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will be necessary after the opportunity for public participation, in order for the permit application to be approved or disapproved, as provided for under Sections 510(a) and (b) of the Act. If the application is disapproved, the permit must be denied. If the applicant desires to complete the application and reapply, it must be handled as a new application.

3. Several comments were received concerning the requirement in proposed Section 786.15(e) that the regulatory authority find that a proposed operation would not adversely affect any places listed in the National Register of Historic Places, or any places eligible for such listing. The commenters felt that only those places actually listed should be protected and that the word “eligible” should be deleted. The Office did not accept these suggestions for the reasons set out in the preamble to Part 761.

These same commenters also suggested that proposed Section 786.15(e) be amended to explicitly specify that a permit could be issued, notwithstanding the adverse effects on a public park or place. These comments were not accepted because additional language was unnecessary. Proposed Section 786.15(e) of the final rules cross-references to Section 761.11(c) of the final rules. The latter Section contains the exception language suggested by the commenters.

4. Several comments were received on proposed Sections 786.15(g) and (h) which require findings by the regulatory authority concerning the applicant’s history of compliance. One commenter suggested that this requirement be added to the site where the proposed operation would be located. The Office has added language to require that the permit be denied if the applicant has a history of violation that may result in a revocation or forfeiture. Section 785.19(h) has been added to require a finding that an applicant has paid all applicable reclamation fees required under Title IV of the Act.

5. One commenter suggested that proposed Section 786.15(h) be revised so that violations to be considered in determining a pattern of violation be limited to violations occurring within the past five years. This same comment was made in relation to proposed Section 786.15(d) which sets forth the requirements for the determination of a pattern of violations. The Office has decided that the regulatory authority is not to be so limited in considering past violations. Discussion of this decision is found in the preamble to final Section 786.17.

6. A few commenters contended that there was no justification in the Act for proposed Section 786.15(i). This Section requires that the regulatory authority find that a proposed operation will not be inconsistent with other restrictions or requirements concerning the implementation of the reclamation plan. The Office has amended Section 786.15(i) to allow the regulatory authority to consider the effects on other operations involving alluvial valley floors, the Office has added the requirement for a finding that the applicant has satisfied Section 785.19. Criteria for approval of alluvial valley floors are found in Part 785 of the regulations.

7. Two commenters felt that there was no justification in the Act for proposed Section 786.15(m). This Section requires that a finding by the regulatory authority that all special approvals required by Subchapter K have been made. Sections 502(c) and 510(b) of the Act set forth the general requirements for special approvals. The required findings under this Section. Since specific information and findings for such operations are required under final Section 785.17, the Office has amended Section 786.15(m) to allow the Office to consider the effects on other operations involving alluvial valley floors, the Office has added the requirement for a finding that the applicant has satisfied Section 785.19. Criteria for approval of alluvial valley floors are found in Part 785 of the regulations.

8. Two commenters felt that there was no justification in the Act for proposed Section 786.15(l). This Section requires that before any operation on prime farmland may be conducted where reclamation is required by the Act is not feasible. In order to insure that this mandate is carried out, numerous facets of a proposed operation and reclamation plan must be evaluated. The Office has added the requirement for a finding by the regulatory authority, as opposed to general approval of the whole permit. The finding made by the regulatory authority under this Section insures that the regulatory authority will perform a last check to make sure that all specific considerations and approvals have been completed. Because this requirement is essential to prevent damage to the environment caused by
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1. Many commenters objected to the requirement in proposed Section 788.13(b)(1)(d) that all existing operations obtain new permits within eight months of the approval of a permanent program permit application. These commenters suggested that the regulatory authorities be given flexibility concerning when to issue new permits during the initiation of a regulatory program. Others suggested that the eight-month time limit should be extended to 18 months. However, Section 788.13(a) of the Act also allows operators with new permits issued in the initial program to continue operating under these permits past the eight-month deadline, as long as the operator applies for a permanent program permit. These requirements have been implemented by Section 771.13(b) of the regulations. Reference to Section 711.13 has been added to this Section in order that there be no confusion concerning time limits for actions on permit applications. To clarify the status of applications submitted after the two-month deadline set forth in Section 771.13, the application, that under Section 786.23(b)(2)(D) there would not be enough time for the regulatory authority to consider other aspects of the application after a decision was rendered on the "pattern of violations" hearing. No change in the regulations was considered necessary. The regulatory authority would not be precluded from hearing and processing other aspects of the permit during the time that a "pattern of violations" hearing was conducted. Because of the time involved in such a hearing, the regulatory authority would have more time than usual to process the permit. In addition, the present regulations state that no time limit can expire during the pendency of pattern of violation hearing under Section 786.17(d).

3. One commenter was concerned that if an informal conference was held and it was later determined that a pattern of violations hearing would have concluded prior to the approval of the permit, that under Section 786.23(b)(3) there would not be enough time for the regulatory authority to consider other aspects of the application after a decision was rendered on the "pattern of violations" hearing. No change in the regulations was considered necessary. The regulatory authority would not be precluded from hearing and processing other aspects of the permit during the time that a "pattern of violations" hearing was conducted. Because of the time involved in such a hearing, the regulatory authority would have more time than usual to process the permit. In addition, the present regulations state that no time limit can expire during the pendency of pattern of violation hearing under Section 786.17(d).

4. A commenter asked that the regulatory authority be required to attach a fact sheet or finding of fact to its decision granting or denying permit applications under Sections 786.23(c) and 786.23(d). As proposed, the regulations required that the regulatory authority state the reason for its decision. The commenter was concerned that such broad language would lead to decisions filled with conclusory statements which would prevent meaningful review of those decisions. It was sug-

practices which could render necessary reclamation not feasible, the regulation has been retained.

9. Section 788.19(a) was added to the regulations pursuant to consultation with the U.S. Fish and Wildlife Service (FWS) of the Department. In accordance with Section 7 of the Endangered Specials Act of 1973, and 50 CFR Part 402, the Office was required to consult with the FWS in regard to the Office's permanent program regulations.

