling and blasting is quite technical and demanding, all PEXCO personnel are trained to conform to the rules and regulations of the industry. The general and specific rules relating to the safe use and handling of explosives can be found in the following publications:

ATF: Explosives Laws And Regulations	BATF
Explosives And Blasting Procedures Manual	U.S. Department Of The Interior
Blasting Vibrations And Their Effects on Structures	U.S. Department Of The Interior
Safety In The Transportation, Storage, Handling And Use Of Explosives Materials	Institute of Makers Of Explosives
Blasters Handbook	E. I. du Pont de Nemours & Co.
EM 385-1-1 Section 29	US Corps of Engineers
etc.	

I Bench preparation, drill accuracy and borehole loading

This portion of the plan is considered the #1 priority, and as such a major portion of this blast plan will focus on our methods, which will improve performance of not only the drilling and blasting activity, but also improve overall job productivity and safety.

Consistent drilling patterns and practices greatly affect results and noise and vibration controls, and for the most part these practices will be present at the onset of this project. A few modifications to the drilling patterns will occur after the first few test blasts.

As detailed in shot diagram #1 & 2, we are outlining our proposed burden and spacing patterns, which will be used for the majority of this project. This is the starting point to find the proper burdens and spacing for the excavations. It will be designed and drilled on a 3.5 X 5 - rectangular (diagram # 1) or diamond pattern, as in diagram # 2.

The explosive loads per hole will be based on this pattern size and as Diagram #1 indicates, an initial powder factor for total earth movement of 1.00 lbs./c yd. However, the actual powder factor for the rock blasted will more closely approximate .85 – 1.00 lbs./c yd.

Typical Blast Plan

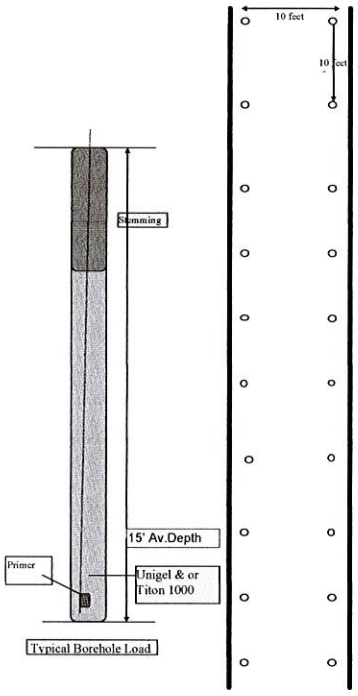


DIAGRAM #1,

Typical Blast Plan

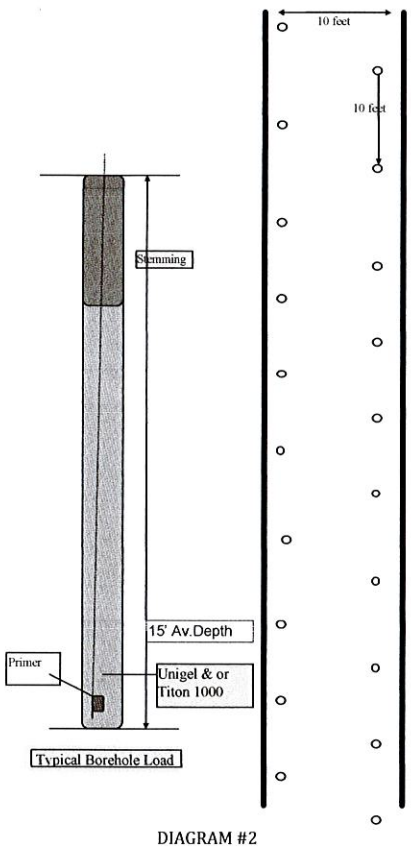


DIAGRAM #2

For the expected PPV we are using the accepted DuPont formulas and the following calculation table - For the blasting of the project, we could expect a PPV of 0.58"/sec. from our expected powder loads at 500' from any one structure.

SCALED DISTANCE CALCULATIONS

Distance from structure	500
Charge weight per 8ms delay	222

Scaled distance calculation

Scaled Distance
34

**** Estimated PPV 0.58 ips ****
* from Dupont Blaster's Handbook

For the expected PPV we are using the accepted DuPont formulas and the following calculation table - For the blasting of the project, we could expect a PPV of 1.76"/sec. from our expected powder loads at 250' from any utilities.

