

# OFFICE OF SURFACE MINING RECLAMATION AND ENFORCEMENT (OSM)



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## **OSM Blasting Performance Standards** **30 Code of Federal Regulations**

### **Sec. 816.61 Use of explosives: General requirements.**

FEDERAL REGISTER CITE: 51 FR 19444 (19461)  
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EFFECTIVE DATE: 06/30/86

(a) Each operator shall comply with all applicable State and Federal laws and regulations in the use of explosives.

(b) Blasts that use more than 5 pounds of explosive or blasting agent shall be conducted according to the schedule required under Section 816.64.

(c) Blasters. (1) No later than 12 months after the blaster certification program for a State required by Part 850 of this Chapter has been approved under the procedures of Subchapter C of this Chapter, all blasting operations in that State shall be conducted under the direction of a certified blaster. Before that time, all such blasting operations in that State shall be conducted by competent, experienced persons who understand the hazards involved.

(2) Certificates of blaster certification shall be carried by blasters or shall be on file at the permit area during blasting operations.

(3) A blaster and at least one other person shall be present at the firing of a blast.

(4) Any blaster who is responsible for conducting blasting operations at a blasting site shall:

(i) Be familiar with the blasting plan and site-specific performance standards; and

(ii) Give direction and on-the-job training to persons who are not certified and who are assigned to the blasting crew or assist in the use of explosives.

(d) Blast design. (1) An anticipated blast design shall be submitted if blasting operations will be conducted within--

(i) 1,000 feet of any building used as a dwelling, public building, school, church, or community or institutional building outside the permit area; or

(ii) 500 feet of an active or abandoned underground mine.

(2) The blast design may be presented as part of a permit application or at a time, before the blast, approved by the regulatory

authority.

(3) The blast design shall contain sketches of the drill patterns, delay periods, and decking and shall indicate the type and amount of explosives to be used, critical dimensions, and the location and general description of structures to be protected, as well as a discussion of design factors to be used, which protect the public and meet the applicable airblast, flyrock, and ground-vibration standards in Section 816.67.

(4) The blast design shall be prepared and signed by a certified blaster.

(5) The regulatory authority may require changes to the design submitted.

### **Sec. 816.62 Use of explosives: Preblasting survey.**

FEDERAL REGISTER CITE: 48 FR 9788 (9807)

PUBLISHED DATE: 03/08/83

EFFECTIVE DATE: 04/07/83

(a) At least 30 days before initiation of blasting, the operator shall notify, in writing, all residents or owners of dwellings or other structures located within 1/2 mile of the permit area how to request a preblasting survey.

(b) A resident or owner of a dwelling or structure within 1/2 mile of any part of the permit area may request a preblasting survey. This request shall be made, in writing, directly to the operator or to the regulatory authority, who shall promptly notify the operator. The operator shall promptly conduct a preblasting survey of the dwelling or structure and promptly prepare a written report of the survey. An updated survey of any additions, modifications, or renovations shall be performed by the operator if requested by the resident or owner.

(c) The operator shall determine the condition of the dwelling or structure and shall document any preblasting damage and other physical factors that could reasonably be affected by the blasting. Structures such as pipelines, cables, transmission lines, and cisterns, wells, and other water systems warrant special attention; however, the assessment of these structures may be limited to surface conditions and other readily available data.

(d) The written report of the survey shall be signed by the person who conducted the survey. Copies of the report shall be promptly provided to the regulatory authority and to the person requesting the survey. If the person requesting the survey disagrees with the contents and/or recommendations contained therein, he or she may submit to both the operator and the regulatory authority a detailed description of the specific areas of disagreement.

(e) Any surveys requested more than 10 days before the planned initiation of blasting shall be completed by the operator before the initiation of blasting.

### **Sec. 816.64 Use of explosives: Blasting schedule.**

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PUBLISHED DATE: 03/08/83  
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(a) General requirements. (1) The operator shall conduct blasting operations at times approved by the regulatory authority and announced in the blasting schedule. The regulatory authority may limit the area covered, timing, and sequence of blasting as listed in the schedule, if such limitations are necessary and reasonable in order to protect the public health and safety or welfare.

(2) All blasting shall be conducted between sunrise and sunset, unless nighttime blasting is approved by the regulatory authority based upon a showing by the operator that the public will be protected from adverse noise and other impacts. The regulatory authority may specify more restrictive time periods for blasting.

