Complaints

If you have a complaint regarding blasting activities at a mine, you can contact the Division of Mining and Reclamation Office nearest to you as listed below:

WVDEP Division of Mining and Reclamation Headquarters, 601 57th Street, SE, Charleston, WV 25304
Phone: 304-926-0499 64 Fax: 304-926-04568

WVDEP Philippi Regional Office, 105 S. Railroad Street, Philippi, WV 25614
Phone: 304-457-3219 Fax: 304-457-5613

WVDEP Fayetteville Regional Office, 1159 Nick Rahall Greenway Fayetteville, WV 25840
Phone: 304-574-4465 Fax: 304-574-4480

WVDEP Logan Regional Office, 1101 George Kostas Drive, Logan, WV 25601
Phone: 304-792-7250 Fax: 304-792-7258

Please have the following information available: the name of the mine, dates and times of the blasts in question (if possible), and your name, address and telephone number. The event(s) will be investigated and you will receive a response. The response will document the on-site investigation and whether any violations of the West Virginia Code or the Surface Mining Regulations were found. The complaint letter will be included in the public file unless a person specifically asks that the complaint remain confidential.

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West Virginia Department of Environmental Protection
Division of Mining and Reclamation

Citizen's Guide to Blasting

The West Virginia Department of Environmental Protection's (DEP) Division of Mining and Reclamation (DMR) is responsible for regulating surface mine blasting operations. DMR's responsibilities include: review of blasting plans and proposed blasting activities for regulatory compliance, reviewing pre-blast surveys for completeness, conducting inspections of blasting operations and taking any necessary enforcement actions, training pre-blast surveyors, training and certifying people that are responsible for blasting procedures on mining operations, and conducting and assisting with blasting research studies and projects. DMR is also responsible for being the first state agency to administer a third-party claims program. A claims administrator, contracted by DMR, will provide resolution to any claims of surface coal mining blasting damage.

This guide is to educate homeowners living in the coalfields of West Virginia of blasting practices and the DMR.

Why do mines have to blast?

After the topsoil and subsoil layers are removed, blasting may be necessary to loosen the rock above the coal seam. Mine operators drill holes in which to load explosives to fracture the rock layers. The blasting agent commonly used in coal mines is called ANFO, a mixture of ammonium nitrate (common fertilizer) and fuel oil (Diesel Fuel). Dynamite is not typically used in fracturing rock on surface coal mining operations. After blasting, a dragline, trucks, shovels, or other heavy equipment remove the rocky overburden to expose the coal seam.

The mine operator must develop a detailed blast plan demonstrating how the blasting will be conducted to comply with West Virginia's regulations and to prevent damage. A certified blaster must either conduct or directly supervise the loading and detonation of all surface coal mine blasts.

Blast Site

Each blast site must be located within the permit area. Blasting may not be conducted within 300 feet of a dwelling unless permission is granted by the owner of the structure. Blasting may not be conducted within 300 feet of a school, church or hospital and not within 100 feet of a cemetery. The blaster will define and control access to all areas (blast area) where flyrock may injure people.

Blasting Schedule

The operator is required to publish a blasting schedule in a newspaper that has general circulation in the counties where the blasting is to take place. Those ads must be published between ten (10) and thirty (30) days before commencing any blasting operations that detonate five (5) pounds or more of explosives at any given time. Copies of the schedule are mailed to local governments, public utilities and each resident who lives within a half-mile of the permit area, or seven tenths of a mile from the blasting site for larger mines. In addition, the operator is to duplicate this notification process at least once every twelve (12) months. The schedule is to include the specific blasting areas, days and time periods when blasting may occur; how access to the blasting area will be controlled; the types and patterns of blast warning signals, and all clear signals. Unless the Cabinet Secretary or the permit specifically states otherwise, a mine may only detonate blasts between the hours of sunrise and sunset, Monday through Saturday.

Blast Records

Records of all blasts, including required seismograph recordings and reports, must be maintained for at least three years from the date of the blast. These records are available for inspection by the representatives of the DEP at the mine site and upon written request by the public. The inspector will make a copy of the blast record available to those who have filed blasting complaints or blasting damage claims. If a citizen wishes to review the blast records, he or she needs to make an appointment with the operator to ensure that an individual from the mine will be available to provide access to the records. The DMR may be contacted to assist the public in obtaining names and phone numbers of the mine operators.

Cast blasting

Cast blasting is a type of blast design, that utilizes the explosive energy to move overburden material (rock that covers the coal seam) across the mining pit. Although cast blasting requires more pounds of explosive for each cubic yard of rock to be moved, it does not necessarily mean that ground vibration intensity will increase. Blast design is very important to the performance of the cast blast. A properly designed cast blast often generates less vibration than a conventional blast design. This is because the explosive energy is moving the rock across the pit and less energy is available to be transmitted to the surrounding environment.

