

Docket No. 7508
Georgia Mountain Community Wind Project

Blasting, Well Monitoring, and Dust Plan

1. Introduction

Georgia Mountain Community Wind, LLC (GMCW) has prepared the following Blasting, Well Monitoring, and Dust Plan, consistent with the requirements set forth in the Certificate of Public Good (CPG) issued to GMCW on June 11, 2010, Docket No. 7508.

This plan responds to conditions 13, 14, and 20 as outlined in the CPG.

Upon PSB approval of this Plan, GMCW will incorporate this plan into project construction contracts covering these activities.

The goal of this plan is to identify at a minimum the requirements, processes, and procedures required to safely construct this project. Knowledge of and adherence to all local, state and federal regulations governing the work is mandatory. All plans, specifications and permits pertaining to the project must be reviewed and followed.

2. Blasting Plan

Introduction

Prior to the start of blasting, a geotechnical survey will be conducted to evaluate subsurface conditions at each wind turbine generator location. Test pits will be conducted along roadways to determine depth to ledge and subsequent anticipated scope of blasting activities.

Communication

In addition to direct notification to property owners within a ½ mile radius of blasting operations as defined below, GMCW will implement various communication tools in order to update the public on current and pending activities. The following steps will be taken at a minimum:

- Construction schedule posted at the town offices of Georgia, Milton, Westford and Fairfax and submitted for publication in the local newspaper 30 days prior to commencement.
- A message board at the project site entrance will be regularly maintained for the duration of construction.

- A 24hr call-in hotline number will be regularly maintained through the duration of construction.

Those abutting landowners requesting direct notification and providing direct telephone contact information will be called between the hours of 8AM and 9 AM of each day's blast schedule.

Applicable Laws

Blasting activities will be performed in accordance with local, state, and federal laws and regulations, including U.S. Department of Interior Rules 816.61-68, 817.61.68, and the Blasting Guidance Manual, Office of Surface Mining, Reclamation and Enforcement, U.S. Department of Interior. State laws include Vermont Statutes Title 13 Chapter 37 and Title 20 Chapter 177.

Project Requirements

All blasting activities will be conducted by a reputable and experienced contractor(s) who are fully trained, licensed, and insured for the transportation, handling, and use of explosives.

All blasting activities shall be conducted by a Vermont-licensed blaster experienced and competent with the hazards involved in blasting. Persons working with explosive materials shall:

1. Have demonstrated knowledge of, and a willingness to comply with, all project safety and security requirements.
2. Be in good physical condition, capable of using mature judgment, and act with upmost professionalism in all situations.
3. Not use or possess illegal drugs, and shall not work while impaired or under the influence of any intoxicant.
4. Possess current knowledge of the local, State and Federal laws and regulations applicable to his/her work.
5. Have a Vermont Blasting License. All persons engaged in the loading operations at the site shall possess a valid Vermont Blasters License and a copy shall be presented to the site representative and retained on file.

Evidence of insurance will be required prior to the start of work. A copy of the blasting firm's Certificate of Insurance, showing explosive liability insurance with minimum per occurrence coverage of \$5,000,000, shall be presented to GMCW prior to any blasting activities.

Additionally the blaster(s) shall be familiar with all OSHA Regulations, State Regulations, and Federal Regulations regarding construction site safety. All blasting personnel shall possess a Mine Safety and Health Administration (MSHA) certificate.

Blast Surveys

Pre and post blast surveys will be offered to all property owners within ½ miles of the blast area. ***Appendix 1*** includes a site layout identifying the number of structures within ½ mile of the blasting zone. Depending on the actual locations requiring blasting, the number of residences affected may be less than shown.

The following properties have structures that may be within ½ miles of the blasting zone:

- Independent Towers of Vermont
- Haselton – Ted Road
- Hall – Ted Road
- Mongeon – Ted Road
- Slingerland – Ted Road
- Kilby – Ted Road
- Sabens – Ted Road
- Turner – Westford Road

There are potential structures on properties owned by Turner (North Road) and Wimble (Georgia Mountain Road) that need to be corroborated as part of final project planning.

