

**FEDERAL REGISTER: 56 FR 59904 (November 26, 1991)**

DEPARTMENT OF THE INTERIOR

AGENCY: Office of Surface Mining Reclamation and Enforcement (OSM)

30 CFR Part 816

Surface Coal Mining and Reclamation Operations, Permanent Regulatory Program; Availability of Decision; Use of Explosives; Denial of Petition

ACTION: Notice of decision on petition for rulemaking.

**SUMMARY:** The Office of Surface Mining Reclamation and Enforcement (OSM) is making available to the public its final decision on a petition for rulemaking from Ms. Shirley Zell and Mr. John Albrecht of Clinton, Indiana. The petition requested that OSM amend certain provisions of 30 CFR 816.62, Use of Explosives: Preblasting Survey; and of 30 CFR 816.67, Use of Explosives: Control of Adverse Effects.

DATES: On November 20, 1991, the Director denied the petition.

ADDRESS: Copies of the petition, and other relevant materials comprising the Administrative Record of this petition are available for public review and copying at Office of Surface Mining Reclamation and Enforcement, U.S. Department of the Interior, Administrative Record, room 5315, 1100 L Street NW., Washington, DC 20240.

FOR FURTHER INFORMATION CONTACT: Michael Rosenthal, Office of Surface Mining Reclamation and Enforcement, U.S. Department of the Interior, 1020 15th Street, Brooks Towers, 2nd Floor, Denver, Colorado 80202; Telephone: 303-844-2755 (Commercial) or 564-2755 (FTS).

**SUPPLEMENTARY INFORMATION:**

- I. Petition for Rulemaking Process
- II. The Zell/Albrecht Petition

**I. PETITION FOR RULEMAKING PROCESS**

Pursuant to section 201(g) of the Surface Mining Control and Reclamation Act of 1977 (the Act or SMCRA), any person may petition the Director of OSM for a change in OSM's regulations. The regulations governing the handling of rulemaking petitions are found at 30 CFR 700.12. Under the rules, the Director may publish a notice in the Federal Register seeking comments on the petition and hold a public hearing, conduct an investigation, or take other action to determine whether the petition should be granted. If the petition is granted, the Director initiates a rulemaking proceeding. If the petition is denied, the Director notifies the petitioner in writing setting forth the reasons for denial. Under 30 CFR 700.12, the Director's decision constitutes the final decision for the Department of the Interior.

**II. THE ZELL/ALBRECHT PETITION**

OSM received a letter dated November 1, 1989, from Ms. Shirley Zell and Mr. John Albrecht of Clinton, Indiana petitioning the Director to amend certain parts of OSM's regulations governing the use of explosives at underground mining operations (30 CFR 817.62 and 817.67). In response to that petition, on December 6, 1989, OSM published a notice in the Federal Register of the petition's availability and requested comments. (54 FR 50414) On December 28, 1989, OSM, responding to requests from commenters, extended the close of the original 30-day comment period until January 22, 1990. (54 FR 53329)

On December 20, 1991, Ms. Zell and Mr. Albrecht requested the November 1, 1989 petition be withdrawn and replaced with the revised petition. The petitioners indicated they were withdrawing the original petition because it mistakenly recommended rulemaking for underground mining operations rather than for surface mining operations at 30 CFR 816.62 and 816.67. OSM published a notice withdrawing the November 1 petition for rulemaking on January 22, 1990. (55 FR 2111) On the same day, OSM published the new petition for rulemaking proposing amendments to the surface mining regulations and providing a comment period until February 21, 1990. (55 FR 2105)

For the reasons discussed in the appendix to this notice, the Director has denied the petition to amend 30 CFR 816.62 and 816.67. Therefore, no rulemaking will occur on this petition.

The Director's letter of response to the petitioners on this rulemaking petition appears as an appendix to this notice. This letter reports the Director's decision to the petitioners. Included in the appendix is an evaluation report on the issues raised by the petitioners which discusses the current OSM regulatory program provisions covering the use of explosives, an analysis of the petitioners' proposed regulatory changes, and a discussion of the comments received on the petition.

Dated: November 20, 1991.  
Harry M. Snyder, Director.

## APPENDIX

November 20, 1991.

Ms. Shirley Zell and Mr. John Albrecht  
RR #1, Box 3  
Clinton, Indiana 47842.

Dear Ms. Zell and Mr. Albrecht:

This letter is in response to your petition for rulemaking dated December 20, 1989, to the Office of Surface Mining Reclamation and Enforcement (OSM) requesting an amendment to the regulations concerning preblasting surveys and the control of adverse effects of blasting at surface coal mining operations.

Following the receipt of your November 1, 1989, letter petitioning OSM to initiate rulemaking to amend certain regulations governing blasting found at 30 CFR 817.62 and 817.67, OSM published on December 6, 1989, in the Federal Register a notice of availability and requested comments on that petition. [54 FR 50414] Several commenters requested an extension to the comment period. On December 28, 1989, OSM extended the original 30-day comment period to January 22, 1990. [54 FR 53329]

On December 20, 1989, you requested the November 1, 1989, petition be withdrawn and replaced with the revised petition. You indicated you were withdrawing the original petition because it mistakenly recommended rulemaking to 30 CFR 817.62 and 817.67 pertaining to blasting for underground mining operations rather than 30 CFR 816.62 and 816.67 pertaining to blasting for surface mining operations. On January 22, 1990, OSM withdrew your November 1, 1989, petition [55 FR 2111] and published a notice of availability of the revised petition and request for comments. [55 FR 2105]

The official administrative record log lists 77 comments and documents entered in response to the petition. The comment period closed on February 21, 1990.

Since 1977, OSM has spent \$1.4 million in research to develop and implement a regulatory program to control the adverse effects of blasting at surface coal mines and to evaluate the possibility that those regulations may not be effective. Almost half of all these studies have been initiated since 1989 with the specific purpose of thoroughly studying the claim that the damage to homes in the Daylight and McCutchanville areas of Indiana resulted from blasting. OSM's technical staff as well as technical specialists from the State of Indiana, the U.S. Bureau of Mines (BOM), and other Federal and state agencies have spent numerous hours studying this problem. After all the time, effort, and research, a direct correlation between blasting at permissible regulatory limits and the damage to homes alleged to have been caused by such blasting cannot be established. There is, therefore, no technical justification to amend existing limits to the levels proposed by the petitioners.

