Section 20
Blasting

1.0 Introduction

This narrative is supported by the project Civil Engineering Design Drawings (Exhibit 1) and the 115kV Transmission Line Drawings (Exhibit 3) that have been included with this submission.

2.0 Overview

The shallow nature of the soils in the Project Area suggests that blasting will be required for this project (see Section 11 of this application for detailed soils information). Soil boring information will be obtained during the project's geotechnical investigation.

Blasting is anticipated for most of the forty (40) turbine foundations, the proposed access roads in areas requiring significant cut, underground power line trenches and for some of the above ground 115kV transmission line poles. Blasting is not anticipated for the construction of the Operations and Maintenance (O&M) Facility, the Substation, at the Line 56 interconnection, or the 34.5 kV Collection System Routes. Should blasting become necessary in these areas then a pre-blast survey (see Section 4.0 of this Blasting Narrative) will be required for any structure within 2,000 feet of the intended blast site.

The anticipated blasting procedure for the removal of rock material at turbine foundation locations will consist of implementing line control to full depth and then the use of controlled blasting techniques in several benches to create minimum breakage outside the line control but create maximum rock fragmentation. Rock anchor foundations may also be considered for the turbines and will be utilized where feasible. If a rock anchor design is recommended, as a result of the geotechnical investigation and structural engineer's analysis, then much less blasting may be required.

Along the Transmission Corridor it may become necessary to blast ledge and large rocks at select locations during construction of the proposed project. The specific areas where blasting will take place will be limited to structure (pole) locations where bedrock is exposed or shallow in depth, potentially to facilitate moving or breaking large boulders to provide access to structure locations.

If blasting is required, along the Transmission Corridor, a blasting contractor will precede the construction crews and will probe designated pole and anchor locations using a tracked drilling machine. If bedrock is detected at structure locations, two to four 4-inch diameter pilot holes will be drilled, the explosives will be placed and stemmed in the holes, and the blast will be conducted. Blasting to accommodate such pole construction will only require small charges because of the limited removal of rock required. The shattered rock will then be excavated and the pole installed and backfilled. When bedrock is detected at an anchor location, a two- to four-inch hole will be drilled and a mechanical-expansion steel rockbolt anchor will then be installed.

In limited circumstances, blasting may be required for breaking or moving large boulders that restrict construction equipment from accessing structure locations. However, the relative size of the charge will still be small considering the limited amount of excavation required to allow for vehicle or equipment movement.

Blasted rock or boulders may be broken into a well-graded mixture of the size recommended by the geotechnical engineer and used as follows:

- Used for deeper fills as specified in the project's Geotechnical Engineering Report.
- Crushed for roadway surface, topping gravel and slope protection.
- Used as riprap and erosion control.

No adverse effects from blasting on either sensitive natural resources or private landowners are anticipated because the majority of the project is in remote locations and because of the minimal size of the individual charges used. In all cases, blasting will be conducted in general conformance with the

U.S. Department of Interior Rules 816.61-68 and 81 7.61-68, and the Blasting Guidance Manual, Office of Surface Mining, Reclamation and Enforcement, U.S. Department of Interior, to limit peak particle velocity and ground vibration to safe levels. Noise and air blast effects will be mitigated by use of proper stemming techniques, and the occurrence of flyrock will be limited by using blasting mats, where appropriate.

3.0 Assessment

Based on a review of aerial photographs and local tax map data the following parcels have structures that are within a 2,000-foot radius of the proposed Turbine Sites and Access Roads (see Exhibit 1), and would be subject to a pre-blast survey if blasting is to occur in that radius:

North Site:

Parcel No.	No. of Structures
Lincoln 16-30	2
16-29	2
16-28	1
16-26	1
Lee 7-1	1
7-1B	1
Lincoln 16-22	2
16-22A	3
Unknown*	5

South Site:

Parcel No.	No. of Structures
Lincoln 19-25	1
19-23	1
19-3-1	1
19-24A	1
19-25A	1
19-23-1	1
19-23-2	2
Unknown*	2
19-3-2	1
19-3	1
19-4	1
19-30	2
Burlington 1-21	1
1-22	1
1-20	1

* - Unknown lot numbers due to unavailable tax map data.

Transmission Line Route:

Parcel No.	No. of Structures
Matt U3-7	5
Winn 7-26, 7-24	6

4.0 Pre-blast Survey

Qualification information will be required from the blasting subcontractor and a public meeting will be conducted prior to any blasting activity. The general contractor will be required to prepare a blasting plan and pre-blast survey prior to any rock removal. A written report of the pre-blast survey and blasting plan will be provided to the Permittee by the contractor and will be available for review in accordance with Maine Department of Environmental Protection requirements (MDEP). The scope of the blasting plan and pre-blast survey will be required to conform to the following specifications and the requirements of Section 5.0 of this Blasting Narrative:

- All structures within a minimum distance of 2,000 feet from any blasting activity shall be surveyed as part of the preblast survey. The extent beyond the 2,000-foot minimum shall be determined by the contractor, their blasting subcontractor, and their insurance companies.

- A blasting plan shall be prepared which addresses:

    - ♦ Airblast limits,

    - ♦ Ground vibrations, and

    - ♦ Maximum peak particle velocity.

- The blasting plan shall meet criteria established in Chapter 3 (Control of Adverse Effects) in the **Blasting Guidance Manual** of the United States Department of the Interior Office of Surface Mining Reclamation and Enforcement.