Appropriate notices will be given at least 30 days prior to the start of blasting activities and appointments made with those owners desiring a pre-blast survey. Such surveys will be conducted by an independent firm with a minimum of 3 years experience in pre-blast inspections. The surveys will include documentation of all existing structural damage on still photographs and/or video along with a detailed written report. Post-blast surveys will be offered to the same owners and completed within 30 days following the conclusion of the blasting on the project.

The US Department of Interior, Office of Surface Mines for coal mine blasting requires the ½ mile pre-blast survey distance as proposed in this Plan. These regulations are designed for large-scale open pit mines that have very large low frequency blasts. Construction blasting required for the GMCW project are much smaller and produce higher frequency vibration than coal blasting and tend to dissipate quicker. The State of VT does not have a pre-blast survey regulation. The State of VT Act 250 Environmental Board has approved 500ft. distances for pre-blast surveys in quarry permit applications. The State of Massachusetts requires pre-blast surveys within 500ft of blasting and the State of NH requires 100ft. We conclude that a ½ mile radius for pre-blast surveys is very conservative and adequate to protect neighboring structures.

Blasting Schedule

In accordance with the Vermont Public Service Board's CPG, blasting activities will be limited to the hours between 9:00AM and 5:00 PM Monday through Friday. Blasting activities will not occur on weekends and state or federal holidays.

Drilling and other ancillary activities will follow the general project schedule, specifically 7:00AM to 5:00PM, Monday through Saturday.

Blasting Activities

All blasting activities will be coordinated with GMCW, site subcontractors, and drilling and blasting contractor. All blasting will be in strict compliance with the conditions of the project permits. Blasts will be designed and executed so as to minimize ground vibrations and offer protection to the surrounding structures.

The following outlines at a minimum the steps that will be taken to ensure public safety and protection of property:

1. Blasting warnings and all clear signals that are audible within a range of ½ mile from the point of the blast shall be given.
2. All access to the blast area shall be regulated to protect the public. Access to the blast area shall be controlled to prevent unauthorized entry before each blast and until a representative of the blasting firm has determined that no unusual condition exists after the blast and the all-clear signal has sounded. Access to and travel in and through the area can then safely resume.
3. Areas in which charged holes are awaiting detonation shall be guarded, barricaded, and posted, or flagged to prevent unauthorized entry and will not be left overnight.
4. All blasts shall be made in the direction of the stress relieved face previously marked out or previously blasted.
5. All stemming shall be a minimum of 3/8" clean, dry crushed stone.
6. Blasting mats shall be used only if there is the threat of injury due to fly rock
7. The blasting contractor shall insure that extra safety and judgment is used to prevent the simultaneous detonation of multiple holes.
8. All required signage indicating blasting activities and the signal sequence shall be posted at a message board at the project site entrance.

Blasting mats and/or backfill should not be required for the blasting at this project but will be utilized when deemed necessary by the blaster in charge. The use of blasting mats and/or backfill should be used if there is any indication that unusual rock movement may occur during the detonation of the blast.

Each blast will be preceded by a security check of the affected area by the blaster in charge or an appointed representative. The check shall be followed by a series of warning whistles. Communications shall be made with on-site personnel to ensure the safest possible operation. All personnel in the vicinity closest to the blast area shall be warned. No blast shall be detonated until the area has been secured and determined to be safe. The Warning Whistles shall follow the following sequence:

- 3 Whistles – 5 Minutes to Blast
- 2 Whistles – 1 Minute to Blast

- 1 Whistle – All Clear

The blast site shall be examined by the blaster in charge prior to the all-clear signal to determine that it is safe to resume work.

All explosives shall be delivered to the blast site on a daily basis. There will be no overnight storage. Only the amount of explosives required to perform the day's work will be brought to the site. All explosives shall be stored in approved magazines when not in use.

