DRAFT

MOHAVE COUNTY WIND FARM CONSTRUCTION PROJECT

Blasting Plan

This is a sample plan utilized at another BPWENA project site. BPWENA will develop a detailed blasting plan (if required) once geotechnical investigations are completed.

Introduction:

Prior to any explosive work beginning, a detailed blasting plan will be developed which outlines the procedures and methods that will be used. This plan must be submitted to BPWE for approval. At a minimum it must include the following:

- Complete Insurance and Bonding Requirements of Subcontractor
- Documented Proof of the Supervisor's Blasting Qualifications
- Documentation from a Similar Project and Details of Any Previous Problems
- Storage Area Procedures and Requirements
- Emergency Procedures
- Methods of Detonation
- Signage
- Communications
- Signals
- Transportation of Explosives
- Loading of Explosives
- Firing Procedures
- Inspection Procedures
- Misfire Procedures
- If Applicable, Procedures for Protection of Surrounding Buildings

Prior to any blasting to occur, a blasting permit must be issued.

Existing Conditions Report:

The blasting sub-contractor shall provide a complete analysis of the area where the proposed blasting shall occur. At a minimum, the following data shall be included:

- Current use and activity including livestock or wildlife.
- Existence of pipelines, above or below grade. Underground locate reports
- Available geotech analysis

Any existing brush will be removed before operations begin.

Permits:

Blasting subcontractor will possess a current BATF to purchase explosives. The applicable state and or the local county additional licenses or permits to purchase or use explosives will be provided prior to any blasting work being done. (ATF license attached, as well as extension letter if applicable)

Job Hazard Analysis:
Fire suppression concerns in the affected areas will be evaluated. The blasting subcontractor will have the local fire department and/or other local entity's visit the project site and give demonstrations and lectures to the entire project team on how to deal with such occurrences. The blasting subcontractor will confirm that the project does not present any other known hazards beyond the noted pipelines than those normally associated with a construction site in which blasting is used. The blasting analysis will be performed to determine if the vibration limits can be maintained below one inch per second peak particle velocity 100 feet from any known gas pipelines. If more stringent requirement are desired the blast could be further adjusted. The safest and surest method to establish the blast design would be to blast on locations further away from the pipeline and measure the vibrations with a seismograph. After receiving the pipeline owners vibration requirements in their right of way, computations can be done to project the estimated vibration level for a given distance and blasting of foundations further away can be done to confirm the projections, Some of the methods of controlling the vibration levels would be adjusting the hole sizes (diameter) to limit the amount of explosives in the blast hole, adjusting the surface delays to limit the number of blast holes during each 8 millisecond delay period during a shot. Decking (the firing of multiple charges in the same blast hole with different delays) is another method to reduce vibration levels. If the requirements of the pipeline owners cannot be meet then the foundations in the area of the pipeline will not be blasted.

Radios will be allowed and used in the blast area. Non-electric shock tube detonators (blasting caps) which are not susceptible to radio frequency detonation and less susceptible to static electricity will be used. Safety has made this type of detonator the industry standard over the electric detonator caps that are presently rarely used.

Only qualified and trained personnel will be allowed in the blasting area. All non-blasting personnel will be required to maintain ¼ mile distance during blasting. This perimeter will be maintained by manning a truck with flashing beacons across all roads leading to the blasting area.

Daily reporting will be in compliance with the requirements of BPWE's Project Manager or designee. This report will include but not limited to daily blasting schedule given at stretching every morning stating blasting area and estimated time of blasting. Daily reporting will also include, by site, work performed including the quantity of explosives brought to site that day, amount used and the amount returned with the explosive material supplier. Explosive material will not be stored on site. Explosive material will be transported in and out on an as needed basis. Explosives will be transported as per OSHA 1926.902.

Job Hazard Analysis (JHA) will be review daily for the blasting and drilling operation and signed by the blasting contractor's employees. The following information will be contained in their respective JHA's

Drilling: The primary hazards in drilling are dust and noise. The operator is in a sealed and pressurized cab. Anyone required to work around an operating drill will be required to wear hearing protection and respirator as needed. As well as hard hat, eye protection, steel toed footwear and high visibility safety vest.

