

# Blasting 101

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Let's just say that my only past exposure to blasting was with a previous property and it was not exactly an optimal experience. Consequently, eighteen years ago, Joe and I were elated when we did not need to blast for our partial basement and crawl space even though our home sits on a hill of rock. Yet, when the prospect for blasting with the new construction on Fernbank's last lots, mostly nestled among developed properties, became very real, I decided to set out on my own investigation. My "game plan" was to achieve a very simple baseline of knowledge that might help myself or anyone else to understand what's involved as well as what are the possible avenues and questions for the added protection of an existing residence. I am not going to pretend that I am any sort of expert even now and that there isn't much, much more to the information out there. I had heard that great changes have happened since 911. The purpose of this article is just a jumpstart to that working baseline of information to prompt a discussion with the professionals.

The "game plan" entailed not only contacting the state regulator but also "in the field" local blasting contractors to make informed comparisons in the hope of achieving a fundamental layman's understanding of what to anticipate as a basic level of quality, reputable service. And guess what? The information from both types of sources matched remarkably, pretty much achieving the goal. Internet searches confirmed expectations with a great deal of more technical information. The following Q&A pretty much outlines my path.

## Q & A:

### 1. What entity regulates blasting in the state of West Virginia?

*Blasting is regulated by the West Virginia Fire Commission-Office of the State Fire Marshal in Charleston, WV. A blasting contractor should be licensed with this state office.*

### 2. What document outlines all the regulations regarding explosives in the West Virginia and where can I find it?

*The WV State Fire Code Title 87-01, Section 2.2.o through 2.2.s or pages 15 to 21 of the pdf copy that can be found on the FUAO website or with a pdf link. As you will see on the copy, this amendment to the existing legislative rule was recently effective 8/1/2020.*

### 3. What do the FUAO regulations indicate?

*In the "Design Guidelines and Design Review Process for Fernbank at Cress Creek - Appendix 2: Regulations" (or page 19 of the actual manual on the website copy) states: (See pdf link.)*

#### **CONSTRUCTION PERIOD REGULATIONS**

In the interest of all owners and contractors, the following regulations shall be enforced during the construction period. These regulations shall be a part of the construction contract document specifications for each residence, and all contractors and owners shall abide by these regulations. It is also required that the contractor be familiar with and abide by the applicable sections of the Declaration and the Guidelines.

#### **Blasting**

Any plans to blast shall be brought to the attention of the ARC before commencement and shall be approved by the ARC. The ARC shall generally permit blasting only on weekdays. Proper safety and protective actions shall be used.

State and County regulations for licensing requirements for blasting shall hold including proper notification and seismographic procedures that are required.

*See the introduction to Appendix 2 for an explanation of the legal basis for the above regulation.*

**4. How does the Fernbank resident become informed of what “proper safety and protective actions” are being used in the case that blasting should take place in the vicinity of their residence?**

*On the FUAO website, there are thirteen questions that resident homeowners should ask the prospective residents and their contractor concerning proposed blasting for new construction. These questions were discussed and approved by the Division Director for the WV Fire Safety Inspection Division at the State Fire Marshal’s Office in Charleston. As a post-script here, I added six of my own personal questions.*

See pdf link.

All of the approved questions cited in #4 are important, yet the remainder of this newsletter article intends to convey the major categories addressed by these questions.

**Here is a Summary of What One Can Anticipate from Reputable Companies:**

**1. A Written Blast Plan:**

**Pre-Blast Prep:** *Entails pre-blast preparation or survey, both interior and exterior. Then, there is the creation of a blast design usually by a rock blasting superintendent and a safety specialist. Seismic survey professionals can also be involved here to help with identifying structural conditions potentially even utilizing digital imagery. Foundation walls, drywall partitions, flooring, sidewalks as well as building materials and water supply are all surveyed.*

**Plan Purpose:** *Provides a project specific information concerning blasting procedures, safety and measures for the best management practices including seismographic implementation.*

**Sample Blast Plan Template with Typical Topics where Appropriate:**

- Introduction
- Pre- and Post-Blast Surveys and Notifications
- Typical Blast Design
- Blast Monitoring
- Blast Reports
- Sequence of Blasting
- Blasting Procedures
- Blast Vibration
- Blast Area Security and Warning Signals
- Delivery and Storage of Explosives
- Licenses and Permits
- Blaster Qualifications
- Blasting Personnel / Blaster Licenses
- Sample Loaded Hole Diagrams
- Sample Blast Hole
- Vibration Limits

**2. A Written Safety Plan often included in the Blast Plan**

**3. A Copy of the Blasting Contractor’s Insurance Policy**

*You may have to ask for this, but you are entitled to it.*

**4. A Pre-blast Video Survey (preferably 3<sup>rd</sup> party)**

*Every source, **fairly emphatically**, alluded to the fact that the neighboring homeowners should request/be offered some type of pre-blast survey.*

*A video pre-blast survey provides a baseline from which to judge post-blast damage. It protects both the homeowner and the blasting contractor. “Third party” alludes to a videographer that is not associated with either the homeowner or the blasting contractor. The video firm will secure the video from view unless needed post-blasting.*

*I was told that properties within just less than a football field length from the blast site were eligible to some type of pre-blast survey. It should be noted that there were various answers about the distance from the blast, but the “football field” correlation seems to cover most answers given.*

**5. A Pre-Blast Meeting that goes over all of the above**

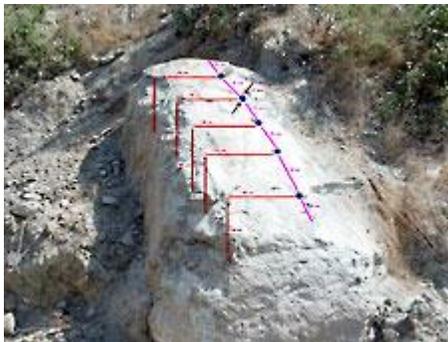
## **Factors that Caught My Attention:**

1. **Blasting Product Mediums:** *It was noted by one safety manager that blasting can be an implosion as well as an explosion allowing for greater safety options. This should be discussed in the blast plan and design. There are choices here that are much more important than a layman may realize. Please note that one of the thirteen approved questions concerns product medium. A couple products here surprised me.*

**Emulsions:** *Greater stability can be offered by an emulsion product that is mechanically mixed by a computer controlled system and a specific ratio of materials is pumped down into the borehole.*

**Demolition grout:** *One construction contractor called this one to my attention. He described a project of his whereby he had to build an addition on a 100 year old home. He needed to “blast” for the new foundation but that would have literally destroyed the original home. His answer was demolition grout which is a non-explosive, expansive agent poured in small boreholes ultimately splitting the rock formations for removal.*

**Before:**



**After:**



2. **Some interesting technologies implemented by the industry:**

- Non-electric blasting techniques permitting a series of small explosions, thousandths of seconds apart, with less risk and more control
- Stable explosive gels, also known as bulk packages in “sausage casings” pumped into boreholes for more powerful precision
- Computer-aided blast design
- Boretrak system that produces a 3D view of the hole
- Laser tracking or laser beams pulsed off rock providing 3D read for use in the loading process