After careful consideration of the arguments presented in the petition and the extensive public comments, I am denying your rulemaking request to amend 30 CFR 816.62 and 816.67 concerning preblast surveys and controlling the adverse effects of blasting, respectively. These regulations applicable to blasting operations are already sufficient to prevent damage to structures and injury to persons.

In September, 1991, OSM funded three new projects to look at new questions associated with blasting. If the research identifies a causal relationship between blasting and damage, existing regulations require that applicable airblast and ground vibration limits be reduced to a level necessary to prevent damage. If the research points to a nationwide regulatory problem, regulatory changes, as appropriate, may be considered.

OSM's regulations governing petitions for rulemaking at 30 CFR 700.12(c) prescribe that technical justifications, facts, or law previously considered during rulemaking on the same issue shall not provide a reasonable basis to repeal or amend a current regulation. The majority of the issues raised and arguments presented in your petition were previously addressed in the preamble to the current blasting regulations of March 8, 1983. [48 FR 9788] With regard to the specific allegations that blasting caused damage is occurring beyond the permit area in the Daylight and McCutchanville areas of Indiana, extensive studies have been unable to scientifically establish a direct causal relationship between the blasting and the damage to the structures. On this basis, I must conclude that existing regulations satisfy the Act in making adequate provisions for the adverse effects of blasting to be regulated in such a fashion as to prevent damage to structures beyond the permit area.

The basis for my decision is fully discussed in the enclosed evaluation of the petition. As provided in 30 CFR 700.12(d), my decision constitutes the final decision for the Department of the Interior.

Sincerely,  
Harry M. Snyder,  
Director.

## **EVALUATION OF THE PETITION TO AMEND OSM'S RULES GOVERNING BLASTING AT SURFACE COAL MINING OPERATIONS**

### **I. SUMMARY OF FINDINGS**

Under section 201(g) of the Surface Mining Control and Reclamation Act of 1977 (the Act), any person may petition the Director for a change in OSM's regulations. The rules governing the handling of rulemaking petitions are found at 30 CFR 700.12. To accept a petition for rulemaking, the petition must cite facts, technical justification, or law which was not previously considered in a petition or prior rulemaking and which justifies a need for a new rule or amending an existing rule.

On December 20, 1989, OSM received a petition from Ms. Shirley Zell and Mr. John Albrecht of Clinton, Indiana (the petitioners) to amend certain parts of OSM's regulations governing the use of explosives at surface mining operations (30 CFR 816.62 and CFR 816.67). On January 22, 1990, OSM published a notice in the Federal Register containing the petition for rulemaking and providing a public comment period until February 21, 1990. (55 FR 2105).

The principal recommendations in the petition are to --

-- Amend the rules governing preblasting surveys by expanding to one (1) mile the distance from the permit area that an operator must notify residents or owners of dwellings or structures from the current ½ mile;

-- Amend the rules governing the control of adverse effects of blasting by reducing to a peak particle velocity (ppv) of 0.5 inch per second (ips) the maximum allowed ground vibration from a distance dependent range of 0.75 ips to 1.25 ips;

-- Amend the alternative blasting level criteria by adding a new low frequency vibration limit of 0.5 ips that would apply to older structures; and,

-- Delete from the rules governing the control of adverse effects of blasting that section which allows the use of the scaled-distance formula without accompanying seismic monitoring.

The petitioners claim that blasting damage has occurred to homes outside the permit areas of surface coal mine operations as a result of a failure of OSM's permanent program regulations to provide adequate protection. In support of the petition, they state that the data used by OSM in its regulations to set maximum ground vibration levels were limited

to blasting events on undisturbed geologic settings; did not include data representative of newer blasting techniques, specifically cast blasting; and that the regulations themselves do not provide for the response of older structures to vibrations from blasting. The petitioners claim that recent studies show that low frequency, long duration vibrations are common at strip mine operations and are different from the high frequency data OSM used to develop its regulations. Finally, the petitioners state their belief that the use of the scaled-distance formula without seismic monitoring does not provide adequate regulatory control to prevent abuse by operators.

The foundational justification for the petitioners' proposal is the uncontested fact that homes beyond the permit area have suffered damage. The petition and supporting public comments allege that the damage is a direct result of blasting at surface coal mining operations. That people may suspect that blasting damage is occurring to their homes because they feel the vibrations from blasting does not, however, establish the fact of blasting damage nor lead to the inevitable conclusion that the regulations which control such blasting are faulty. Cracks in walls, for instance, may result from stresses caused by many factors such as weather, settling, problems with foundations, etc., as well as blasting vibrations. Even if the damage could have been traced to blasting at a surface coal mine, the regulations themselves have not been shown to be inadequate.

Since 1977, OSM has spent \$1.4 million in research to develop and implement a regulatory program to control the adverse effects of blasting at surface coal mines and to evaluate the possibility that those regulations may not be effective. Almost half of all these studies have been initiated since 1989 with the specific purpose of thoroughly studying the claim that the damage to homes in the Daylight and McCutchanville areas of Indiana resulted from blasting. OSM's technical staff as well as technical specialists from the State of Indiana, the U.S. Bureau of Mines (BOM), and other Federal and state agencies have spent numerous hours studying this problem. After all the time, effort, and research, a direct correlation between blasting at permissible regulatory limits and the damage to homes alleged to have been caused by such blasting cannot be established. There is, therefore, no technical justification to amend existing limits to the levels proposed by the petitioners.

Research continues. In September, 1991, OSM funded three new projects to look at new questions associated with blasting. If the research identifies a casual relationship between blasting and damage, existing regulations require that applicable airblast and ground vibration limits be reduced to a level necessary to prevent damage. If the research points to a nationwide regulatory problem, regulatory changes, as appropriate, may be considered.