Material Data Specification Sheets (MSDS) for the explosive products used shall be furnished to the site representative and be available on site for inspection.

Blast Monitoring

An experienced person trained in the set-up and use of seismic monitoring equipment will monitor all blasts. A minimum of one seismograph will be used for all blasts. Monitoring equipment will be placed at the nearest structure or at an adjoining structure with concerns. The seismic information as well as blast criteria will be reviewed following each blast so that adjustments can be made to the blast design prior to the next blast if necessary. All seismic data will be filed with the remainder of the blast documentation.

Blast vibration will be monitored at the blast site, typically at the structure(s) closest to the blast site. Vibration limits will closely follow those recommended by the U.S Bureau of Mines. Blast designs shall be modified, as required, to stay within the recommended allowable limits. Blasting operations shall be modified accordingly when changes in site conditions warrant. **Appendix 2** provides preliminary vibration calculations based on known distances of concern and anticipated blast design criteria.

Air blasts will be monitored at the blast site in the same manner as the ground vibration. The seismograph used to record ground vibration will also have the capabilities to record the air blast generated by the blast. The air blast limits, as with the ground vibration, shall follow the limits recommended by the U.S Bureau of Mines. Blast design criteria must be modified to insure that the blasting does not exceed these allowable limits.

Accurate records will be kept with the pertinent information surrounding each blast. Among other information, the minimum information contained in the blast report will be: blasting company name, address, name of blaster in charge, Vermont blaster license identification, time and date of blast, size and depth of bore holes, spacing (pattern) of bore holes, type and amount of explosive in each bore hole, total number of holes, total pounds of explosives, number of delays per hole, maximum pounds of explosive per delay, minimum distance (ft) to nearest structure from blast, distance and location of seismograph. There will also be a diagram showing the layout of the blast with direction and distances to structures. See **Appendix 3** for a copy of a sample blast report.

3. Well Monitoring Plan

The State of Vermont, Town of Milton, and Town of Georgia do not have specific requirements for set back distances with respect to blasting and water wells. Industry experience and research has shown that the same guiding principles and blast design parameters implemented for this project to monitor and protect structures is sufficient to protect water wells.

Pre and post construction well monitoring will be offered to all owners of wells in use within ½ miles of the blast area. Testing will include monitoring of both quality and quantity of water from each well.

Appropriate notices will be given at least 30 days prior to the start of blasting activities and appointments made with those owners desiring to participate. Similar arrangements will be made at the conclusion of blasting activities.

The water quality test will be conducted prior to the start of blasting and immediately following completion of blasting by an independent firm with a minimum of 3 years experience in well testing. A certified testing laboratory will test water samples for the following contaminants as recommended by Vermont Department of Health: coliform, nitrate, chloride, arsenic, copper, iron, manganese, lead, and sodium. Since the State of Vermont does not regulate the quality of water in private wells, results will be reported to the project and homeowner indicating a comparison to acceptable levels as set forth by the EPA.

A water quantity test will also be conducted prior to the start of blasting and immediately following completion of blasting by an independent firm with a minimum of 3 years experience in well testing. The test consists of running water from an exterior tap for up to four hours, where volumetric tests are performed at various frequencies. If flow decreases significantly during the test, the test is suspended for a minimum of 30 minutes to allow the well to recover. Testing will commence again following the same procedure. If the well does not recover and flow remains too low than testing is permanently suspended. A report will be issued to the project and homeowner documenting the results.

4. Dust Plan

Methods to minimize and control airborne dust on the project site will require a coordinated effort by all construction personnel onsite. The primary goal for the project will be to eliminate sources of dust generation to the extent possible, which can be generated during construction of roadways, blasting, material processing, and general construction traffic on dirt covered roadways.

- Properly phase sitework activities to minimize the amount of disturbed soils open at any given time.
- Stabilize soils as soon as practical using appropriate Best Management Practices.