This consultation resulted in the FWS making specific recommendations for modifications or additions to the proposed permanent regulatory program. These proposed changes were suggested in order to ensure that the protection granted threatened or endangered species and critical habitat under the Endangered Species Act would be provided under the Office's permanent regulations. These recommendations were adopted, under authority of Sections 4 and 7 of the Endangered Specials Act of 1973, 50 CFR Part 402; and Section 102, 201, 501, 503, 504, 507, 508, 510, 511, 516, 517, and 522 of the Act.

§ 786.21 Criteria for permit approval or denial. Existing structures.

This Section has been added to the final rules in response to comments solicited at 43 Fed. Reg. 41735 (Sept. 18, 1978), regarding structures which exist prior to the approval of a State or Federal program in a particular State. As explained in further detail in the preamble to Subchapter A, the Office has adopted final rules which authorize special treatment in the application of the requirements of Subchapter K to existing structures.

Existing structures are defined at Section 701.15 of the rules. Section 701.11(e) establishes the applicability of Subchapter K to those structures. Under Sections 786.12 and 786.12, the operation and reclamation plan, portions of permit application will have to establish how the applicant will demonstrate compliance with the applicability requirements of Section 701.11(e). Section 786.21 establishes the criteria by which the regulatory authority is to decide whether the applicant has made a sufficient demonstration that the proposed operations will be conducted in compliance with the applicability requirements of Section 701.11(e). The authority, basis and purpose for these criteria are discussed in the preamble to Section 701.11(e).

§ 786.23 Permit approval or denial. Authority, purpose and basis for this Section are discussed in 33 F.R. 41726 (September 18, 1978), under Section 786.13.
gusted that the bases for the decision be set forth explicitly in the form of findings of fact or a “fact sheet”, and that the proposed fact sheet be modeled after the proposed Environmental Protection Agency regulation to be found at 40 CFR 124.45, which call for such fact sheets on draft NPDES permits. The commenter was also concerned that previous State regulatory practice provided inadequate explanations for decisions on permit applications.

The Office believes that Section 786.23(c) already provides an adequate level of explanation for decisions. However, the wording of the regulation has been changed to require that the regulatory authority give its “specific” reasons for the decision. The form of the decision is not dictated by the regulations, however. Hopefully, this will strike a reasonable balance between the need to protect citizens to know the facts and reasons behind a regulatory decision, and the need of the regulatory authority for ease of administration. A regulatory authority should ordinarily list the specific facts and reasons behind each decision in order to limit the number of issues in any appeal.

5. Several industry commenters objected to public notice of regulatory authority decisions on permit applications. Some objected to sending the decision to anyone but the applicant and others to the publishing of a summary of the decision in a newspaper. Others objected to notification of the Office's Regional Director and local governmental units. Section 514(a)-(c) of the Act however, requires that the actual decision be sent to the applicant and all parties to the informal conference. Also Section 510(a) of the Act requires that notice be sent to local governments. Since the Office would standardize record keeping under permanent State programs, it would be necessary for copies of all permits issued to be on file with the Office. In addition, under Section 514(c) of the Act, any person whose interest may be adversely affected by a decision on a permit application (regardless of their participation in the review of the application) has the right to file for administrative review of the decision by the regulatory authority. A newspaper advertisement would be essential in order to notify the public of the decision. Without this notice, adversely affected persons would lose their last opportunity to protect their rights because Section 514(c) of the Act limits the opportunity for judicial appeal to those who participated in the formal administrative hearing reviewing the decision of the regulatory authority. Therefore, newspaper notice provisions are also retained in the final rule.

§ 786.25 Permit terms.

The authority, basis and purpose of this Section was explained under Section 786.11 in 43 FR 41720 (Sept. 18, 1978):
1. Several commentators suggested that proposed Section 786.11(a)(2) be revised since a specified longer term may be needed to allow the applicant to obtain necessary financing for equipment and opening an operation. Section 506(b) of the Act states that a longer term may be granted “... if the applicant demonstrates that a specified longer term is reasonably needed to allow the applicant to obtain necessary financing for equipment and opening of the operation.” Based on this, Section 786.25 was revised in the final rule.

2. Additional commentators suggested that the need for confirming this financial need in writing was unwarranted. However, Section 506(b) of the Act provides that the applicant shall demonstrate that a longer term is needed. The Office has determined that confirmation in writing is the appropriate method to demonstrate that a longer fixed term is, in fact, needed. Therefore, this Section has been retained as proposed.

§ 786.27 Conditions of permits: General and right of entry.

The authority, basis, and purpose for this Section was demonstrated under Section 786.12 of 43 FR 41720 (September 18, 1978):
1. Several commentators contended that warrantless entries by State and Federal inspectors would contravene the Fourth Amendment of the U.S. Constitution and suggested that proposed Section 786.12(b) be deleted. Based upon a review of the Act's legislative history and relevant case law, the Office has found warrantless entries by State and Federal Inspectors to be lawful and proper under the Act. (See, In Re Surface Mining Litigation, 456 F. Supp. 1301, 1317-1319 (D.D.C., 1978).) The Office has determined that warrantless entries are necessary for proper administration and enforcement of the Act, and this Section was therefore retained in the final rules.

2. Other commentators suggested that Section 786.27(b) be revised so that entry to a mine site was “at reasonable times.” Section 517(b)(3) of the Act uses the term “at reasonable times” only when access to and copying of any records is necessary, or inspection of any monitoring equipment or method of operation is necessary. However, the Act does not state that the right of entry of authorized representatives be exercised only “at reasonable times.” Entry at all times is needed to insure for effective compliance by on-going operations. As a result, the rule was not revised. A few commentators contended that all of paragraph (b) should be deleted, since the provisions of this Section are stated in the Act or Subchapter L of the regulations. Since Section 786.25 deals with general conditions of permits as to right of entry and Subchapter L deals with the exercise of the right during inspections, the provisions were not deleted. However, subparagraphs (b)(1)(i)-(ii) of proposed Section 786.12 were deleted from Section 786.27, since they would be merely duplicative of Parts 840 and 842.