OSM's blasting regulations place a heavy responsibility on a regulatory authority to set more stringent blasting limits or impose specialized monitoring systems when needed to prevent damage. See, among other requirements, 30 CFR 816.67(a), (b)(1)(ii), (d)(5), and (d)(6). Regulatory authority discretion is needed because, to a large degree, the effects of blasting are governed by site specific conditions. Weather, geology, type and amount of overburden, and the nature of structures outside the permit area all will determine the nature of the blast and the level of control needed to provide protection. Displacing much of the regulatory authority's discretion through stricter national standards is not an effective solution to respond to allegations of site specific problems. Whatever regulatory limits exist in the national regulations, there will always be a requirement for the regulatory authority to ensure that the national limits will be reduced, when necessary, to provide damage protection for the site under permit. The imposition of stricter national standards would be justified if it were demonstrated that a problem existed that was not limited in geographic scope and was caused by inadequate limits in the existing rules. No such demonstration has been made in this proceeding.

OSM believes the most effective way of handling site specific concerns is not to remove discretion from the regulatory authority but to ensure that the regulatory authority has all the tools necessary to do an effective job. OSM is committed to ensuring that regulatory authorities have ready access to the computer software to plan and evaluate permit applications, training for their inspectors and permit evaluators, and, if needed for specialized problems, technical specialists from OSM.

After thoroughly analyzing the facts, technical justification and law submitted by the petitioners and over 70 public commenters, the Director is denying the petition for rulemaking. Existing regulations satisfy the requirements of the Act in making adequate provision for the adverse effects of blasting to be regulated in such a fashion as to prevent damage to structures beyond the permit area. Detailed explanations of OSM's findings regarding each of the petition's proposals are provided in the following two sections. Section II. presents the findings for those proposed amendments dealing with preblasting surveys. Section III. presents the findings for those proposed amendments dealing with controlling the adverse effects of blasting.

## **II. PROPOSED AMENDMENTS TO 30 CFR 816.62 - USE OF EXPLOSIVES: PREBLASTING SURVEY**

### **A. DISTANCE OF SURVEY NOTIFICATIONS**

The petition proposes to amend 30 CFR 816.62(a) by increasing the distance in which the operator must notify residents of the availability of a preblasting survey from ½ mile to one mile from the permit area. The preblasting survey documents any preblasting damage and other physical factors that could reasonably be affected by blasting. The petition and several commenters justified the change on complaints from citizens beyond the ½ mile distance about damage which they believed was caused by blasting. The petitioners and some commenters attributed damage to structures beyond the ½ mile survey limit, in part, to the fact that low frequency waves which dominate at longer distances are the frequencies most likely to cause damage to homes. Petitioners and some commenters added it would be in the operator's interest to expand the distance to protect himself from unsubstantiated damage claims.

While the petitioners and commenters have provided allegations and assertions about the inadequacy of the ½ mile limit, they failed to provide any technical facts or justification to prove these allegations. The existence of citizen complaints and even damage beyond the ½ mile limit does not mean the regulations are inadequate. The citizen complaints and the damage must be the result of events which are otherwise within regulatory limits for the regulations themselves to be the cause of the problem. The dominance of low frequency waves at longer distances and the fact that low frequency waves are most likely to cause damage to homes does not mean that the ½ mile limit does not provide adequate control. Finally, there is nothing in the present rules which prevents coal companies from offering preblasting surveys to a wider area, should they desire.

Industry commenters cited two cases for the proposition that the Secretary has no discretion to expand the survey distance beyond the prescription of section 515(b)(15)(E) of the Act. While these cases are distinguishable, OSM agrees with the general proposition that the Secretary cannot promulgate rules when no statutory authority exists to do so. OSM is, however, unwilling to say that no circumstances could ever exist which would provide an adequate basis and purpose for extending the survey requirement beyond the present ½ mile limit.

OSM previously considered the possibility of requiring notification of residents and owners beyond ½ mile during the 1979 rule making and concluded that the ½ mile distance was adequate. (*44 FR 15182*, March 13, 1979) The ½ mile distance in 30 CFR 816.62(a) is taken from the statutory language implemented by this regulation.

OSM has expended substantial monies in research related to investigating complaints of blasting damage occurring outside the permit area and beyond the ½ mile survey limit. As noted earlier, these studies were unable to correlate structural damage to specific blasting events or distances. If OSM were to increase the preblasting survey distance to one mile, in most cases there could be a significant increase in cost associated with performing such surveys. To justify an increase to a mile, OSM requires a substantial showing that the current ½ mile distance is not accomplishing the statutory purpose.

OSM finds that this issue was considered in a prior rulemaking and that neither the petitioners nor commenters who favored the change have provided new facts which either demonstrated that the ½ mile limit is inadequate nor why a one mile distance [as opposed to some other distance] is needed.

### **B. NEW OWNERS OF PROPERTY**

The petition proposes to amend 30 CFR 816.62(d) to require operators to provide a copy of the preblasting survey to a new [i.e., subsequent] owner of the property on request. The petition failed to provide a justification for the new requirement.

Existing OSM regulations already provide a reasonable opportunity for adequate notice. 30 CFR 816.62 (a) requires that a copy of the preblasting survey must be given both to the person requesting the survey and to the regulatory authority. In addition, the preblasting survey is a part of the permit and, therefore, a public document which would be available to the subsequent owner (or resident) of a dwelling or structure.

The exchange of title between the buyer and seller of a previously surveyed residence is a transaction which does not involve the operator. The subsequent owner can also obtain the preblasting survey directly from the previous owner in the course of the purchase just as he would with other documents pertaining to the structure or transaction.

OSM finds there is no justification provided by the petitioners as to why these regulations should be amended nor any justification as to why the operator should bear the cost of disseminating publicly available information for a transaction in which he had no part.

### **C. SURVEY SHALL DETERMINE BLASTING DESIGN REQUIREMENTS**

In three places the petition proposes to amend the current rules by expanding the traditional role of the preblasting survey from a description of a structure's preblasting condition to also that of a determinant of the blasting design. In 30 CFR 816.62(c) the petition proposes the "survey [vice operator] shall determine the condition \* \* \* that could reasonably be affected by blasting". In Section 816.62(e) the petition states that the preblasting report may contain "recommendations of any special conditions or proposed adjustments to the blasting plan that should be incorporated into the blasting plan to prevent damage". In Section 816.67(d)(4) the petition proposes that the "maximum allowable ground vibration shall be reduced \* \* \* if so recommended in any preblasting or condition survey". Read together these three changes would add a new dimension to the traditional role of the preblasting survey. By requiring recommendations made in the survey to be followed by the person designing the blasting plan, the "survey" becomes a determining factor in the blast plan. The petitioners' justification for these proposals is, at best, unclear. The petitioners claim that actual damage to structure is dependent not only on the peak particle velocity but also on the type of structure, the height of the structure and the state of repair or disrepair. The petitioners do not, however, link these conditions with their proposal to change the traditional role of the preblasting survey to also include serving as a determinant of blasting design.