- Establish rock processing facility as far from residences and other site activities as possible.
- Following geotechnical study and test pits, complete final grading plan that provides a balanced site while minimizing the amount of ledge removal.

The secondary means for managing airborne dust that is generated will be through the implementation of engineered controls. The following controls, at a minimum, will be utilized:

- Keep the public roadway clean at the intersection of Westford Road and Ted Road, using hand brooms, hand tools, or truck sweeper.
- Limit speeds on project roadways to less than 15 miles/hr.
- Utilize a water truck to spray roadways as conditions dictate. Water will be supplied from an offsite source.
- Calcium carbonate or other salts will not be utilized.
- Maintain safe distances of personnel from blasting and material processing activities.



Legend

- Project Boundary
1/2 mile buffer
Approx Structure Location
Approx Property Boundary

JOB NUMBER

JOB NUMBER

5610001

5610001

Georgia Mountain
112310
DRAWN BY:

Georgia Mountain
112310
DRAWN BY:

CWW

CHECKED BY: CA

SCALE:
1 inch = 100

SCALE:
1 inch = 100

PRE-BLAST SURVEY

PRE-BLAST SURVEY

Georgia Mountain

Community Wind, LLC

One Cianbro Square, PO Box 1000
Pittsfield, ME 04967
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DATE: _____

01-20-2011

Appendix

1

Typical Blast Design
GEORGIA WIND PROJECT

# of Holes	30	Stemming:	3.66'
Depth	10		
Hole Diameter	3.0"		
Burden	6		
Spacing	6	Wet Load:	3.67'
Holes / Delay	1		
LBS / Delay	15.90		
Total LBS	159.00		
Powder Factor	1.19	Primer:	2.67'
Decks	1		

Vibration Prediction (formula based on Dupont Handbook)

Site Factor (k)	160	Ground Constant based on Site/Rock Conditions
Distance – ft (d)	100	Distance to Structure
Lbs / Delay (w)	15.90	Lbs of explosives / 8 ms delay period
Scaled Distance (SD)	25.00	SD = d / square root of w
Estimated PPV (ips)	0.9277	PPV = k * SD ^ - 1.6

Name of Company _____

Job Location _____

Blast Location_____ **Type of Blast**_____

[illegible]

Height of Face (Ft)_____ Size of Hole (in)_____ Sub-Drilling (Ft)_____ Horizontal_____ Vertical_____