(3) Unscheduled blasts may be conducted only where public or operator health and safety so require and for emergency blasting actions. When an operator conducts an unscheduled blast, the operator, using audible signals, shall notify residents within 1/2 mile of the blasting site and document the reason for the unscheduled blast in accordance with Section 816.68(p).

(b) Blasting schedule publication and distribution. (1) The operator shall publish the blasting schedule in a newspaper of general circulation in the locality of the blasting site at least 10 days, but not more than 30 days, before beginning a blasting program.

(2) The operator shall distribute copies of the schedule to local governments and public utilities and to each local residence within 1/2 mile of the proposed blasting site described in the schedule.

(3) The operator shall republish and redistribute the schedule at least every 12 months and revise and republish the schedule at least 10 days, but not more than 30 days, before blasting whenever the area covered by the schedule changes or actual time periods for blasting significantly differ from the prior announcement.

(c) Blasting schedule contents. The blasting schedule shall contain, at a minimum--

- (1) Name, address, and telephone number of operator;
- (2) Identification of the specific areas in which blasting will take place;
- (3) Dates and time periods when explosives are to be detonated;
- (4) Methods to be used to control access to the blasting area; and
- (5) Type and patterns of audible warning and all-clear signals to be used before and after blasting.

**Sec. 816.66 Use of explosives: Blasting signs, warnings, and access control.**

FEDERAL REGISTER CITE: 48 FR 9788 (9807)  
PUBLISHED DATE: 03/08/838  
EFFECTIVE DATE: 04/07/83

(a) Blasting signs. Blasting signs shall meet the specifications of Section 816.11. The operator shall--

(1) Conspicuously place signs reading "Blasting Area" along the edge of any blasting area that comes within 100 feet of any public road right-of-way, and at the point where any other road provides access to the blasting area; and

(2) At all entrances to the permit area from public roads or

highways, place conspicuous signs which state "Warning! Explosives in Use," which clearly list and describe the meaning of the audible blast warning and all-clear signals that are in use, and which explain the marking of blasting areas and charged holes awaiting firing within the permit area.

(b) Warnings. Warning and all-clear signals of different character or pattern that are audible within a range of 1/2 mile from the point of the blast shall be given. Each person within the permit area and each person who resides or regularly works within 1/2 mile of the permit area shall be notified of the meaning of the signals in the blasting schedule.

(c) Access control. Access within the blasting area shall be controlled to prevent presence of livestock or unauthorized persons during blasting and until an authorized representative of the operator has reasonably determined that--

(1) No unusual hazards, such as imminent slides or undetonated charges, exist; and

(2) Access to and travel within the blasting area can be safely resumed.

**Sec. 816.67 Use of explosives: Control of adverse effects.**

FEDERAL REGISTER CITE: 48 FR 44777 (44780)

PUBLISHED DATE: 09/30/83

EFFECTIVE DATE: 10/31/83

(a) General requirements. **Blasting shall be conducted to prevent injury to persons, damage to public or private property outside the permit area, adverse impacts on any underground mine, and change in the course, channel, or availability of surface or ground water outside the permit area.**

(b) Airblast. (1) Limits. (i) Airblast shall not exceed the maximum limits listed below at the location of any dwelling, public building, school, church, or community or institutional building outside the permit area, except as provided in Paragraph (e) of this Section.

Lower frequency limit of measuring system, in Hz (+/- 3 dB)	Maximum level, in dB
0.1 Hz or lower--flat response <sup>1</sup>	134 peak
2 Hz or lower--flat response	133 peak
6 Hz or lower--flat response	129 peak
C-weighted--slow response <sup>1</sup>	105 peak dBC

<sup>1</sup> Only when approved by the regulatory authority.

(ii) If necessary to prevent damage, the regulatory authority shall specify lower maximum allowable airblast levels than those of Paragraph (b)(1)(i) of this Section for use in the vicinity of a specific blasting operation.

(2) Monitoring. (i) The operator shall conduct periodic monitoring to ensure compliance with the airblast standards. The regulatory authority may require airblast measurement of any or all blasts and may specify the locations at which such measurements are taken.

(ii) The measuring systems shall have an upper-end flat-frequency response of at least 200 Hz.

(c) Flyrock. Flyrock travelling in the air or along the ground shall not be cast from the blasting site--

(1) More than one-half the distance to the nearest dwelling or other occupied structure;

(2) Beyond the area of control required under Section 816.66(c); or

(3) Beyond the permit boundary.