3. Several commentators stated that there was no authority under the Act for requiring accompaniment of State inspectors by private persons. Other commentators felt that Section 786.27 was too broad, because it did not specify in what instances a private citizen could accompany a State Inspector regarding citizen accompaniment of State inspectors. The Office decided not to change the final rule for the reasons explained in the preamble to Subchapter L. Commenters objecting to the breadth of the proposed rule were, however, correct, in objecting that it was not limited to citizens who had made a complaint to the regulatory authority. Thus, Section 786.27(b)(2) was revised to state that a person may accompany an authorized representative on an inspection when the inspection is in response to an alleged violation reported to the Office by that person.

4. A few commentators contended that revisions should be made to Section 786.27(b) to assure that (1) private persons are properly attired with safety apparel when entering a mine site and (2) all private persons entering a mine site would be required to waive all claims against the operator for injuries received while on the property. These suggestions were not accepted. It has been the Office policy that all Inspectors be properly attired with proper safety apparel before entering a mine site. Also, private persons entering a mine site must be under the control, direction, and supervision of the authorized representative. As a result, an authorized representative would not allow a private person to enter a mine site, unless he or she was properly attired with safety apparel. As for the liability question, ordinary tort law principles can be used and some States may have specific laws or regulations with regard to liability. See also discussion of this issue in the preamble to Part 842. Therefore, no change was made in the regulations as a result of this comment.

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§ 786.29 Conditions of permits: Environment, public health and safety.

The statutory authority, basis and purpose for this section was explained under Section 766.13 at 43 FR 41721 (September 18, 1978).

1. A few commenters requested that the entire Section 786.29 be deleted as having no justification. This Section, like Sections 786.25 and 786.27 sets forth general terms and conditions to be attached to all permits as well as special conditions to be attached to certain types of permits. Subsection (a) places affirmative responsibilities on operators to report and remedy events of noncompliance. Subsection (b) places affirmative responsibilities on operators to dispose of materials produced by pollution control devices in an environmentally acceptable manner. Subsection (c) allows the regulatory authority to place special conditions on permits in order to protect the environment in situations not specifically handled in the regulations. The Office feels this Section is necessary to carry out the environmental protection policies of the Act found in Section 102 (a) and (d), and retained it in the final rules.

2. Another commenter suggested that a new Subsection be added to allow the permittee 15 days to review any conditions attached to a permit and comment on them. This suggestion was rejected because an addition is unnecessary. If a permittee is dissatisfied with any conditions, he or she can appeal the decision of the regulatory authority under Section 787.11.

3. Several commenters state that warning a person who may be adversely affected by noncompliance, as required by Subsection (a)(3), would be an unnecessary burden to the operator. These commenters recommended that the provision be deleted. They felt the operator should not have to worry about who may be adversely affected in noncompliance situations which quite obviously do not threaten the health or safety of the public.

This Subsection has not been deleted, however. One of the purposes of the Act is to protect society and the environment from the adverse effects of surface coal mining operations. Section 786.29(a)(3) helps assure that this provision of the Act is implemented. A few commenters also suggested that this Section be reworded for clarification. This was done to narrow the rule so that it now states "... any person whose health and safety is in imminent danger due to noncompliance." This revision implements the wording "imminent danger to health and safety to the public" which is defined in Section 701.5 of the regulations.

4. One commentor recommended deletion of Section 786.29(b) as unnecessary and outside the scope of the Act. It was the commenter's position that the requirements of Subsection (b) were already being administered under the Clean Water Act. The Office believes, however, that the requirements in Subsection (b) in no way supersede or modify the Clean Water Act and will help insure that the goals of both that Act and SMCRA will be met. Therefore, the regulations have not been changed.

5. Several commenters objected to Section 786.29 (c) as being vague and not required by the Act. This Subsection allows the regulatory authority to attach special permit conditions. The Office considers this authority a critical element for any rational regulatory system. The performance standards of the regulations contain dozens of provisions which establish generally applicable rules, but provide for regulatory authority approval of "alternative" ways to comply with the performance standards. The determination of whether and to what extent an alternative should be authorized will require a specific written regulatory determination by the agency operator, and public will clearly understand what specific legal requirements are being applied to the operator. Further, these specific determinations need to be reflected in the permit to be binding and enforceable, since the enforcement provisions of the Act speak of violation of permits.

This authority is also necessary since there will invariably arise situations where the proposed operations have the potential to cause adverse environmental impacts, but the solutions for these problems are not specifically addressed in Section 515 of the Act. Indeed, Congress recognized this problem by requiring the issuance of cessation orders for "significant, imminent environmental harms," but that provision only deals with on-going operations, not prevention of such harms which can be identified during the permit process. Because the Office believes the regulations should, to the extent practical, ensure that potential problems raised by proposed operations be adequately handled in the permit phase, the authority of the regulatory authority to impose special conditions has been retained. However, in order to clarify the situations in which these special conditions may be added, the language of the regulations has been changed to specify that they may be imposed to prevent environmental harms and to ensure compliance when alternative methods of meeting the performance standards of the Act. PART 787—ADMINISTRATIVE AND JUDICIAL REVIEW OF DECISIONS BY REGULATORY AUTHORITY ON PERMIT APPLICATIONS

Part 787 was Part 789 in the proposed regulations.

§ 787.11 Administrative review.

Authority, purpose and basis for this section are discussed in 43 FR 41727, (Sept. 18, 1978). As proposed, 787.11 concerned the procedures to be followed by a regulatory authority at the adjudicatory hearing to review the decision on the approval or denial of a permit application. Sections 514(c), (d) and (e) of the Act set forth the minimum procedural requirements for adjudicatory hearings on permit actions. The proposed regulations basically repeated the language of these sections.

In the preamble to the proposed regulations, the Office solicited comments on whether more specific procedural requirements should be adopted.