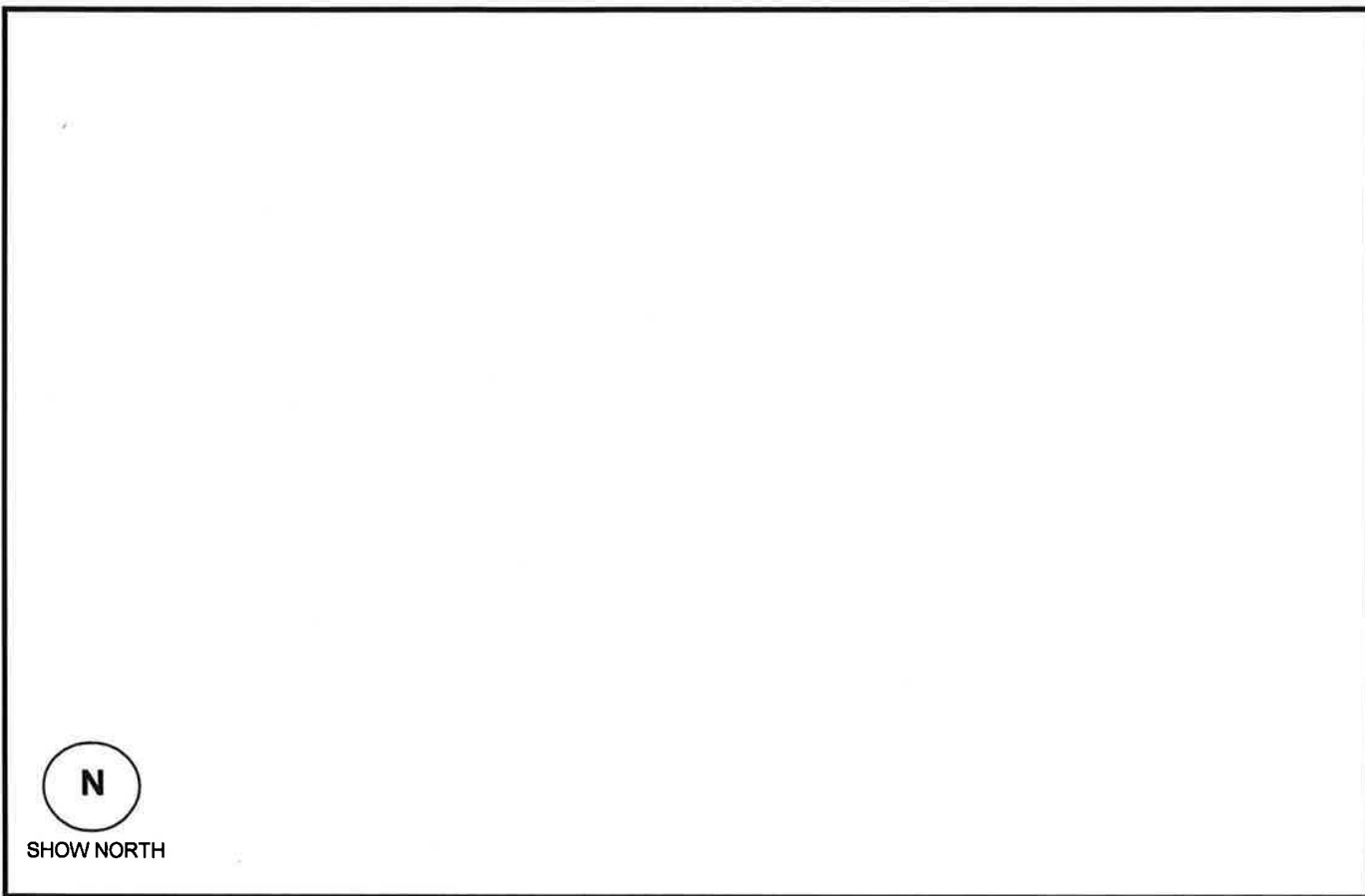
Cap Mfg _____ Length of Wire / Tube _____ No. of Series _____ No. Caps Each Series _____

Weather Conditions _____ Temperature _____ Wind Direction _____ Wind Speed _____

Blaster _____ License Number _____

Fill out this report completely. Use back for shot Diagram SIGNATURE _____

Blast Site Sketch: Show pattern, timing, shot direction, depth variation. Specify distance to nearest structures(s), Seismograph locations(s), direction to blast site.



Scale Distance - Maximum Weight of Explosives / Delay = $\frac{\text{Distance (Ft)}}{50}^2 =$ _____

Type of Blasting Cap: Electric () Nonel ()

No. Delays Used _____ Maximum Lbs. Per Delay _____ Maximum No. Holes Per Delay _____

Blast Direction & Location _____

Distance from Nearest Dwellings: Buildings _____ Highways or Railroads _____

Was Mat Used? Yes / No Quantity _____ Type Mat _____ Other Precautions _____

Exact Location of Seismograph: House # _____ Street _____

Seismograph Model _____ S/N _____ Operator _____

Calibration Date _____ Seismic Readings: T _____ V _____ L _____

Trigger Level _____ Frequency _____

Distance to Blast _____ Peak Overpressure _____ dB _____

Exact Location of Seismograph: House # _____ Street _____

Seismograph Model _____ S/N _____ Operator _____

Calibration Date _____ Seismic Readings: T _____ V _____ L _____

Trigger Level _____ Frequency _____

Distance to Blast _____ Peak Overpressure _____ dB _____