- The blasting plan should include provisions and measures to monitor and assure compliance with airblast, PPV and frequency limits.

5.0 Blasting

Blasting shall be performed only after approval has been given by the applicant for such operations and must comply with the following provisions set forth by the State of Maine Statute Title 38, Chapter 3, Subchapter 1, Article 8-A, Section 490-Z(14):

A. The contractor or any subcontractor shall use sufficient stemming, matting or natural protective cover to prevent fly rock from leaving property owned or under control of the Permittee or operator or from entering protected natural resources or natural buffer strips. Crushed rock or other suitable material must be used for stemming when available; native gravel, drill cuttings or other material may be used for stemming only if no other suitable material is available.

B. The maximum allowable airblast at any inhabited building not owned or controlled by the developer may not exceed 129 decibels peak when measured by an instrument having a flat response (+ or – 3 decibels) over the range of 5 to 200 hertz.

C. The maximum allowable airblast at an uninhabited building not owned or controlled by the developer may not exceed 140 decibels peak when measured by an instrument having a flat response (+ or – 3 decibels) over the range of 5 to 200 hertz.

D. Monitoring of airblast levels is required in all cases for which a pre-blast survey is required by paragraph F. The contractor may file a MDEP permit modification requesting a waiver of the monitoring requirement if the contractor or subcontractor secures the permission of affected property owners to increase allowable airblast levels on their property and the MDEP determines that no protected natural resources will be adversely affected by the increased airblast levels. The cost to prepare the permit modification and the affect of project delay while the MDEP reviews the request shall be borne solely by the contractor or his subcontractor.

E. If a blast is to be initiated by detonating cord, the detonating cord must be covered by crushed rock or other suitable cover to reduce noise and concussion effects.

F. A pr-eblast survey is required and must extend a minimum radius of 2,000 feet from the blast site. Notification that blasting will occur should be provided to all owners of structures to be surveyed at least 10 but not more than 30 days prior to commencement of blasting. Pre-blast surveys should include both the interior and exterior of each structure. The pre-blast survey must document any pre-existing damage to structures and buildings and any other physical features within the survey radius that could reasonably be affected by blasting. Assessment of features such as pipes, cables, transmission lines and wells and other water supply systems must be limited to surface conditions and other readily available data, such as well yield and water quality. The pre-blast survey must be conducted prior to the initiation of blasting at the operation. The contractor or subcontractor shall retain a copy of all pre-blast surveys for at least one year from the date of the last blast on the development site.

> *(1) The contractor or the subcontractor is not required to conduct a pre-blast survey on properties for which the Permittee or operator documents the rejection of an offer by registered letter, return receipt requested, to conduct a pre-blast survey. Any person owning a building within a pre-blast survey radius may voluntarily waive the right to a survey.*

G. Blasting timeframes shall be coordinated with the local emergency responders, or as otherwise restricted by the local Fire Department. No blasting shall be completed on weekends, holidays or other weekday times until written permission is received by the local Fire Department and the Permittee.

H. Sound from blasting may not exceed the following limits at any protected location:

Number of Blasts Per Day	***Sound Level Limit***
1	*129 dbl*
2	*126 dbl*
3	*124 dbl*
4 or more	*123 dbl*

L. A record of each blast, including seismographic data, must be kept for at least one year from the date of the last blast, must be available for inspection at the development or at the offices of the owner or operator if the development has been closed, completed or abandoned before the one-year limit has passed and must contain at a minimum the following data:

(1) Name of blasting company or blasting contractor;
(2) Location, date and time of blast;
(3) Name, signature and social security number of blaster;
(4) Type of material blasted;
(5) Number and spacing of holes and depth of burden or stemming;
(6) Diameter and depth of holes;
(7) Type of explosives used;
(8) Total amount of explosives used;
(9) Maximum amount of explosives used per delay period of 8 milliseconds or greater;
(10) Maximum number of holes per delay period of 8 milliseconds or greater;
(11) Method of firing and type of circuit;
(12) Direction and distance in feet to the nearest dwelling, public building, school, church or commercial or institutional building neither owned nor controlled by the developer;
(13) Weather conditions, including factors such as wind direction and cloud cover;
(14) Height or length of stemming;
(15) Amount of mats or other protection used;
(16) Type of detonators used and delay periods used;

(17) The exact location of each seismograph and the distance of each seismograph from the blast;
(18) Seismographic readings;
(19) Name and signature of the person operating each seismograph; and
(20) Names of the person and the firm analyzing the seismographic data.

M. All field seismographs must record the full analog wave form of each of the 3 mutually perpendicular components of motion in terms of particle velocity. All seismographs must be capable of sensor check and must be calibrated according to the manufacturer's recommendations.

N. If any blasting activity exceeds the standards in this subsection, the department must be notified within 48 hours of the blast event. Notification must include the name of the blasting operator, the location, date and time of the blasting event and a description of the specific occurrence that is in noncompliance with this subsection. Use of explosives at the quarry may be suspended by the department until the cause of the noncompliance is identified and appropriate steps are implemented to reduce, prevent or eliminate reoccurrence.

O. Prior to blasting, the owner or operator shall develop and implement a plan that provides an opportunity for prior notification of a planned blast for all persons located within 1,000 feet of the blast site. Notification may be by telephone, in writing, by public notice in a newspaper of general circulation in the area affected or by other means identified in the plan. The plan must be in writing and available for inspection by the department.