1. Some commentors pointed out differences between Federal, State and Federal lands programs, but suggested that the procedures for each program be as close as possible for consistency's sake. Two commentors wanted to be sure that an Administrative Law Judge would hear appeals under Federal programs. Some commentors recommended that the following specific additional procedural requirements be included: (a) Final decisions in a hearing should include findings of fact and conclusions of law and a "fact sheet" similar to that required under USEPA's National Pollutant Discharge Elimination System (NPDES) permit regulations; (b) Specification of a "presiding officer," who would have the power to issue subpoenas, rule on evidence, regulate the hearing, hold prehearing conferences and make recommended decisions; (c) Provide for a right to present documentary evidence and cross-examine witnesses; (d) Provide for the right of the parties to submit proposed findings of fact and conclusions of law at the end of the hearing; (e) Prohibit ex-parte contacts between persons deciding hearings and parties to proceedings which include the staff of the regulatory authority; and (f) Include provisions to ensure that an informal conference under Section 786.14 is an adjudicatory hearing.

2. The Office has decided to adopt the suggestion that Section 787.11 distinguish between adjudicatory hearings for Federal, State and Federal lands programs, because of the statutory and institutional differences between the three programs.

3. Regarding State programs, the Office has decided to accept the suggestion that the regulations be reaffirmed to specify that, in addition to the
procedural devices specifically enumerated in Section 514 (c) and (e) of the Act, the adjudicatory hearing must provide for right to prehearing discovery and for decision of the regulatory authority to be in the form of findings of fact and conclusions of law. Specification of discovery rights is particularly necessary, as commentators pointed out, in preparing for the complex, non-specific technical issues involved in coal mining permit hearings. Furthermore, discovery is implicit in the specifications of Section 514(e) of the Act which allows the regulatory authority to subpoena witnesses or other evidence from any State that is necessary for conducting regulatory program hearings will, in general, be governed by the general principles of administrative law. However, since the States may have hearing authorities under Sections 788.17-'189.12. The rule was modified to clarify that it also applies to Federal programs under authority of Section 526(a)(2) of the Act.

PART 788—PERMIT REVIEWS, REVISIIONS, AND RENEWALS: AND TRANSFER, SALE AND ASSIGNMENT OF RIGHTS GRANTED UNDER PERMITS

In order that all permit actions taken subsequent to the granting of a permit could be found in one location, to condense the size of the regulations, and to minimize cross-referencing, proposed Parts 780, 791 and 792 have been combined into one new Part 788. Because of this combination, editorial changes have been made in Sections 788.1 and 788.2.

§ 788.1 Scope.

Authority, basis and purpose are discussed in 43 Fed. Reg. 41726 (Sept. 18, 1978), under Parts 780, 791, and 792.

§ 788.2 Objectives.

Authority, basis and purpose are discussed in 43 Fed. Reg. 41726 (Sept. 18, 1978), under Parts 780, 791, and 792.

§ 788.3 Responsibilities.

Authority for this section is found in sections 102, 201(c), 501(b), 503(a), 504, 506, 507, 508, 509, 510, 511, 513, 514, 515, 516, 517, and 701 of the Act. Because of the combination of three parts into new Part 788, a new Section 788.3 has been added which sets forth, first, the responsibilities of regulatory authorities in taking permit actions subsequent to the granting of the original permit under regulatory programs. This section also specifies the responsibilities of persons conducting surface coal mining and reclamation
operations with respect to changes, modifications, renewals, and revisions of permits after they are originally granted, and of persons who attempt to succeed in rights of permits by transfer, sale, or assignment of rights. This section has been added as an aid to users of the regulations and does not establish any responsibilities which were not included in proposed Part 790, 701, or 502.

§788.5 Definitions.

Authority for this section is Sections 102, 201(c), 501(b), 503, 504, 507, 508(a), 509, 510, 511(b), 515, 516, 517, and 518 of the Act.

In response to a comment directed to proposed section 792.12(a) (788.18(a) in the final rules), the office has added definitions for the terms “cases in interest” and “transfer, assignment, or sales of rights.” The commenter was concerned that actual transfers of effective control would not necessarily be subject to prior regulatory authority review and approval, if these terms were not specifically defined. As defined, these terms will include any change in ownership or in the person actively exercising the rights to mine. For example, these terms would include all subcontractors who actually perform the mining who were not listed in the original application pursuant to Sections 788.13(a)(5), 783.13(a)(5) and 786.14, 783.14. This is necessary so that the regulatory authority can determine the suitability of the person actually conducting the surface coal mining and reclamation operations involved under the substantive criteria of 788.17-788.18.

The definition of successor-in-interest is provided to insure consistent use with the terms “transfer, sale, or assignment of rights” as defined. The common understanding of these terms include any effective shift in control over rights, in addition to technical changes in ownership. See "Black's Law Dictionary" at 135, 1699 (1957 ed).

§788.11 Regulatory authority review of outstanding permits.

Authority, purpose, and basis for this section are discussed in 43 Fed. Reg. 41772 (Sept. 18, 1978) under Section 790.11.

1. Under Section 511 (c) of the Act, the regulatory authority is to review each permit at least once during its term. Following this review, the regulatory authority is authorized to revise or modify the permit, to assure compliance by the permittee with the Act. Similar, but particularized review, revision, and modification power is provided to the regulatory authority for certain special categories of mining by Section 515(b)(16), 515(c) and 515(e) of the Act. Section 788.11 is proposed to generally implement these requirements, along with similar provisions for the special categories of mining at Section 785.13, 785.16 and 785.18 of this Subchapter.

2. Several commenters suggested that this section be modified to allow the regulatory authority to revoke a permit through the review process. These comments were rejected. Section 511(c) of the Act allows the regulatory authority to require “Reasonable revision or modification of the permit provisions” during the review process. Sufficient mechanism is provided in other sections of the regulations for the revocation of a permit. (See Subchapter L).

3. The commenter suggested that modifications be made to this section to allow citizens to petition the regulatory authority to conduct reviews of existing permits. The regulatory authority has plenary power under the Act to review permits with the overall plans and operations during the review of the permit application, the mid-term review, and the renewal process. In addition, it can order cessation of an operation at any time for any imminent hazard or hazards created by the operation. (See Subchapter L). Therefore, the right to petition for review was considered unnecessary to protect citizen's rights. Concerned citizens can also file citizen's complaints and participate in the review and renewal process.