.Blasting: The primary hazards related to blasting are site security, improper handling of explosives and thunderstorms. These hazards are addressed in the following blasting protocol:

> *The blast area will be secured and posted with warning signs prior to the start of loading blast holes by the blasting contractor. Warning signs with blasting personnel will be posted at all roads accessing the blast area. Only trained and necessary personnel assigned by the Blaster in charge will be allowed on the shot while it is being loaded. In the event of a lightning storm or other hazard the Blaster in Charge will vacate the shot area and will move personnel to a safe location away from the blast area and blasting personnel will secure the area until the hazard has passed.*
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> *In preparation for the blast, the blasting crew will secure the area a safe distance from the blasting zone, ¼ mile as a minimum. An air horn will be used to warn all personnel of an impending blast as well as radio communications with BPWE Project Management designee. BPWE Project Management's designee will then go over the radio and announce at 5 minutes and then at 1 minute that the area needs to be clear and stay cleared until authorization over the radio is given.*
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> *Three long blasts of the air horn will indicate a 1 minute warning to the blast. After the blast is determined to be all clear, one long blast on the air horn will indicate that the blast is over and that is safe to re-enter the area. After the blasting crew notifies the BPWE Project Management designee that the area is clear to work in, the all clear notification will be given over the radio to the entire project site.*
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> *During the loading operations, the blast area will be guarded from unauthorized personnel by the blasting personnel. Only trained personnel will be handling explosives.*
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> *After a blast has occurred, the blaster in charge will visually inspect the blast site for misfires and general safety of the area. Then an all clear horn will be sounded. After the blasting crew notifies the BPWE Project Manager or designee that the area is clear to work in, the all clear notification will be given over the radio to the entire project site.*
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> *This protocol will be given and reviewed daily when blasting operations are anticipated at the morning stretch, as well as, anticipated times and location of*

the blast. In a best case scenario all blast will take place at a certain time each day.

Public and Craft worker Safety:
Only personnel required and trained for blasting operations will be allowed in the blasting area. All non-blasting personnel will be required to evacuate an area with in ¼ mile radius of the blast site.

The following is the safety protocol that will be used on this project:

The blast area will be secured and posted with warning signs prior to the start of loading blast holes by the blasting contractor. Warning signs with blasting personnel will be posted at all roads accessing the blast area. Only trained and necessary personnel assigned by the Blaster in charge will be allowed on the shot while it is being loaded. In the event of a lightning storm or other hazard the Blaster in Charge will vacate the shot area and will move personnel to a safe location away from the blast area and blasting personnel will secure the area until the hazard has passed.

In preparation for the blast, the blasting crew will secure the area a safe distance from the blasting zone, ¼ mile as a minimum. This perimeter will be maintained by manning a truck with flashing beacons across all roads leading to the blasting area. An air horn will be used to warn all personnel of an impending blast as well as radio communications with BPWE project management.

Three long blasts of the air horn will indicate a 1 minute warning to the blast. After the blast is determined to be all clear, one long blast on the air horn will indicate that the blast is over and that is safe to re-enter the area. After the blasting crew notifies the BPWE Project Manager designee that the area is clear to work in, the all clear notification will be given over the radio to the entire project site.

During the loading operations, the blast area will be guarded from unauthorized personnel by the blasting personnel. Only trained personnel will be handling explosives.

After a blast has occurred, the blaster in charge will inspect the blast site for misfires and general safety of the area. Then an all clear horn will be sounded. After the blasting crew notifies the Mortenson designee that the area is clear to work in, the all clear notification will be given over the radio to the entire project site.
This protocol will be given and reviewed daily when blasting operations are anticipated at the morning stretch, as well as, anticipated times and location of

the blast. In a best case scenario all blast will take place at a certain time each day.

Copies of Material Safety Data Sheets will be carried by blasting supervisory personnel and also will be provided at the central job offices in BPWE Project Management's office trailer. A map will be attached to this plan for location and blasting sites.

Drilling & Blasting Operations:
Blasting Products – The blasting subcontractor or designee will furnish all blasting products. The primary blasting products that will be used are listed below.

