

**Sparrows Point Project
Mid-Atlantic Express Pipeline**

Project Blasting Plan

1. INTRODUCTION

The Mid-Atlantic Express Pipeline project will involve installation of approximately 87 miles of natural gas pipeline in Maryland and Pennsylvania. Pipe installation will require trenching to a nominal depth of five feet below existing grade (up to seven feet of trench depth may be required to facilitate five feet of cover in selected areas such as some agricultural lands). Preliminary data review has identified several areas along the alignment where bedrock may be less than five feet below ground surface and therefore rock removal may be required. In the event it becomes necessary to utilize blasting techniques to remove rock within the trench, all blasting and blasting-related activities will be performed in accordance with the guidelines presented in this Project Blasting Plan.

Specific areas where blasting may be required would be determined during construction.

This Project Blasting Plan is intended to serve as an overall guidance document for all blasting on the project; however, the blasting contractor will be responsible for generating a written, Site-Specific Blasting Plan (SSBP) for each individual area where blasting activities will take place, and requirements and procedures may vary from one blasting work area to the next.

Blasting would be performed by a licensed, experienced blasting contractor in accordance with applicable Federal, State and local regulations and codes.

2. PRE-BLASTING IMPACT ASSESSMENT

2.1 Blasting Abatement

If feasible and practicable, depending on rock characteristics, alternative bedrock trenching techniques such as ripping and cutting, hydraulic hoe-ramming, rock trenching equipment or non-explosive demolition agents (such as S-Mite) may be used.

If blasting is deemed necessary, efforts will be made to avoid or minimize the following potential adverse impacts: ground vibration; air blast overpressure; generation of fly rock; generation of dust; generation of noxious gases; and chemical residue in the subsurface.

2.2 Potential Impact Assessment

Prior to initiating blasting operations, and as part of preparation of an SSBP, the Contractor shall assess the potential impact from the proposed blasting operations on nearby residential or other structures, above-ground and below-ground utilities, and roadways. If Federal, State or local regulations dictate minimum distances for assessing and/or protecting from blasting impacts, these distance thresholds will be followed. If no such regulations exist, the impacts will be assessed and monitored as set forth in the SSBP.

Pre-blast condition surveys should be performed on all other structures within the SSBP-prescribed distance from the blast zone. These surveys should include videotape or photographic documentation of structure conditions including any observable cracks in foundation or structure walls, conditions of window glass, and other features as appropriate.

In addition, the locations of private or public water supply wells should be documented. Information regarding the well construction (well depth, casing type/diameter/depth, water depth, water-bearing formations, well yield, etc.) should be obtained and reviewed, if available.

3. BLASTING PROCEDURES AND REQUIREMENTS

3.1 Site-Specific Blasting Plan

All blasting-related activities will be performed in accordance with a Site-Specific Blasting Plan to be prepared by the blasting contractor. The SSBP will include measures for avoiding, abating or minimizing potential impacts. The following is a list of minimum requirements that must be satisfied by the SSBP. It is possible that additional, specific local requirements not listed herein may be required.

- All blasting activities will be performed by a licensed blasting contractor. A copy of the license will be included in the SSBP.
- The work will be performed in accordance with applicable Federal, State and local blasting regulations. The Contractor will be also responsible for obtaining all applicable permits required to perform the work.
- Prior to blasting, the contractor will notify all applicable and potentially-affected parties, including adjacent and nearby property owners, local municipalities, and other parties as may be required by the FERC certificate conditions, project permits or applicable regulations.
- Controlled blasting techniques would be designed specifically to impact only near-surface materials (e.g., limited in intensity to fracture only shallow rock) to facilitate construction.
- The SSBP will contain a Safety Plan which will include, at a minimum:
 - Measures that will be taken to execute the work in a manner that minimizes potential for injury to project personnel, the public-at-large, and adjacent/nearby properties;
 - Contact information for all project managerial and emergency personnel, including the local fire department, and any others as may be required by applicable permits;
 - Procedures to follow in the event of injury or other emergency;
 - Procedures for establishing sentries as needed to prevent access to the blast zone(s) by unauthorized personnel;
 - Procedures for explosive materials handling, storage and use.
- The SSBP will also contain details regarding:
 - Blast hole spacing, blast charge weight, delay type/ configuration, and other design aspects to be utilized to minimize impact;
 - Explosive material cut-sheets, including chemical content of the materials and potential by-products;
 - Methodology for containing fly-rock, dust, fumes and noise;
 - Use of warning signs and other site controls;
 - Proposed vibration monitoring locations;

- Provisions for a monitored test blast to assess the effects of the blasting as proposed and the potential need for modifications to the blast methodologies;
- Proposed hours of drilling and blasting operations;
- Other criteria as appropriate.

3.2 Explosive Types

Some explosives and detonators can have adverse impact on the subsurface in the form of environmentally-harmful residue in soil, bedrock or groundwater. Examples are:

- Explosives that contain perchlorate compounds; and
- Ammonium Nitrate Fuel Oil (ANFO). If ANFO detonation is not oxygen-balanced it can result in incomplete detonation and nitrate residue can remain. In addition, ANFO produces significant quantities of gas during the explosive process, which in some circumstances can increase the risk of flyrock.

Accordingly, to avoid potential adverse impacts special trenching-type explosives which are designed specifically for trench blasting and do not contain perchlorates or ANFO will be required for use on the project.