4. A commenter requested that public notice and opportunity to submit comments be added to this section. The Office rejected this suggestion. If citizens believe that an operation is in violation of the Act or regulations, or is creating danger to the public or the environment, they can petition the regulatory authority or OSM under Subchapter L. In investigating the complaint, the regulatory authority will necessarily review the past performance of the operation. Moreover, during the periodic review, the regulatory authority will have to consider complaints which have been filed against the operations.

5. A commenter objected to the office setting times for permit reviews as per proposed Section 786.11(a), citing the comments as leaving this issue entirely to the regulatory authority. The commenter suggested modification of this section to delete references to Sections 785.15, 785.16, and 785.18, and to delete the requirement that all permits be reviewed not later than the middle of the permit term, except those permits governed by Section 785.13.

This comment was rejected. Section 788.11(a) is within the authority granted the Secretary, acting through the office, pursuant to Sections 102, 201, 501(b) and 503(a) of the Act, to establish guidelines for the State programs.

6. Some commenters suggested that where permits are issued for terms of longer than five years under Section 785.25(a), regulatory authority review of the permit should occur more frequently than once in the term of the permit. The Office agreed with that suggestion. Where permits extend beyond 5 years terms, mining and reclamation technology advances should be considered for application on recurring intervals. Moreover, care is needed to assure that the predictions of successful reclamation accepted when the original permit was issued remain valid. Therefore, the final rule was revised to require that long-term permits be reviewed at least once every 5 years, the ordinary length of a permit term.

7. Some commenters questioned the criteria for notice and opportunity for citizens to review permits following review. This matter was clarified by cross-referencing Section 788.11 in the final rules to 30 CFR 787, which provides detailed hearing criteria.

§788.12 Permit revisions.

Authority, purpose, and basis for this section are discussed in 43 Fed. Reg. 41728 (Sept. 18, 1978), under Section 790.12.

1. Under Section 511(a) of the Act, a permittee may apply for a permit revision during the term of its permit, by filing an application together with a revised reclamation plan. Under Section 511(a)(2) of the Act, however, those revisions are not to be used to extend the area of operation beyond the original permit area, except for incremental boundary revisions. Section 788.12 implements those provisions of the Act.

2. A commenter suggested that Section 788.12(b)(1) be modified to require a permit revision only for "substantial" changes in the methods of coal mining or reclamation operations. The commenter recommended that this be when these changes would constitute a significant departure from the methods of mining and reclamation contemplated by the original permit. The commenter reasoned that mining and reclamation plans would always be fluid to some extent, and that changes in the methods of operations or reclamation which were consistent with the basic plans approved in the permit application should not require a permit revision.

The Office agreed and, accordingly, Section 788.12(b)(1) was modified in the final rules. Additional language...
was also incorporated to ensure that each regulatory authority will provide parameters in their regulations to determine what changes in the methods of operations or reclamation constitute a significant alteration of the permit. A significant alteration of a permit can only be made by following the procedures for revisions to extend beyond the boundaries of the original permit. Under paragraph Cc) of the final rule, permit renewals are only available for those portions of the mine plan area that were approved as being within the boundaries of the initial permit area when the permit was first issued by the regulatory authority. This clarifies the confusion expressed by many commenters as to the relationship between and differing effects of the forms “permit area” and “mine plan area.” It also reflects Congressional intention that permit renewals not be used by the operator to avoid making the detailed demonstration to the regulatory authority that proposed operations will be conducted to comply with the Act and regulatory program provisions wherever those operations are conducted or located. See H.R. Rept. No. 95-218, 95th Cong., 1st Sess. at 92 (1977).

2. Paragraph (b) of the final rules provides standards for disposition of portions of applications that cover parts of the mine plan area that were not within the permit area approved under the permit for which renewal is being sought. These are to be treated as application for new permits under Section 788.14(b)(2).

3. A commenter requested that Section 788.12(c)(2) be revised to include a definition of the term “significant alteration” of a permit. The Office rejected this request because the Act contains no provisions to merely repeating the language of the Act. Section 511(a)(2) of the Act requires that revision or modifications of permits be obtained by notice and hearing requirements. In the absence of such requirements, the operator cannot be exempted from complying with the requirements of the permit. Thus, the regulatory authority may, by order, “require reasonable revisions or modifications of permits that contain sufficient information and are subject to public participation, so that revised operations are first proven to provide for feasible reclamation. Further, the Act prohibits from prohibiting guidelines for State programs, as Sections 501(b) and 503(a) of the Act clearly contemplate that OSM would adopt such regulations. Indeed, these regulations are necessary to ensure that the States generally provide even-handed treatment among operations on revisions and that the States require sufficient information in revision applications.

4. A commenter suggested a complete rewording of paragraph (c) of the proposed rule to use only the language of the last sentence of Section 511(a)(2) of the Act. The Office rejected this for the following reasons:

(a) The commenter argued that proposed Section 788.12(c) was unauthorizing under the Act. However, Congress did not limit OSM’s discretion to merely repeating the language of the Act. See Sections 102(a) and 503(a) of the Act. The provisions of Section 788.12(c) are authorized under Sections 102(a)-(d), (k), (m), (n), and 511, to ensure that applications for revisions of permits contain sufficient information and are subject to public participation, so that revised operations are first proven to provide for feasible reclamation.

(b) The Office also asserted that OSM may not require applications for revisions to extend beyond changes in the reclamation plan. This is without merit. First, Section 511(b)(1) of the Act requires that the regulatory authority (based on written findings) be subject to notice and hearing requirements established by the State or Federal program. Thus, the operator cannot be exempted from complying with the requirements of Parts 786 and 787.

While the comment was rejected, the rationale supporting the comment indicated that modification of Section 788.11 needed further consideration. Under Section 788.11(a), the regulatory authority may, by order, “require reasonable revisions or modifications of the permit provisions...” subject to notice and hearing requirements. In effect, the regulatory authority could have subjected an operator to these potentially expensive and time-consuming requirements with no avenue of appeal regarding the “reasonableness” of the ordered revisions being open to the operator. According to the commenter, the regulations were revised to provide the operator with a procedure whereby any order issued by the regulatory authority, under section 788.11, was subject to a hearing process. The necessary language to provide this process is incorporated in Section 788.12(c)(2).