(d) Ground vibration. (1) General. In all blasting operations, except as otherwise authorized in Paragraph (e) of this Section, the maximum ground vibration shall not exceed the values approved in the blasting plan required under Section 780.13 of this Chapter. The maximum ground vibration for protected structures listed in Paragraph (d)(2)(i) of this Section shall be established in accordance with either the maximum peak-particle-velocity limits of Paragraph (d)(2), the scaled-distance equation of Paragraph (d)(3), the blasting-level chart of Paragraph (d)(4), or by the regulatory authority under Paragraph (d)(5). All structures in the vicinity of the blasting area, not listed in Paragraph (d)(2)(i) of this Section, such as water towers, pipelines and other utilities, tunnels, dams, impoundments, and underground mines, shall be protected from damage by establishment of a maximum allowable limit on the ground vibration, submitted by the operator in the blasting plan and approved by the regulatory authority.

(2) Maximum peak particle velocity. (i) The maximum ground vibration shall not exceed the following limits at the location of any dwelling, public building, school, church, or community or institutional building outside the permit area:

Distance(D)from the blasting site, in feet	Maximum allowable peak particle velocity(V max) for ground vibration, in inches/ second <sup>1</sup>	Scaled-distance factor to be applied without seismic monitoring <sup>2</sup> (Ds)
0 to 300	1.25	50
301 to 5,000	1.00	55
5,001 and beyond	0.75	65

<sup>1</sup> Ground vibration shall be measured as the particle velocity. Particle velocity shall be recorded in three mutually perpendicular directions. The maximum allowable peak particle velocity shall apply to each of the three measurements.

<sup>2</sup> Applicable to the scaled-distance equation of Paragraph (d)(3)(i) of this Section.

(ii) A seismographic record shall be provided for each blast.

(3) Scaled-distance equation. (i) An operator may use the scaled-distance equation,  $W=(D/Ds)^2$ , to determine the allowable charge weight of explosives to be detonated in any 8-millisecond period, without seismic monitoring; where W=the maximum weight of explosives, in pounds; D=the distance, in feet, from the blasting site to the nearest protected structure; and Ds=the scaled-distance factor, which may initially be approved by the regulatory authority using the values for scaled-distance factor listed in Paragraph (d)(2)(i) of this Section.

(ii) The development of a modified scaled-distance factor may be authorized by the regulatory authority on receipt of a written request by the operator, supported by seismographic records of blasting at the minesite. The modified scale-distance factor shall be determined such that the particle velocity of the predicted ground vibration will not exceed the prescribed maximum allowable peak particle velocity of

Paragraph (d)(2)(i) of this Section, at a 95-percent confidence level.

(4) Blasting-level chart. (i) An operator may use the ground-vibration limits in Figure 1 to determine the maximum allowance ground vibration.