During the 1979 rulemaking, OSM rejected a comment recommending the mandatory implementation of blasting plan recommendations which might appear in the preblasting survey. (*44 FR 15183*) OSM concluded then, and continues to believe now, that the professional qualifications needed to properly perform a preblasting survey of a structure or residence were not necessarily the same qualifications needed to make recommendations for blasting plans. OSM's rules at 30 CFR 780.13 clearly place responsibility for designing a blasting plan on the permit applicant and responsibility for approval on the regulatory authority.

One commenter who opposed the rulemaking petition echoed OSM's 1979 reasoning for rejecting mandatory survey recommendations by noting that preblasting surveys are often conducted by claims adjusters and other persons who may not have any blasting expertise since none is needed to document a structure's condition. Such persons would not necessarily be qualified to recommend adjustments to a blasting plan.

Persons performing the preblasting survey cannot be relied on to make competent recommendations regarding blasting at a mine site. The preblasting survey describes the condition of the residence or structure and is only performed on structures and dwellings when requested. Also, the preblasting survey would not include information on seismic or geologic conditions or on weather conditions, all of which are important factors in designing blasts.

OSM finds that the petition has failed to provide a reasonable basis for its proposal the subject matter of which was previously considered and rejected in a prior rulemaking.

### **D. CONDITION SURVEY**

The petition proposes to amend 30 CFR 816.62(d) to add a "condition survey" which may be requested by the resident or owner of a dwelling or structure after the start of blasting. The petition does not discuss why such a survey is needed.

The current regulations at 30 CFR 816.62(e) require an operator to give ample notice of the availability of a preblasting survey and to perform a preblasting survey prior to the initiation of blasting if requested 10 days prior to blasting. The regulations also provide for requesting an updated preblasting survey after any additions, modifications, or renovations to a dwelling or structure. These provisions allow the operator to efficiently schedule the requested surveys.

Several commenters opposed the proposal on the grounds that it would place an undue burden on an operator who could be subjected to repeated requests for surveys by residents or owners. OSM is sympathetic to this concern, particularly when residents or owners are provided the opportunity to request a survey on a timely basis prior to the initiation of blasting.

Also, OSM finds that nothing in the current regulations prevents a resident or owner of a dwelling or structure from requesting a preblasting survey at any time. More importantly however, the petitioners have not provided OSM with any justification of the need for this new category of surveys.

#### **E. FORM OF NOTIFICATION WHEN RESIDENT DISAGREES WITH SURVEY**

The petitioners propose to delete the provisions of 30 CFR 816.62(d) that a resident who disagrees with a preblasting survey submit "a detailed description of the specific areas of disagreement" to the operator and regulatory authority. In its place, petitioners propose to include a provision at 816.62(e) that the resident simply "notify, in writing" the operator and regulatory authority of the specific areas of disagreement. Here again, the petitioners have not provided justification for their proposal.

The current rules at 30 CFR 816.62(d) allow any written disagreement with the preblasting survey to be on the public record so it may be considered by the regulatory authority when deciding whether the permittee fulfilled his obligation. OSM understands the possible reluctance of certain residents to take the time to detail their disagreements with the survey, particularly since blasting damage may never occur. The survey, however, including a description of disputed results, serves as a record of the condition of the dwelling or structure. Thus OSM concludes that it is in both parties' interests that the record be complete and accurate.

Commenters opposing this proposal suggested the greater detail and specificity required in the existing regulations is of benefit in resolving any area of disagreement concerning the preblast condition of the property. These commenters were also concerned that under the proposed revisions the reporting requirements on the operator would be unfairly expanded, yet the regulations would undermine citizen cooperation in this process by removing the requirements to provide a detailed description as provided in existing rules.

OSM agrees with these comments and finds that the petitioners have not offered a sufficient basis for their proposal to amend the current rules.

#### **F. PREBLASTING SURVEY ISSUES RAISED BY COMMENTERS BUT NOT INCLUDED IN THE PETITION**

Commenters to the petition raised several issues related to preblasting surveys which, while not specifically included in the petition's proposal, will be responded to.

Commenters said that the notice of availability of preblasting surveys should be mailed by certified mail to each resident and that the operator should be responsible for seeing that everyone has received their notice. They also wanted the notice to fully explain citizens' rights and that OSM provide a prepared statement signed by the Director pointing out those rights to a survey. They also wanted the blasting schedule to be hand delivered and orally explained to all residents within one mile of the permit area and that the preblasting survey be mandatory. Commenters were concerned that an illiterate resident may not know how to request a preblasting survey.

Current regulations at 30 CFR 816.62(a) require the operator to notify, in writing, all residents within ½ mile of the proposed permit area of how to request a preblasting survey. Mailing the notice provides reasonable assurances that it will be received by the addressee. The commenters have not provided any facts which indicate that certified mail, hand delivery of the blasting schedule, or mandatory preblasting surveys are necessary for the regulatory authority to ensure that a permit applicant fulfilled his obligation under section 515(b)(15)(E) of the Act.

Current regulations also require the notice to explain how the resident may request a preblasting survey. The commenters have not provided a reasonable basis to conclude that these provisions are inadequate.