5. A commenter suggested deletion of paragraph (e) of the proposed rule, on the basis that the material covered there was also included in Section 788.12(a) and was, therefore, redundant. The comment was rejected. Paragraph (e) was not clearly included in the provisions of proposed paragraph (a); further, this section is grounded directly in Section 511(a)(3) of the Act and should, therefore, be clearly stated in the regulations.

6. Some editorial changes were made to eliminate redundancy and ambiguity. Paragraphs (a) and (b) of the proposed rule covered essentially the same material; that is, when a revision should be obtained. They were combined into one paragraph in the final rule. Section 790.12(b)(4) referred to “State” programs only in the proposed rule. However, proposed Section 790.12(b) indicated that all sections of 790 applied to both State and Federal programs (e.g., “regulatory programs”). An appropriate change was made to the final rule. Paragraph (c) of the proposed rule did not specify that the permit application was to be “complete.” As discussed in the preamble to 30 CFR 786.11, the Office accepted comments suggesting that the permit rules be generally revised to specify that time limits for application reviews and public participation run only from the submission of “complete” applications to the regulatory authority. Because permit revisions will also be subject to time constraints and public participation in the review of applications, Section 788.12 was modified in a manner similar to 786.11.

§ 788.13 Permit renewals—general requirements.

Authority, purpose and basis for this section are discussed in 43 Fed. Reg. 41726 (Sept. 18, 1978), under Section 791.11.

1. Section 788.13 has been changed from its proposed form in Section 791.11, in order to accommodate the change in organization of Parts 790, 791, and 792, and to clarify procedures relating to permit renewals which seek to extend the boundaries of the original permit. Under paragraph (a) of the final rule, permit renewals are only available for those portions of the mine plan area which were approved as being within the boundaries of the initial permit area when the permit was first issued by the regulatory authority. This clarifies the confusion expressed by many commenters as to the relationship between and differing effects of the forms “permit area” and “mine plan area.” It also reflects Congressional intention that permit renewals not be used by the operator to avoid making the detailed demonstration to the regulatory authority that proposed operations will be conducted to comply with the Act and regulatory program provisions wherever those operations are conducted or located. See H.R. Rept. No. 95-218, 95th Cong., 1st Sess. at 92 (1977).
§788.14 Application for renewals. Authority, basis and purpose of this section are found at 43 Fed. Reg. 41728 (September 18, 1978), under section 791.2.

1. Several commenters objected to the public participation provisions found in Section 788.14 for the permit renewal process. Section 506(d) of the Act states that renewals of permits are subject to the public notice requirements of sections 513 and 514 of the Act. These sections of the Act are implemented by Sections 786.11, 786.12, 786.13 and 786.14 of the final regulations. However, the proposed rule made reference only to the requirement for newspaper notice, and not to opportunities for objections, comments, and informal conferences on the application.

Some commenters thought that the newspaper advertisement of permit application requirement should be deleted as unreasonable, while others thought that the public notice requirements were meaningless, without inclusion of the rights to public participation found in Sections 513 and 514 of the Act. It was obviously the intent of the Act to encourage public participation throughout the permit process. (See Section 102(d) of the Act. Section 506(d) of the Act contemplates public participation at some type of proceeding, by stating that the burden of proof shall be on the opponents of renewal of permits. Given that Section 514 of the Act concerns the concept of regulatory decisions after informal conference, and with adjudicatory hearings thereafter, it was decided that Sections 786.11, 786.12, 786.13 and 786.14 should apply to the renewal process. Therefore, the final rule has been changed to require compliance with all these sections. This will give citizens the right to file objections and requests for informal conferences concerning permit renewals. The wording of the section has also been changed to make it clear that the right to administrative and judicial review exists for decisions on permit renewals, which will protect both the permittee and the public.

2. A commenter suggested stipulating that proof of publication of the newspaper advertisement of the permit application should be a factor in determining the completeness of an application for permit renewal. As discussed above, it has been determined that full public notice and participation requirements will apply to permit renewal actions. The submission of proof of publication to the regulatory authority is necessary in order to demonstrate that the required notice has been given.

3. In an addition to this section allowing an operation to continue under the terms of the old permit, should the application for renewal be contested beyond the term of the old permit. This suggestion was rejected. Section 506(d) of the regulations requires that applications for renewal be submitted at least 120 days prior to expiration of the permit involved, which should be ample time in which to process renewal applications. Section 506(d) of the Act and 30 CFR 788.16 state that an operation shall have the right of successive renewal, unless the regulatory authority makes certain findings. If these findings are not made, the permittee could continue mining past the term of the original permit, even if the decision of the regulatory authority was contested by opponents of renewal. However, if the regulatory authority found that the permit should not be renewed, and the original term of the permit expired during an appeal, the operator should not be able to continue to operate under the Act. See Sections 102, and 510(b) of the Act.

4. A few commenters suggested that the permit renewal applications be required to be “complete.” As discussed in the preamble to Section 786.11 of the regulations, the Office has decided to require renewal applications for permit renewals, so the comments were accepted.

§788.15 Terms of renewals. Authority, purpose and basis of this section are discussed in 43 Fed. Reg. 41728 et seq. (Sept. 18, 1978), under Part 792.

1. Section 788.15 sets forth the requirement for written regulatory authority approval prior to any transfer, assignment, or sale of permit rights. Section 788.18 contains the procedures for obtaining such approval, and Section 788.19 establishes under what circumstances a successor-in-interest will be required to file a new permit. Subsections (b)(1) and (2) of proposed Section 787.11 and (2) have been deleted in the final rule as duplicative of revised Section 787.18 and new Section 788.19 which is discussed below.

2. A commenter contended that the concept of “prior written approval” regarding transfer, sale, or assignment of permit rights was beyond the authority of the Act. The suggestion was rejected. Section 510(b) of the Act clearly states that permit renewals, require modification of, or deny the application for a permit in a reasonable time set by the regulatory authority ...” (emphasis added). The legislative intent of Congress was not for the Office to fix a specific time for action by the regulatory authority, but to allow State regulatory authorities to determine specific decision times at their own discretion.