Flyrock

Flyrock is rock that is propelled through the air or along the ground from a blast. Flyrock shall not be expelled; from the blasting site more than half way to the nearest dwelling or other occupied structure, beyond the boundary of the permit, or beyond the controlled blast area.

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offices listed at the end of this document when there is an allegation of blasting damage and to file a blasting complaint.

The Division or a mining and reclamation inspector will contact the property owner to schedule an appointment for a mining and reclamation inspector from DMR to make an initial assessment of the alleged damage and to explain the blasting damage claims process. The inspector shall also inspect the blasting operation for compliance related to your claim. The property owners will be advised of the four resolution options available to them under DMR regulations, and the owners will be given an opportunity to submit a claim through the DMR claims process. Should the property owner choose DMR's claims process, then information regarding the claim will be forwarded by DMR to an independent, third-party claims administrator, contracted by DMR. The claims administrator hires an adjuster and any other professionals whose services may be required to investigate the claim. The claims administrator makes a judgment as to the merit and loss value of the claim based on the information acquired from the investigation. The findings are forwarded to DMR to be distributed to the parties involved and to enforce the collection of any monetary judgments.

In the event that either party disagrees with the findings of the claims administrator, a binding arbitration process administered by the American Arbitration Association can be requested by contacting the DMR.

This trigger level is the point at which a vibration event will cause the seismograph to record the event. If a blast vibration does not exceed this threshold level the instrument will not activate to record the blast. A trigger level is necessary because the instrument would continually record vibration events that may not be a blast and will eventually use all the storage space the seismograph has to hold vibration data. If all of this storage space is used by non-blasting events, valuable blast vibration data could be lost. The trigger level will normally be set just high enough to filter out some normal environmental vibrations, but well below the level at which a violation or damage will occur. A seismograph may be activated by anything that will produce a vibration higher than the present trigger level. Examples of items that may cause a vibration high enough to trigger a seismograph are lawn mowers, weed trimmers, kids playing near the seismograph, etc.

A trigger level is also set for the microphone, or the acoustic channel, which measures the airblast. Trigger levels for the microphone are normally set high enough to prevent wind or even thunder from constantly activating the instrument. The acoustic channel measures the airblast in decibels (dB).

The blasting seismographs used by coal mines are manufactured to specifically measure the vibrations from a mine blast. The resulting measurements are on a different scale from those used for monitoring earthquake vibrations. As such, the particle velocity measured by blasting seismographs cannot be compared to earthquake measurements made on the Richter Scale.

What do the blasting seismograph readings mean?

A blasting seismograph measures the vibrations every one-thousandth of a second. The results are reported as a time-history or waveform. The recorded waveform contains the actual peak particle velocities of the vibration event, the corresponding frequencies that the vibrations contained and the four channels actually doing the recording.

The recording also displays the vibration wave on each of the four channels. A coal mine blast will have a distinct wave, which enables the blasting specialists to distinguish the difference between a blast or some other type of vibration event. This recording will contain the name of the mine and the residence where the instrument is located. Additional information is the date and time of the blast and the trigger, or threshold, levels at which the seismograph will begin to record a vibration event.

Claims and Arbitration

West Virginia is the first state to offer a claims and arbitration process for property owners who believe they have sustained structural damage due to surface coal mine blasting. A property owner is responsible for notifying DMR at one of the

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Airblast

When a blast is detonated, some of the energy may be release into the atmosphere as air pressure. This air pressure, or airblast, may be monitored with a seismograph and there are limits that may not be exceeded. While airblast may be the most annoying aspect of blasting, it is the least damaging. The first sign of damage resulting from airblast will be window glass breakage. The acoustic levels of airblast is measured in decibels (dB). Research has shown the damage from airblast does not occur until approximately 140 dB. The maximum airblast limits range from 129 dB to 134 dB depending upon the type of microphone in use with the seismograph. Weather conditions can affect the distance airblast travels. Normally airblast decreases as the distance from the blast increases.

Ground Vibration

The intensity of ground vibrations depends on several factors. The most important are how close the person or house is to a blast and how many pounds of explosives are detonated per delay period. The magnitude of ground vibrations decreases as the distance from the blast increases. For example, dropping a stone into a lake or water puddle produces waves that travel away from the point of impact and eventually disappear. Similarly, the farther a person or house is from a blast, the lower the ground vibration amplitudes or waves will be.

The regulations allow an operator to use several methods to demonstrate compliance with the ground vibration limits. One way is by using a seismograph to monitor every blast. Or, an operator may choose to use the *Scaled Distance Equation* to prove compliance with the ground vibration limits.

The *Scaled Distance Equation* method is a mathematical equation, which allows an operator to prove compliance with the vibration limits without using a seismograph. The equation determines how many pounds of explosives may be detonated in any eight millisecond (ms), or eight one-thousandths of a second, time period. This is often referred to as the *maximum pounds per delay*. While eight milliseconds do not sound like very much time, it actually separates the total charges of the blast into many smaller blasts and allows the blaster to control the blast and vibrations.