In 1979, OSM allowed oral requests for preblasting surveys and justified this as needed to accommodate illiterate residents. (44 FR 15183) This policy was changed in 1983 to require all requests to be written. The preamble to those final rules explained the basis of the change. OSM believes that written requests for surveys is the best method to provide control over the request and survey production process without placing undue burden on the regulatory authority's manpower or the persons requesting the survey. (48 FR 9793, March 8, 1983)

A commenter said that there should be a mandatory check of the quality and quantity of a domestic water source as part of the preblasting survey. OSM rules at 30 CFR 816.62(c) acknowledge that structures such as water systems warrant special attention but the survey may be limited to its surface condition and other readily available data. Application of the preblasting survey rules to the assessment of structures such as wells and water systems was fully discussed in the preamble to the 1983 blasting regulations. [48 FR 9793]

### **III. PROPOSED AMENDMENTS TO 30 CFR 816.67 - USE OF EXPLOSIVES, CONTROL OF ADVERSE EFFECTS**

#### **A. REDUCTION OF PEAK PARTICLE VELOCITY**

Petitioners propose to amend 30 CFR 816.67(d)(2) by replacing the existing maximum peak particle velocities (ppv) for ground vibration which range from 0.75 inch per second (ips) to 1.25 ips with a single value limit of 0.5 ips. While petitioners provided no specific justification for their proposed 0.5 ips ground vibration limit, they and several commenters supporting the proposal pointed to the alleged inadequacy of existing ground vibration limits to prevent blasting damage outside the permit area. This position was supported by testimonial evidence including one commenter who provided, without citation, excerpts from testimony presented before the House Interior and Insular Affairs Subcommittee on Mining and Mineral Resources in April 1989 of citizens who had suffered damage to their homes.

The petitioners and several commenters were also concerned about the human response to blasting vibrations at existing ppv limits. One of these commenters cited to the prescriptions of section 515(b)(15)(C) of the Act that blasting be limited so as to "(i) prevent injury to persons." This commenter concluded that blasting vibrations should therefore be controlled so as to prevent possible psychological, physiological and emotional injury to persons. Another commenter cited to the preliminary injunction decision of the Federal district court in *Massa v. Peabody Coal Co.*, TH 88-63-C, slip op. at 20, 34 (S.D. Ind. August 4, 1989) which held that the blasting limits established by a regulatory authority, which were essentially the same as OSM's standards, were "not adequate protection for the plaintiff's peaceful and quiet use of their homes" and that many of the blasts caused "undue and unnecessary discomfort and inconvenience to the plaintiffs."

The petitioners and some commenters stated that OSM's current blasting regulations were faulty because they were developed for comparatively undisturbed geologic conditions and they failed to consider the structural responses to low frequency, long duration blasting vibrations.

The petitioners also claimed that the damage criteria used by OSM for its blasting regulations was developed to quantify the response of and damage to residential structures from small to intermediate sized blasts. The petitioners suggested that the "coal industry is using new methods, such as cast blasting which was not the technique being used when research was done that the current regulations were based on". They also claimed that cast blasting in association with long distance have greater damage potential to structures because of the large amounts of explosives used per delay in that form of blasting. Another commenter said that OSM did not take the effects of repeated blasting on structures into account when the blasting regulations were issued.

With regard to the concerns over possible adverse human response to blasting vibrations, the current regulations provide sufficient protection for those values protected by the Act. Section 515(b)(15)(A) accounts for the individual response to blasting effects in its requirement that "advance written notice be provided to \* \* \* residents who might be affected by the use of such explosives \* \* \* of the proposed blasting schedule \* \* \*." Congress did not prohibit emotionally stress-producing blasts but made provision for affected residents to prepare for such blasts by providing notice of the blasting schedule. In this light, the prescription of section 515(b)(15)(C) to prevent "injury to persons" must be read as preventing physical injury from flying rock or other direct blast effects. OSM's regulations implementing the notice provision of section 515(b)(15)(A) are found at 30 CFR 816.64 and 816.66.

In 1979, OSM also considered the impact of repeated blasts on structures. OSM concluded that vibration data are typically of a single event and thus do not consider the accumulated effects from multiple blasts. One of these effects could be induced settlement. This as a contributing factor, although not a major one, in lowering the ground vibration limit from 2.0 ips ppv to 1.0 ips ppv, i.e., "several small vibrations may do as much damage as one large one". [44 FR 15197]

OSM wishes to correct information presented by the petition and some commenters regarding cast blasting. First, while cast blasting per se was not a specific type of blasting receiving separate analysis in Structure Response and Damage Produced by Ground Vibration from Surface Mine Blasting. (Bureau of Mines Report of Investigation 8507, Siskind and others, 1980) (hereinafter referred to as RI 8507), data in that report (see, for example, Table 1) included blasting events at surface coal mines with as much as 2,600 lb/delay and blasting events at surface iron mines, with 7 up to 21,000 lb/delay. The preamble to the 1983 rules also discussed the use of "delay blasting techniques available to conduct large blasts using this amount (5,900 pounds) per delay." (48 FR 9801) These amounts of explosives are comparable to those used in surface coal mine blasting. Therefore, the data used in RI 8507 and elsewhere considered in the 1983 rulemaking was not limited to small to intermediate sized blasts and included representative data to cover cast blasting sized events. Second, cast blasting is a blasting technique that has been used for over 50 years. While the term "cast blasting" only came into use in the early 1970's, prior to that time, cast blasting was called "hard blasting". Therefore, OSM was aware of cast blasting techniques when the 1983 regulations were issued. Third, cast blasting does not use more explosives per delay than in-place blasting but cast blasting may involve a larger total quantity of explosives per unit volume of overburden. Cast blasting is most effective when the delay period increases momentarily between successive rows. This slight increase in the delay period allows the overburden time to move outward, thus providing room for successive overburden movement during subsequent blasts. (U.S. Bureau of Mines, Stachura, RI 8916).

OSM rules have adopted the protections from blasting set forth in the Act. The regulations prevent injury to persons and damage to public and private property outside the permit area. The existing ground vibration limits were issued after considerable review and discussion of available research on blasting effects. Even so, OSM recognized during the development of its regulations that the prescribed peak particle velocity limits would not universally protect all structures, everywhere. Therefore, the regulations in Section 816.67(d)(5) do require "[t]he 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."

The foundational justification for the petitioners' proposal is the uncontested fact that homes beyond the permit area have suffered damage. The petition and supporting public comments allege that the damage is a direct result of blasting at surface coal mining operations. As discussed earlier in the Summary of Findings section, since 1977, OSM has spent \$1.4 million dollars in research to develop and implement a regulatory program to control the adverse effects of blasting at surface coal mines and to evaluate the possibility that those regulations may not be effective. Almost half of all these studies have been initiated since 1989 with the specific purpose of thoroughly studying the claim that the damage to homes in the Daylight and McCutchanville areas of Indiana resulted from blasting. OSM's technical staff as well as technical specialists from the State of Indiana, the U.S. Bureau of Mines (BOM), and other Federal and state agencies have spent numerous hours studying this problem. After all the time, effort, and research, a direct correlation between blasting at permissible regulatory limits and the damage to homes alleged to have been caused by such blasting cannot be established. There is, therefore, no technical justification to amend existing limits to the levels proposed by the petitioners.