SCALED DISTANCE CALCULATIONS

Distance from structure	250
Charge weight per 8ms delay	222

Scaled distance calculation

Scaled Distance
17

**** Estimated PPV 1.76 ips ****
* from Dupont Blaster's Handbook

The driller(s) will be told what the required patterns are by the "blaster in charge" and or field supervision and left to their own devices and discretion as to the methods they use to drill out the pattern. The methods and procedures which PEXCO personnel follow for any drilling and blasting project are spelled out in the Standard Operating Procedures Chapters # 19 - 31. A copy of these procedures will be located on the job sight as well as filed with all permit applications.

A great deal of time will be spent by the blasting crews in observing and measuring the drilling for both the proper patterns as well as depths and conditions.

A drill bit size of 4" – 4 ½" diameter will be used for drilling of the boreholes, however, this may change during any time during the project if conditions warrant, for proper explosive distribution and better fragmentation. A diameter change could optimize explosives placement/distribution for reduction of boulders and improved fragmentation.

Both PEXCO and contractor personnel must take it upon themselves to ensure that benches are properly prepared and ready for drilling a pattern. Clearing of the drilling bench is of extreme importance to proper drilling techniques and placement of the blast holes.

Staking and preparation of the drilling bench and location of any gas, electric, water - etc. - utilities, on this project, will be done by others and PEXCO personnel proceed with blasting operations accordingly.

Drillers are not required to fill out a drilling log and as such the powder crew be measuring and documenting the loads that will be used in each hole on their Blast Plan. (example of blast plan is attached).

II Distribution of Delay Detonators

The initial blasts muck displacement and fragmentation will possibly change the distribution and timing sequences of the detonators; however, the basic layout and design of the blasts will remain the same. Our objective is to separate each blast holes firing times to stay within the perimeter of no more than .75" - 1.00 PPV on any one structure.

Blast crews will use the patterns that are drilled; therefore, their input as to hole or row placement is vital to the whole operation. The results of their efforts can only be as good as the patterns that are drilled. There will be some overlap or formal communications between the blast crew and driller(s). Delay patterns and timings between rows and or holes are dependent on the pattern configuration.

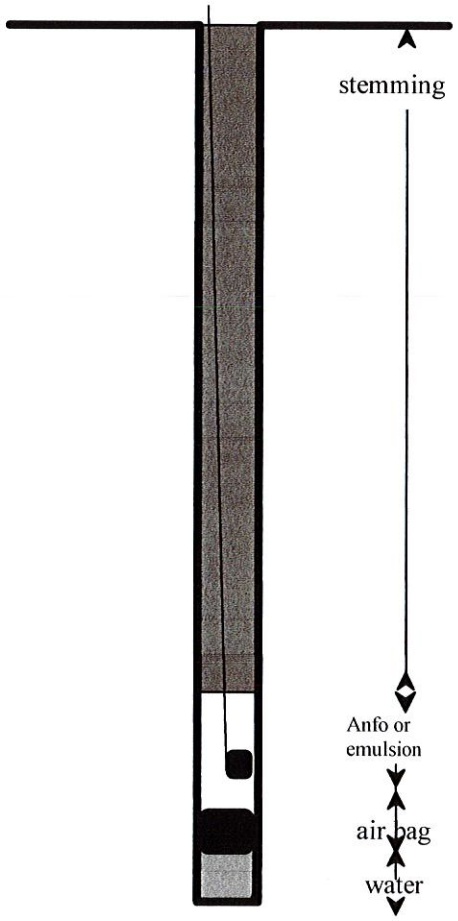
Much of the improved fragmentation that will be achieved on this project will be due to the bench preparation aspects of the program. However, delay patterns and timing improvements will provide us with

the little extra to ensure that the blast design is as efficient as it can be. We will want to look into using a reduced timing between rows and possibly some new or expanded products for initiating the holes.

III Wet Hole Materials And Use Of Air Bag Technology

We will be using wet hole products such as emulsions or dynamites during this project. Our start-up of this project will utilize a dynamite product, or an emulsion product initiated by EZ DETS. Dry holes will be column loaded with ANFO and if wet holes are encountered the packaged emulsion or dynamite will be used.