The key factor in the equation is the distance between the blast and the nearest dwelling or other protected structure. As the distance to the nearest structure decreases the pounds of explosives allowed per delay also decreases.

The ground vibration limits found in West Virginia regulations were derived from considerable research conducted by the United States Bureau of Mines and rules of the federal Office of Surface Mining. These limits are based on the distance a structure is located from a blast. They are:

Allowable Blasting Limits

DISTANCE TO STRUCTURE	PEAK PARTICLE VELOCITY	SCALED DISTANCE FACTOR
0 to 300 ‘	1.25 in/sec	50
301-5,000’	1.00 in/sec	55
5001’ and beyond	.075 in/sec	65

The vibration limits, measured as peak particle velocity (ppv), are designed to prevent cosmetic damage from occurring to any structure. Peak particle velocity is how fast a particle of soil may move and not how far the structure or ground will move. This does not mean citizens living near a mine will not feel some vibration from a blast. The laws are not designed to address nuisance caused by a mine.

Pre-blast Surveys

A pre-blast survey documents the pre-existing condition of a man-made structure before blasting begins. At least thirty days prior to commencing blasting, an operator is to notify all owners and occupants of dwellings that the operator will perform pre-blast surveys. This includes contacting in writing, all owners and/or occupants of dwellings or others structures within one-half mile of the permitted area or seven tenths of a mile of the proposed blasting site for certain larger mines. The DMR recommends that anyone eligible to receive a pre-blast survey request this service. A citizen should make the pre-blast survey request using the forms provided to them by the mining company. The operator may conduct the survey himself or hire an independent contractor to do the survey. All pre-blast surveyors must be trained and approved by DMR. Upon completion of the pre-blast surveys, the operator or his designated appointee (contractor) submits two (2) copies to the DMR. The surveys are reviewed as to form and completeness. Once the review is completed and the surveys are accepted, one copy is confidentially secured by DMR and one copy is forwarded to the structure owner and/or occupant. If a structure owner/occupant disagrees with the results of a survey, they may notify DMR, in writing, of the specific areas of disagreement. That document will be made a part of the confidential pre-blast survey file for that structure.

Why does my house shake?

When explosives are detonated the rock above the coal seam is fractured by the release of large amounts of energy. Unfortunately, not all of the energy is used to fracture the rock and some will be transmitted to the surrounding environment in the form of ground vibrations and airblast.

Blasting can account for approximately 25% of the operating cost of a coal mine.

Any ground vibration that is transmitted to surrounding areas, homes, etc. is essentially wasted energy and, in the eyes of a mine operator, wasted money. As the ground vibration affects a house, the structure will begin to respond or shake. Unless a person inside a house is expecting a blast to occur, it is usually startling when the vibration reaches the structure. How a person perceives a blast will vary. It can depend on where the individual is in the structure when the blast is detonated, what the person is doing and how sensitive that person is to vibrations. As a general rule of thumb, a person will begin to feel blast vibrations at levels as low as 0.02 in/sec (two hundredths of an inch per second.) This level is well below the level at which research has shown that damage may occur, and consequently, well below the level at which an operation would be considered out of compliance with ground vibration limitations.

Won’t the constant shaking eventually damage my house?

The U.S. Bureau of Mines built a house in advance of a large surface mine in southern Indiana to determine the effects of repeated blasting. The house was subjected to vibrations from a total of 753 blasts with peak particle velocities ranging from 0.10 to 6.94 in/sec. The test house was subject to 645 mining blasts with ground vibrations of less than 0.75 in/sec peak particle velocity. The house was then subjected to an additional 108 blasts ranging from 0.5 in/sec to 6.94 in/sec as the blasting proceeded from 700 feet to within 300 feet of the test house. At which time the blasting phase of the study ceased. Although the house had sustained blast-induced cracking in the form of hairline cracks, for those blasts within the 700 feet range and with measured peak particle velocities well above the maximum limits allowed by West Virginia mining regulations, the structural stability had not been affected.

Upon completion of the mine blasting, the house was mechanically shaken to produce fatigue cracking of the building materials. The first crack occurred after what was the equivalent of 28 years of blast-generated vibrations of 0.50 in/sec twice a day. No house in West Virginia is ever expected to be subjected to this amount of shaking.

What is a blasting seismograph?

A blasting seismograph is a very sensitive instrument designed to measure the intensity of ground vibrations and airblast. It records ground vibrations in three directions or channels and the airblast on a microphone, which is considered a fourth channel. If a ground vibration or airblast exceeds the maximum limits in any of these parameters a *Notice of Violation* will be issued.

A blasting seismograph cannot be *fixed* to read only what the mine operator wants it to read. When a seismograph is installed, either by the WVDEP or a mine operator, a trigger, or threshold, level is programmed into the instrument.