A commenter, opposed to the petition's proposal, asserted that a 0.5 ips standard would increase operators' production costs and raise safety hazards for personnel because reduction of the ground vibration standard would require operators to reduce the size of the charge, thereby increasing the frequency of blasting. This commenter reasoned that reduced charge weights would make it more difficult to move or fragment the overburden and the greater frequency of blasting would increase the potential safety risk to personnel.

The justification for OSM's current ppv ground vibration limits is thoroughly discussed in the preamble to the 1983 rules and remains valid. (48 FR 9788) However, OSM also does not completely agree with the last comment opposing the change to 0.5 ips. If the overall peak particle velocity were reduced to 0.5 ips there would be a decrease in the total weight of explosives used per delay. This would not, however, necessarily increase the number of blasts. In order to reduce the maximum weight of explosives used per delay the blaster must either reduce the number of holes per delay or increase the number of delays per hole. This process would not necessarily increase the number of blasts nor put

personnel at greater risk. Neither the petitioners nor the commenters have presented any technical justification supporting the 0.5 ips vibration level. Allegations regarding the inadequacy of the current rules to address blasting techniques have not been sustained. OSM does not believe a reasonable basis has been established for amending the current ppv ground vibration limits to the 0.5 ips level proposed by the petitioners.

## **B. ALTERNATIVE BLASTING LEVEL CRITERIA**

The petitioners propose to amend the alternative blasting level criteria incorporated as Figure 1 in 30 CFR 816.67(d)(4) by replacing it with the figure from appendix B of RI 8507. The proposed amendment to the blasting level criteria would add appendix B's separate ground vibration ppv limits at mid-range frequencies for the drywall and plaster type of construction of a protected structure. Noting that structural response varies from structure to structure and within each structure, the petitioners fault the OSM alternative blasting level criteria of 30 CFR 816.67 for not having the separate ground vibration limits for the two types of construction. For this reason the petitioners assert that OSM's alternative vibration standards do not adequately address structural response.

As discussed in the preamble to the 1983 rules, much of the data used in development of OSM's blasting regulations came from RI 8507. Data in RI 8507 were collected from a variety of blasting events during coal mining, iron mining, quarrying and construction. The blasting events also varied by use and included highwall, parting, and excavation shot types. OSM adopted the alternative blasting level criteria in Figure 1 of 30 CFR 816.67(d)(4) from appendix B of RI 8507. The only difference between Figure 1. in 30 CFR 816.67(d)(4) and the figure in appendix B is that OSM's regulation did not include the 0.5 ips ppv plaster limit which appears in the appendix but not in the regulations. The petitioners propose to reintroduce that limit. OSM's reasoning for not providing that limit in the blasting regulations was thoroughly discussed in the 1983 preamble and remains valid. (48 FR 9802)

## **C. SCALED-DISTANCE FORMULA**

### **1. DELETION OF THE SCALED-DISTANCE FORMULA**

The petitioners propose to delete existing section 30 CFR 816.67(d)(3) which authorizes the use of the scaled-distance formula without seismic monitoring for each blast. In support for the proposal the petitioners claim that the 8 millisecond (ms) delay period prescribed by the scaled-distance equation is invalid. Petitioners refer to "recent research" on this topic by the Bureau of Mines which suggests that, in some cases, the 8 ms delay may be insufficiently long for low frequency sites and should not be used in cases of vibration with dominant frequencies below 10 Hz. The petitioners do not recommend an alternative delay period, but instead propose to delete the use of the scaled-distance formula altogether.

As stated by the petitioners, OSM regulations requiring a minimum 8 ms delay are based on 1963 research by W.I. Duvall, et al. published in *Vibrations From Instantaneous and Milliseconds Delayed Quarry Blasts* (U.S. Bureau of Mines, RI 5161, 1963). Also, as the petitioners state, since 1963 very little research has been done on determining the optimum delay periods between blasts. One study, by Siskind, Stachura, and Nutting, *Low Frequency Vibrations Produced By Surface Mine Blasting Over Abandoned Underground Mines* (U.S. Bureau of Mines, RI 9078, 1987) (possibly the study the petitioners allude to) concluded that 8 ms may not be the optimum delay. The study, however, did not recommend an alternative delay period. Further study by Siskind, et al., *Comparative Study of Blast Vibrations from Indiana Surface Coal Mines* (U.S. Bureau of Mines, RI 9226, 1989) reached a similar conclusion.

The 8 ms delay appears in OSM rules allowing the use of regulated scaled-distance factors. This rule appears at 30 CFR 816.67(d)(3)(i). The Bureau of Mines did not study the 8 ms delay as it applies to these particular scaled-distance factors. Instead, the Bureau of Mines studied the modified scaled-distance formula values which are regulated under a different rule, 30 CFR 816.67(d)(3)(ii). The Bureau's conclusions were based on a comparison between a modified scaled-distance formula's predicted peak particle velocity values and the actual peak particle velocities. Neither study compared OSM's scaled-distance factors in 30 CFR 816.67(d)(3)(i) against actual results. One further point, the Bureau of Mines results found that even though some of the peak particle velocities were higher than predicted none exceeded the regulatory maximum ground vibration levels. Therefore, none of these studies invalidate the use of scaled-distance equation of 30 CFR 816.67(d)(3)(i).

The 8 ms delay has also been a concern of the explosives industry but from the opposite perspective. In a paper cited to by a commenter and presented at the 1989 Annual Meeting of the Society of Explosives Engineers, The 8 millisecond Criterion: Have We Delayed Too Long in Questioning It? Douglas A. Anderson concluded that, "[t]he [8 ms] guidelines should not be promoted as a method of vibration control applicable to all operations, and should not be enshrined in regulations as a restriction on blast design where more sophisticated means to control vibration are available". Anderson recommends, "that scaled-distance based upon 8 ms separation be used only as a very conservative criterion to indicate worst case vibration levels". These findings are recommending to the explosives industry to avoid using the 8 ms delay because it unnecessarily restricts the blast design, i.e., that separations can be found which would allow higher weights of explosives within the regulated ground vibration levels. For the present, OSM would rather maintain the existing "very conservative" standards which account for severe vibration levels than to provide for the use of higher weight of explosives. The existing rules strike a balance between the competing views and have not been shown to be inadequate.