§788.17 Transfer, sale or assignment of rights granted under permit: General requirements.

Authority, purpose and basis of this section are discussed in 43 Fed. Reg. 41728 et seq. (Sept. 18, 1978), under Part 792.

1. Section 788.17 sets forth the requirement for written regulatory authority approval prior to any transfer, assignment, or sale of permit rights. Section 788.18 contains the procedures for obtaining such approval, and Section 788.19 establishes under what circumstances a successor-in-interest will be required to file a new permit. Subsections (b)(1) and (2) of proposed Section 787.11 and (2) have been deleted in the final rule as duplicative of revised Section 787.18 and new Section 788.19 which is discussed below.

2. A commentator contended that the concept of “prior written approval” regarding transfer, sale, or assignment of permit rights was beyond the authority of the Act. The suggestion was rejected. Section 510(b) of the Act clearly states that permit renewals, require modification of, or deny the application for a permit in a reasonable time set by the regulatory authority ...” (emphasis added). The legislative intent of Congress was not for the Office to fix a specific time for action by the regulatory authority, but to allow State regulatory authorities to determine specific decision times at their own discretion.
or revised permit would be required. Authority for this is provided by Sections 102, 201, 501(c), and 511 of the Act. These comments have been further addressed by the addition of Section 788.19.

§ 788.18 Obtaining approval for transfer, assignment or sale of rights.

Authority, purpose and basis for this section are discussed in 43 Fed. Reg. 41729 (Sept. 18, 1978), under Section 792.12.

1. A commenter suggested that the proposed Section 782.15(a)(1) (now included as Section 788.18(a)(1)) be revised so that it would allow that, in the event of a permit transfer, the new permittee should be required to post a new bond, at which time the bond of the original permittee would be released. In support, it was said that it would be very unlikely for a surety company to consent to the transfer of its bond to a new permittee. This suggestion was rejected, as it was determined that such a release of the bond would not always be desirable, if complete reclamation has not occurred or the successor is unwilling to assume all reclamation responsibilities of the original permittee.

Section 506(b) of the Act requires a successor-in-interest to "obtain the bond coverage of the original permittee." It was, therefore, decided in light of the foregoing comment, to clarify the regulation so that the intent was for the successor to obtain equivalent bond protection. In obtaining equivalent coverage, the successor would have several options, including that of obtaining the bond coverage of the original permittee. Accordingly, the proposed regulations were revised by adding subsections 788.18(a)(1)(i)-(iv) to the final rules.

2. A commenter suggested that the provisions of this section be expanded to cover the possibility that a permit's bond could be effectively transferred by outright purchase of the permit holder, or by some other method of gaining effective control of the permit holder. As Section 511(b) of the Act specifically prohibits the transfer, assignment, or sale of rights under a permit without the written consent of the regulatory authority, the regulations were revised. Definitions of terms "successor-in-interest," and "transfer, assignment, or sale of rights," have been included in new Section 788.5 and are discussed in the preamble to that section.

3. Several comments were received objecting to the proposed application for approval required under the proposed rule. Commenters contended that a potential successor-in-interest to the rights granted under a permit should only have to agree to abide by the terms of the original permit and show adequate financial responsibility. One asserted that an assignee of a coal property which is covered by a permit should not be subjected to a detailed permitting process, as long as the assignee is prepared to furnish the required bond. Some commenters requested that the requirements for information in Section 788.18(a)(2)(III) be deleted, as this information would have been supplied by the original permittee.

These suggestions were all rejected, because the permit application requirements of Sections 102, 507, and 510 of the Act specifically require the applicant to provide a variety of specific and detailed information to the regulatory authority. Public comments on the person conducting operations. Approval of a permit application depends on more than the financial stability of the applicant, e.g. information regarding the past performance and character of the operator is required by Section 506(c)(2) of the Act. As Section 511(c) of the Act is to provide the regulatory authority with sufficient information to accurately assess both the applicant and the proposed field operations prior to issuing a permit. Thus, a successor-in-interest to a permittee must file an application for approval of the transfer. In determining whether to grant an application for approval of transfer, it is necessary that the regulatory authority conduct an evaluation of the prospective successor-in-interest to ascertain whether he or she will have the legal and financial capabilities required by the Act to carry out the plan, as well as his or her past history as an operator. An integral part of this process is the solicitation of comments from the public on the plan and the operator's capability to determine an operator's past history of compliance with the Act. (See Sections 102(c), 513, and 514 of the Act.) For these reasons, the public notice requirement has been retained in the final rule.

5. Several commenters suggested modifying the proposed rule, to limit the right to submit written comments to any person whose interests are or may be adversely affected by a decision of the regulatory authority. This suggestion was adopted, to align Section 788.18 with the wording of Section 513(b) of the Act.

§ 788.19 Requirements for new permits for persons succeeding to rights granted under a permit.

1. Authority for this section is 102, 201(c), 501(b), 503, 504, 506, 507, 509, 511, 513, and 514 of the Act. Under 506(b) of the Act, persons succeeding to rights under an existing permit must file an application within 30 days of that succession for a new permit. Section 788.19 implements that section as interpreted by the Office, by requiring persons seeking approval under Sections 788.17 and 788.18 to obtain a new or revised permit from the regulatory authority, if the operations are to be changed from those contemplated under the original permit or extended outside the original permit area. See 43 Fed. Reg. 41728-41729 (Sept. 18, 1978).

2. A commenter suggested revising proposed Section 782.11(b)(1) (now included in Section 788.19) to delete the references to Sections 782.12(c)(2), and 771.19(c)(3), and insert a time requirement of 30 days to apply for a new permit. This was based on the commenter's interpretation that 506(b) of the Act explicitly requires a successor-in-interest to a permittee to obtain bond coverage for the area and file an application for a new permit within 30 days.

The Office does not agree that 506(b) of the Act requires every successor-in-interest to obtain a new permit. As stated in the preamble for 788.17, a new permit is required only if the successor wishes to either change the method of operation from that contemplated under the original permit, or to expand the operations to areas outside those authorized by the original permit.