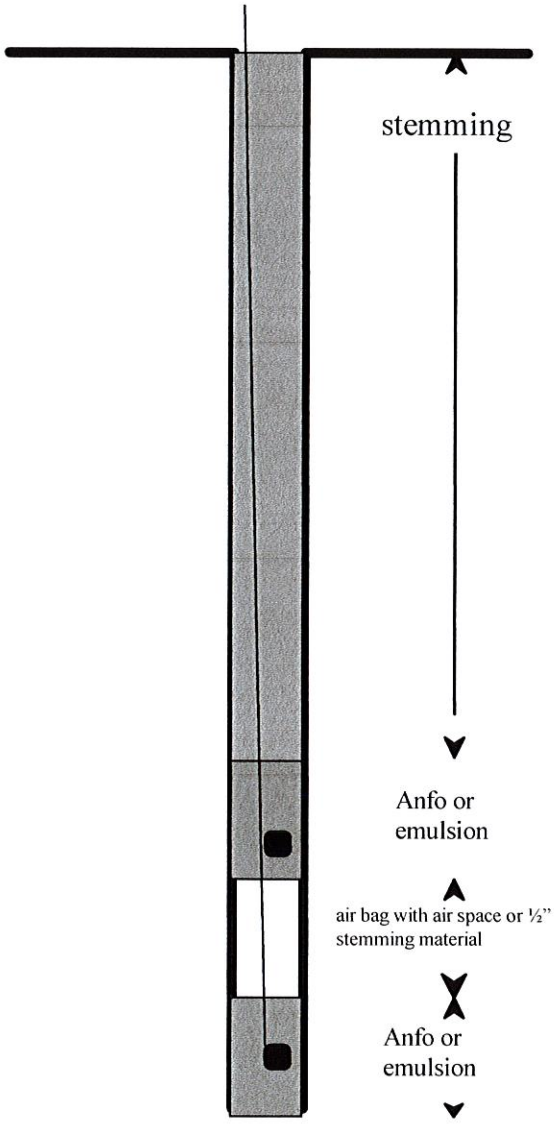
If ANFO is used, we may be using the air bag technique of collaring off a hole that will have very little water. Holes with a small amount of water (< 1 ft.) present can be loaded with ANFO if an air bag was to use in between the water and the ANFO, thus preventing water from coming in contact with the Anfo. This technique has worked quite well and could possibly be used to control powder distribution and fragmentation. The following diagram illustrates how the air bags may be used.



IV Decking via The Use of Annular Air Space and or Solid Cuttings

The use of the air bag technology has enabled us to use fewer pounds of explosives on some blasting projects, thereby reducing the fly rock from a blast. The diagram below shows the method that may be used.

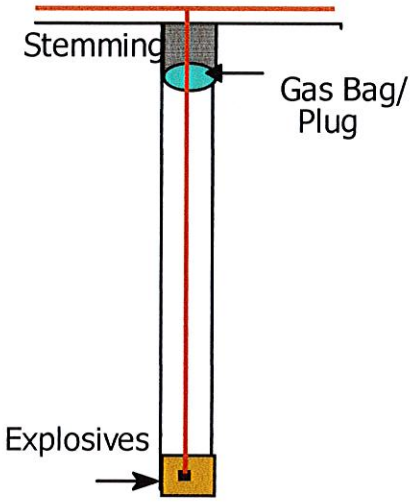
Using the air bag has reduced the detonator and primer cost, and by reducing the column load of Anfo by several feet, we offset the effect and consequences of blasting through a seam of incompetent material. The powder crew has adapted to this procedure and is confident that it will reduce labor hours for loading and provide for better blasting control.



V Presplit via The Use of Annular Air Space and or Solid Cuttings

The use of the air bag technology has enabled us to use fewer pounds of explosives for presplit projects, thereby reducing the over break, within the surface wall, from a blast. The diagram below shows the method that may be used if presplitting becomes necessary.

Using the air bag has reduced the detonator and primer cost, and by reducing the column load of presplit powder, we offset the cost of the air bag. The powder crews have adapted to this procedure and are confident that it will reduce labor hours for loading and provide for better blasting control.



VI The use of seismograph machines and Public Relations

Unless otherwise required, the use of a seismograph for monitoring vibration levels on this project will occur whenever a blast is to take place within a 500 ft distance from any structure.