OSM finds that the petitioners' proposals have been considered previously in rulemaking and have failed to provide facts, technical justification or law to support deleting the use of scaled-distance formula.

## **2. CONFIDENCE INTERVAL**

The petitioners and several commenters stated that RI 8507 and OSM regulation 816.67(d)(3)(ii) allow an acceptable probable range of damage to structures of 5%. They reason that a 95% confidence level allows for 5% of the structures in the vicinity of blasting to be damaged. They claim that this is in conflict with the Act because the Act requires that blasting be conducted to prevent damage to all structures, not just to 95% of the structures.

OSM rules at 30 CFR 816.67(d)(3)(ii) allow for a modification to the scaled-distance factor when an operator can demonstrate that the scaled-distance factor at a specific mine differs from that established as the national standard. Upon the collection of sufficient data and an analysis using statistical techniques the operator can generate a scaled-distance formula that meets the vibration limits of current regulation at a 95% confidence level.

The petitioners have misunderstood the purpose of a confidence interval. The confidence interval is a means of providing a margin of safety for the possibility that the data used in a sample may not accurately represent the population from which it was drawn. When developing a modified scaled-distance formula under 30 CFR 816.67(d)(3)(ii), an operator performs a regression analysis on a sample of data which includes the actual distance between the blast and the monitoring instrument, the actual charge weight of explosives, and the resulting peak particle velocity. The regression analysis computes a line representing the expected value of the scaled-distance. This line fully represents all the information contained in the data sample. But, because the sample of data may not truly represent the population, OSM requires an additional margin of safety to be added to the regression results. The confidence interval is a statistical specification of how to account for this possible error in the data. OSM, following the Bureau of Mines recommended methodology in RI 8507, prescribes a 95% confidence interval. The resulting regulated value of the modified scaled-distance formula will be the sum of the regression line plus a value equal to two standard deviations of the sample data.

Confidence intervals are a standard statistical technique discussed in most college level texts on statistical methods. The selection of the 95% confidence level, as opposed to other levels, was based on a recommendation of the Bureau of Mines, whose broad experience in the collection of blasting data provides them with an unparalleled understanding of the potential sources of errors in a sample. The 95% confidence level was employed, without challenge, in the 1983 rulemaking. [48 FR 9801]

OSM believes that the petitioners' challenge to the 95% confidence interval was based on an incorrect premise that a "95% confidence interval" allowed a certain level of damage to occur. In fact, a confidence interval adds to the protection afforded by the rules by compensating for the possibility that the sample used to compute a modified scaled-distance formula may contain errors.

## **D. MANDATORY MONITORING AND STATE REGULATORY AUTHORITY DISCRETION**

In concert with their proposal to delete the scaled-distance equation option provided by existing 30 CFR 816.67(d)(3), the petitioners also propose to amend the language in 30 CFR 816.67(d)(6) to require operators to monitor

each blast. This requirement would replace the current provisions which require the regulatory authority to impose special, site-specific seismic monitoring, when necessary, under existing 30 CFR 816.67(d)(6).

The petitioners reason that there is no way for a regulatory authority to assess whether blasting is actually damaging property if the operator is not required to monitor each blast. They also say that, since blasting is not an exact science, continuous monitoring should be required so that problems can be discovered more readily. A commenter added that the regulatory authority should conduct random blasting level checks with a seismograph. The petitioners assert that they do not trust operators to honestly fill out the blasting record and that by not monitoring all blasts the door is open to the operator to falsify records.

OSM provided the justification for using scaled-distance formula without monitoring in the preamble to the 1983 rules. (48 FR 9801) In the 1979 rules, OSM acknowledged that scaled-distance formula is not considered to provide absolute protection against exceeding a specific ground vibration level. This was stated as one reason for retaining the provision which authorized the regulatory authority to monitor any blast at any time. [44 FR 15201] The monitoring provision was retained in the 1983 rulemaking and now appears at 30 CFR 816.67(d)(6).

With regards to the concerns for falsification of blasting records, OSM has established a training program for state and Federal inspectors in the field of explosives and blasting including training in monitoring ground vibration and airblasts and analyzing records and monitoring data. Inspectors are trained on how to examine a blasting log and in the techniques to detect a blasting log containing false information. Falsification of a blasting log is a serious matter and, when discovered, enforcement action is taken in accordance with 30 CFR 850.15(b) and other applicable regulations.

One commenter, supportive of the proposal, said that the option of setting more stringent site specific standards by the regulatory authority has proven ineffective. While there may be isolated differences of opinion between a regulatory authority and homeowners as to whether blasting within the regulatory limits is causing damage to residences and structures, this does not establish any claim as to the ineffectiveness of the current rules. To the extent that OSM becomes aware of instances that the regulatory authority is not sufficiently implementing its rules, there is an issue of oversight of the administration of that program and not an indication of the insufficiency of those rules. As stated earlier, OSM believes that part of the answer to the problem of assessing blasting damage is to ensure that the regulatory authority has all the tools necessary to do an effective job. OSM is committed to ensuring that regulatory authorities have ready access to the computer software to plan and evaluate permit applications, training for their inspectors and permit evaluators, and, if needed for specialized problems, technical specialists from OSM.

A commenter suggested that the regulations be amended to allow the regulatory authority to reduce the maximum peak particle velocity based upon factors such as density of population, age, hydrology of the area, frequency of blasting or other factors. As discussed earlier, OSM rules currently require a regulatory authority to reduce ground vibration limits when necessary to provide protection from damage.

The same commenter suggested that the regulatory authority solicit public comments should fifteen citizens who are being affected by blasting operations make a request and that a public meeting be held if twenty-five citizens so request.

Current regulations allow a person who may be affected by blasting to make a citizen's complaint to the state regulatory authority under the provisions of 30 CFR 840.15. In addition to the specific performance standards for airblast and peak particle velocity, under 30 CFR 816.67(a), blasting is to be conducted to prevent injury to persons and damage to public or private property outside the permit area. If blasting is not conducted in such a manner, the operators would be in violation of Section 816.67(a). The regulatory authority could, in such instances, prescribe a whole range of remedial measures. As a result of an investigation of a citizen's complaint, the regulatory authority would have the authority to issue a notice of violation, issue a cessation order, reduce both the airblast and peak particle velocity according to 30 CFR 816.67 (b)(1)(ii) and (d)(5), require monitoring of any or all blasts, and to take other appropriate actions. Thus no additional requirements appear warranted.