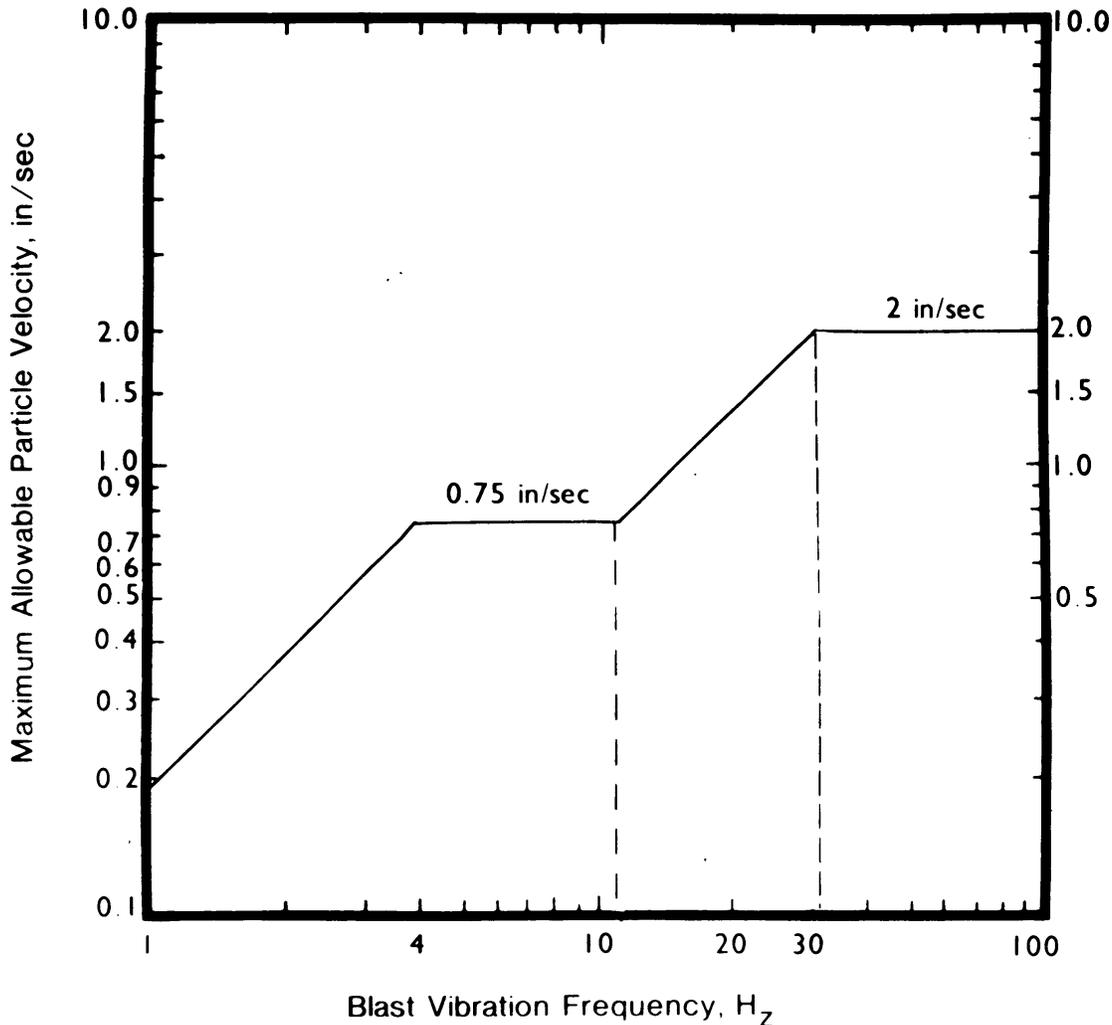


Figure 1. Alternative blasting level criteria  
(Source: Modified from figure B-1,  
Bureau of Mines R18507)

(ii) If the Figure 1 limits are used, a seismographic record including both particle velocity and vibration-frequency levels shall be provided for each blast. The method for the analysis of the predominant frequency contained in the blasting records shall be approved by the regulatory authority before application of this alternative blasting criterion.

(5) The maximum allowable ground vibration shall be reduced by the regulatory authority beyond the limits otherwise provided by this Section, if determined necessary to provide damage protection.

(6) The regulatory authority may require an operator to conduct seismic monitoring of any or all blasts or may specify the location at which the measurements are taken and the degree of detail necessary in the measurement.

(e) The maximum airblast and ground-vibration standards of Paragraphs (b) and(d) of this Section shall not apply at the following locations:

(1) At structures owned by the permittee and not leased to another person.

(2) At structures owned by the permittee and leased to another person, if a written waiver by the lessee is submitted to the regulatory authority before blasting.

**Sec. 816.68 Use of explosives: Records of blasting operations.**

FEDERAL REGISTER CITE: 52 FR 29180 (29181)

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The operator shall retain a record of all blasts for at least 3 years. Upon request, copies of these records shall be made available to the regulatory authority and to the public for inspection. Such records shall contain the following data:

- (a) Name of the operator conducting the blast.
- (b) Location, date, and time of the blast.**
- (c) Name, signature, and certification number of the blaster conducting the blast.
- (d) Identification, direction, and distance, in feet, from the nearest blast hole to the nearest dwelling, public building, school, church, community or institutional building outside the permit area, except those described in Section 816.67(e).
- (e) Weather conditions, including those which may cause possible adverse blasting effects.
- (f) Type of material blasted.
- (g) Sketches of the blast pattern including number of holes, burden, spacing, decks, and delay pattern.**
- (h) Diameter and depth of holes.**
- (i) Types of explosives used.**
- (j) Total weight of explosives used per hole.**
- (k) The maximum weight of explosives detonated in an 8-millisecond period.**
- (l) Initiation system.**
- (m) Type and length of stemming.
- (n) Mats or other protections used.
- (o) Seismographic and airblast records, if required, which shall include--
  - (1) Type of instrument, sensitivity, and calibration signal or certification of annual calibration;
  - (2) Exact location of instrument and the date, time, and distance from the blast;
  - (3) Name of the person and firm taking the reading;
  - (4) Name of the person and firm analyzing the seismographic record;and
  - (5) The vibration and/or airblast level recorded.
- (p) Reasons and conditions for each unscheduled blast.**