3.3 Vibration Monitoring

As specified in the SSBP, blast vibration and airblast overpressure monitoring should be performed and reported for each round by an experienced, qualified firm, using a seismograph for vibration and an omnidirectional transducer. Appropriate documentation will be maintained and available for review by applicable agencies in accordance with the SSBP.

Unless otherwise approved, ground vibrations at adjacent and nearby structures should be kept below the safe limits recommended by the U.S. Bureau of Mines (USBM RI 8507, 1980), which are provided on Figure 6A-1. These limits are based on the frequency and the peak particle velocity of the blast vibrations, and are generally-accepted limits for preventing cosmetic damage to residential structures. These limits may vary in accordance with state-specific or local regulations or codes.

Unless otherwise approved, air blast overpressures should normally be kept below a limit of 133 dB (Peak Impulsive), or 0.013 pounds per square inch (psi), which is the limit recommended by the U.S. Bureau of Mines to prevent damage to windows and minimize annoyance.

4. POST-BLAST ACTIVITIES

Upon completion of blasting in a given work area the following post-blast activities will be implemented:

- Notifications of work completion will be made to the agencies or parties as required by the applicable permit and as specified in the SSBP;
- Post-blast surveys will be completed of those structures, if any, for which a pre-blast survey was performed;
- Documentation of the vibration monitoring, pre- and post-blast survey results will be provided to applicable agencies as required by permit and/or as specified in the SSBP; and
- Other permit-specified post-blast requirements as necessary.

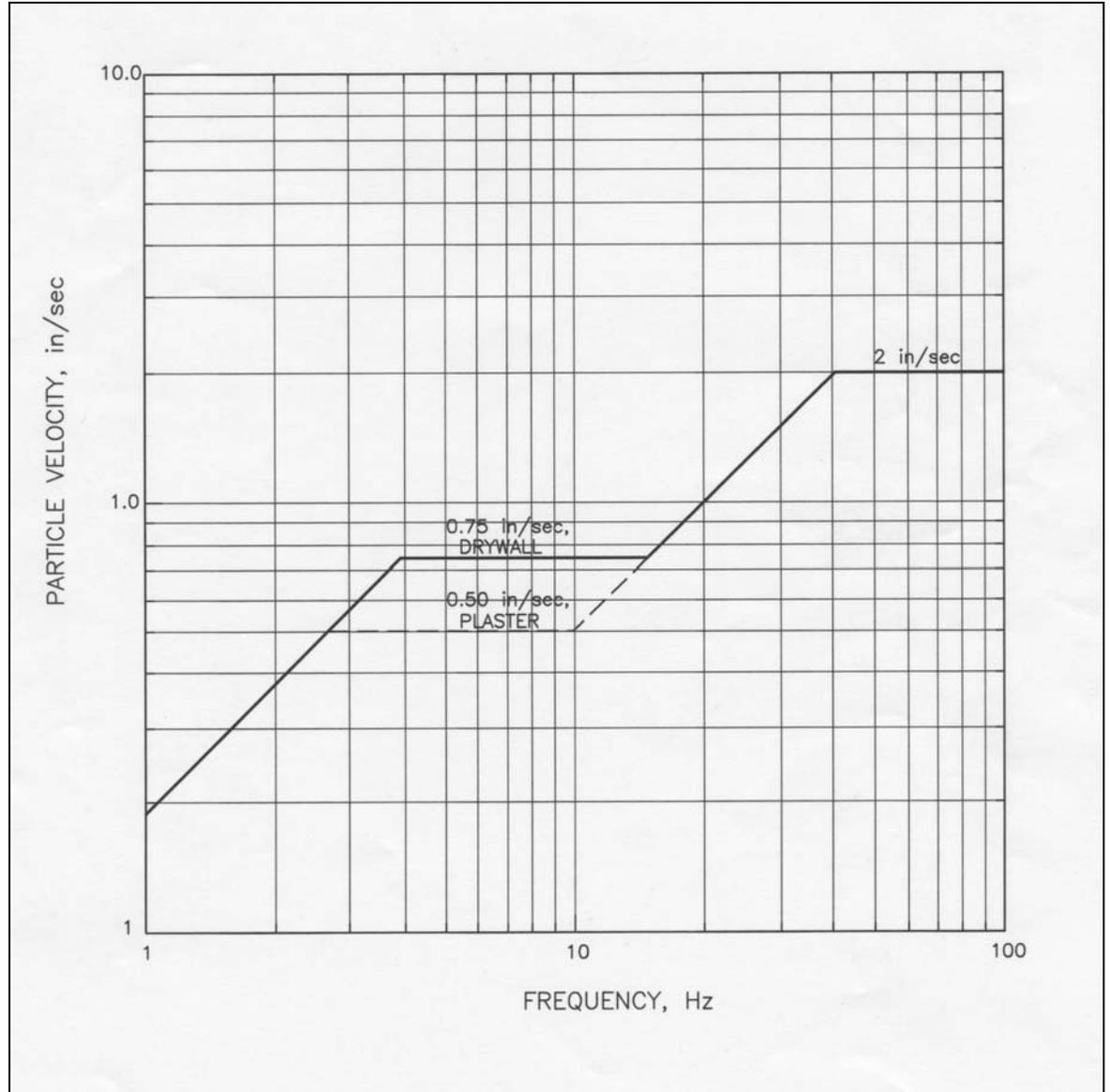


FIGURE 6A-1
BLASTING VIBRATION LIMIT CRITERIA

From: U.S. Bureau of Mines (USBM RI 8507, 1980)