The petitioners ask whether the Bureau of Mines found low frequency airblasts that match the natural frequency of residential structures. In response, most airblast has a concussion component that is below 20 Hz. In many cases, the concussion component matches the natural frequency of residential structures. The Bureau of Mines found that airblast is less likely to crack walls than ground vibrations. Cracking occurs predominantly from shear and tensile wall strains that

are produced by shearing rather than bending. However, airblasts are often responsible for the secondary rattling and annoyance effects (RI 8507).

Many commenters thought that the petition for rulemaking was fundamentally a response to a local problem based on localized conditions and that ample coverage for the petitioner's concerns could already be found at: 30 CFR 816.67(d)(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". 30 CFR 816.67(d)(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". 30 CFR 816.67(b)(2)(i) -- "The regulatory authority may require airblast measurements of any or all blasts". OSM agrees that its rules governing blasting provide adequate authority for the regulatory authority to prevent the adverse impacts of blasting.

## **E. OTHER ISSUES RAISED BY COMMENTERS BUT NOT INCLUDED IN THE PETITION**

Commenters to the petition raised several issues related to the prevention of adverse effects of blasting which, while not specifically included in the petition's proposal, deserve a response.

### **1. HISTORIC STRUCTURES**

Several commenters were concerned that OSM blasting regulations were not adequate to protect historic structures from blasting damage. OSM notes that the rules governing the protection of historic structures were not a part of the petition. OSM provides regulations for protecting sites which encompass not only the effects of blasting but all other adverse impacts.

OSM regulations 30 CFR 779.12(b)(1) require that a permit application describe and identify the nature of cultural, historic, and archaeological resources listed or eligible for listing on the National Register of Historic Places and known archaeological sites within the proposed permit and adjacent areas (adjacent areas are areas outside the permit area where a resource, such as an historic structure, could be expected to be adversely impacted by mining). The existence of an historic structure in the vicinity of the proposed mining operation would, therefore, be identified during the permitting process.

OSM regulations 30 CFR 780.31(a)(1) and (b) require that the permit application contain a plan to prevent adverse impacts to these historic places. Historic places must be specifically protected from all adverse effects of mining, including blasting. If a lower ground vibration limit is necessary to protect any structure, the regulatory authority is required to set a lower peak particle velocity than those otherwise provided for in 30 CFR 816.67 in order to protect that structure. This requirement is clearly expressed in 30 CFR 816.67(d)(5).

OSM finds that the protection of historic structures is outside the scope of the petitioners' requested rulemaking and that adequate protection under SMCRA currently exists within the rules to prevent adverse impacts. n1

n 1 This decision is not intended to address OSM's compliance with the recent district court decision in *Indiana Coal Council v. Lujan*, Nos. 87-1067 and 87-1020 (D.D.C. 1991). Such compliance is proceeding independently.

### **2. WATER SUPPLIES.**

Several commenters were concerned that blasting may cause damage to home water wells. OSM notes that the rules governing the replacement of water supplies adversely affected by surface mining activities were not a part of the petition.

OSM regulations at 30 CFR 816.41(h) require the replacement of a water supply if it is damaged or destroyed by surface coal mining activities, including blasting. A Bureau of Mines study, *Survey of Blasting Effects on Ground Water Supplies in Appalachia*, (Bureau of Mines OFR 8(1)-82, Philip R. Berger and Associates, Inc.) concluded that blasting has very little, if any, effect on water wells. But, if a well is damaged or destroyed through mining operations, protection is afforded through current regulations.

OSM finds that the replacement of water supplies is outside the scope of the petitioners' requested rulemaking and that adequate protection currently exists within the rules.

### **3. FISH AND WILDLIFE**

Several commenters asked OSM to consider the potential impacts blasting may have on fish and wildlife. They reason that noise cannot only be annoying to wildlife but also disruptive to their breeding and migration patterns. OSM notes that the rules governing the protection of fish and wildlife were not a part of the petition.

The Act of section 515(b)(24) requires that operators must "to the extent possible using the best technology currently available, minimize disturbance and adverse impacts of the operation on fish, wildlife, and related environmental values". OSM regulations at 30 CFR 780.16 and 816.97 were specifically designed to protect fish, wildlife, and endangered and threatened species. Protection is also provided by the Endangered Species Act of 1973, as amended (*16 U.S.C. 1531 et seq.*), the Bald Eagle Protection Act, as amended, (*16 U.S.C. 668 et seq.*) and other laws.

OSM finds that the present rules provide a level of protection consistent with the requirements of the Act and the comment is outside the scope of the petitioners' requested rulemaking.

### **4. RESPONSE SPECTRA METHODS OF ANALYSIS**

Several comments from firms in the explosives industry stated that the use of response spectra methods of analysis considers both the entire vibration time history as well as the dynamics of the structure and, therefore, is the best method of monitoring blasting events. They suggest that response spectra analysis is a tool that can be used as an accurate representation of possible damage potential. As discussed in the preamble to the 1983 blasting regulations, OSM acknowledged that response spectra techniques might prove to be the best substantiation of the actual damage range and does not wish to discourage its use as a means of providing a seismographic record of regulatory compliance. (*48 FR 9800*)

### **5. SUBSIDENCE**

The petitioners assert that low-level vibrations and how they relate to subsidence need to be investigated. The petitioners did not include specific facts to justify their assertion.

OSM has not seen evidence to indicate that there is a connection between low-level vibrations and subsidence. Blast vibration researchers have observed a tendency of low frequency vibrations to increase near underground mines but they have also observed peak particle velocities to decrease with increased blast to structure distance (*Explosives and Rock Blasting, Atlas Powder Company, 1987*).

### **6. UNDERGROUND MINING**

One commenter, an underground mining operator, felt that they should be excluded from the blasting requirements of 30 CFR Part 816. OSM notes that regulations governing underground mining appear at 30 CFR part 817 which were not part of this petition.