Types of Explosives

ANFO – non-cap sensitive blasting agent used for dry hole applications.
Blastex – non-cap sensitive emulsion blasting agent used for wet hole applications.
Unimax – cap sensitive high explosive dynamite.
Unigel – cap sensitive high explosive dynamite.
EZdet Blasting Caps – delay blasting caps.
Primacord – detonating cord.
Cast Boosters – cap sensitive high explosive.

All of these explosives will be transported in approved magazines in accordance with ***OSHA 1926.902 – Surface Transportation of Explosives.***

Typical Details - In general, the following blasting details will be used. Drilling patterns and powder factors will be adjusted on an as needed basis as the project develops and as the rock conditions dictate.

Production Blasting – Production blast holes will vary from 3" to 4 ½" with an 8' x 8' spacing. Condition and results may dictate the adjustments of the spacing of the holes.

Typical dry blast holes will be loaded with ANFO and primed with Umimax dynamite or cast boosters and Snapdets. Wet holes will be loaded with Blastex and primed like the dry holes.

Stemming will be with ½" chips.

Disposal of explosives packaging materials will be done off site.

Storage of Explosives – No explosives will be stored on site.

Transportation of Explosives – All transportation of Explosives will be in compliance with ***OSHA 1926.902*** All explosives will be transported to the blasting site via pickup truck or pickup and trailer in an approved magazine. The blasting caps and high explosives will be kept separated while being transporting in either different vehicles or in compartments separation by a four inch hardwood barrier.

The blasters in charge on this project will be:

Name	License No.:	State where Licensed

A list of licensed responsible parties and explosive possessors from the US Department of Justice is attached. The license expiration date and any extension letter from the ATF will also be provided.

Communication and Blast Protocol:
The distance to nearest dwelling or neighbor from proposed blast site will be assessed. This distance poses no danger to dwellings from the blasting operations. Pipeline owners will be notified and their blasting recommendations will be followed or those areas of conflict will not be blasted. Landowners will also be given this document and notified of blasting operations. This will add in the prevention of non-project personnel entering the blast area at sensitive times.

Before each blast, blasting personnel will notify project management and safety personnel and follow blasting protocol as follows:

The blast area will be secured and posted with warning signs prior to the start of loading blast holes by blasting contractor. Warning signs with blasting personnel will be posted at all roads accessing the blast area. Only trained and necessary personnel assigned by the Blaster in charge will be allowed on the shot while it is being loaded. In the event of a lightning storm or other hazard the Blaster in Charge will vacate the shot area and will move personnel to a safe location away from the blast area and blasting personnel will secure the area until the hazard has passed.

In preparation for the blast, the blasting crew will secure the area a safe distance from the blasting zone, ¼ mile as a minimum. An air horn will be used to warn all personnel of an impending blast as well as radio communications with BPWE Project Manager or designee.

Three long blasts of the air horn will indicate a 1 minute warning to the blast. After the blast is determined to be all clear, one long blast on the air horn will

indicate that the blast is over and that is safe to re-enter the area. After the blasting crew notifies the BPWE Project Manager or designee that the area is clear to work in, the all clear notification will be given over the radio to the entire project site.

During the loading operations, the blast area will be guarded from unauthorized personnel by the blasting personnel. Only trained personnel will be handling explosives.

After a blast has occurred, the blaster in charge will inspect the blast site for misfires and general safety of the area. Then an all clear horn will be sounded. After the blasting crew notifies the BPWE Project Manager or designee that the area is clear to work in, the all clear notification will be given over the radio to the entire project site.

Anticipated at the morning stretch, as well as, anticipated times and location of the blast. In a best case scenario all blast will take place at a certain time each day.

Emergency response plan in case of accident will follow the job site protocol for the Mohave County Wind Farm developed and required to be used by the blasting subcontractor. This plan and maps are distributed by the blasting subcontractor to all job site personnel at safety orientation.

The following is a list of the emergency information for this project:

Project Information

Project Address (Mail):

Project Address (Delivery):

Telephone
Facsimile

C. Medical Clinic

D. Hospital

E. Ambulance Service