SUBCHAPTER J—BOND AND INSURANCE REQUIREMENTS FOR SURFACE COAL MINING AND RECLAMATION OPERATIONS

This Subchapter establishes the minimum requirements for the Secretary's approval of that portion of a regulatory program governing performance bonds and liability insurance in accordance with Sections 102, 201, 501, 503, 504, 507(c), 509, 510, 519 and 701(17) of the Act. These include requirements governing the amount of liability under a performance bond, adjustments in the amount of liability, the duration, form, terms and conditions of the bond, procedures and criteria for the release of bond liability under a permit, and criteria for forfeiture of the bond.
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PART 800—GENERAL REQUIREMENTS FOR BONDING OF SURFACE COAL MINING AND RECLAMATION OPERATIONS UNDER REGULATORY PROGRAMS

Part 800 establishes general requirements for bonding and liability insurance imposed on permit applicants as conditions precedent to the issuance by the Regulatory Authority of new, revised, or renewed permits to conduct surface coal mining and reclamation operations.

§ 800.5 Definitions.

1. Section 800.5 includes nineteen definitions. These definitions should aid in the interpretation and clarification of bonding requirements. The definition of a collateral bond has been changed to include the irrevocable letter of credit concept. Although a "letter of credit" as defined by the Uniform Commercial Code does not fall within the traditional concept of a collateral, it was added here in response to a commenter's request because it was determined that an irrevocable letter of credit would offer the regulatory authority additional flexibility in determining the amount of performance bond liability required for the permit. The comments period on the rule did not consider whether this definition would be different.

Unless it has been done sooner, the regulatory authority shall notify the applicant of the amount of performance bond liability required for the permit area. If the notice of permit approval is given, if an approval initially given by the regulatory authority is stayed by a hearing authority during the pendency of any judicial review or an adjudicatory proceeding, the amount of required performance bond liability will be redetermined, if an approval is given after completion of the hearing. Such redetermination should be made in the form of an order in the proceeding or in the form of a determination by the regulatory authority in fitting the bonding and sequence of mining and reclamation operations made as a result of the proceeding, and to account for any changes in reclamation costs caused by the delay.

Congress intends that the amount of performance bond liability applicable to a permit be subject to review or an adjudicatory proceeding. Therefore, the Office does not require or provide for either administrative or judicial review of such a decision. The Office believes this is not inconsistent with due process because the regulatory authority has no discretion to reject a bond and withhold a permit if the required amount of performance bond liability has been released, then a water pollution problem, and liability under bonds filed for the first area mined under the permit has been partially released. The remaining liability under the bond filed for the first area is inadequate to cover the work required to correct the problem, and liability under bonds filed for later increments is not applicable to the first area. It is intended that any bond liability filed under a permit extend to all reclamation, restoration, and reclamation work needed anywhere in the permit area to achieve the reclamation and environmental protection goals of the Act, regulations, and regulatory program. Any bond or surety may be renewed permits where additional acreages to be mined are approved in the interpretation and clarification of bonding requirements. The definition of a collateral bond has been changed to include the irrevocable letter of credit concept. Although a "letter of credit" as defined by the Uniform Commercial Code does not fall within the traditional concept of a collateral, it was added here in response to a commenter's request because it was determined that an irrevocable letter of credit would offer the regulatory authority additional flexibility in determining the amount of performance bond liability required for the permit. The comments period on the rule did not consider whether this definition would be different.

Unless it has been done sooner, the regulatory authority shall notify the applicant of the amount of performance bond liability required for the permit area. If the notice of permit approval is given, if an approval initially given by the regulatory authority is stayed by a hearing authority during the pendency of any judicial review or an adjudicatory proceeding, the amount of required performance bond liability will be redetermined, if an approval is given after completion of the hearing. Such redetermination should be made in the form of an order in the proceeding or in the form of a determination by the regulatory authority in fitting the bonding and sequence of mining and reclamation operations made as a result of the proceeding, and to account for any changes in reclamation costs caused by the delay.

Congress intends that the amount of performance bond liability applicable to a permit be subject to review or an adjudicatory proceeding. Therefore, the Office does not require or provide for either administrative or judicial review of such a decision. The Office believes this is not inconsistent with due process because the regulatory authority has no discretion to reject a bond and withhold a permit if the required amount of performance bond liability has been released, then a water pollution problem, and liability under bonds filed for the first area mined under the permit has been partially released. The remaining liability under the bond filed for the first area is inadequate to cover the work required to correct the problem, and liability under bonds filed for later increments is not applicable to the first area. It is intended that any bond liability filed under a permit extend to all reclamation, restoration, and reclamation work needed anywhere in the permit area to achieve the reclamation and environmental protection goals of the Act, regulations, and regulatory program. Any bond or surety may be renewed permits where additional acreages to be mined are approved in
second or successive terms of the original permit as the permit area expands with the approval of successive permit terms, the liability under a bond applicable to that permit will extend to the newly approved additions to the permit area.

This demonstrates that the dollar amount of liability under a specific performance bond will change. The amount of liability under a given instrument will not change without the consent of the parties to the instrument. As mining advances, new areas are disturbed, and old areas successfully reclaimed, the total dollar liability of performance bonds under a permit will change. As the dollar liability changes, existing instruments creating the bond liability may be modified, supplemented by additional instruments, or replaced by new instruments at the option of the permittee with the approval of the regulatory authority. However, all bond liability in effect under a permit must apply to the entire area under the permit and extend to all reclamation, restoration or abatement work which may need to be performed by the regulatory authority at that operation.

PART 805—AMOUNT AND DURATION OF PERFORMANCE BOND

Part 805 prescribes the criteria that the regulatory authority shall use to determine the amount of performance bond applicable to a permit for surface coal mining and reclamation operations. This Part also prescribes the minimum amount of each bond, periods of liability, and the requirement that the regulatory authority adjust the bond amount if the costs of reclamation are determined to have substantially changed during the term of the permit. The authority for this Part is found in Sections 102, 201, 501, 503, 504 and 509 of the Act.

§ 805.11 Determination of bond amount.

1. Section 805.11 provides standards the regulatory authority must use to determine the appropriate amount of the performance bond for each surface coal mining and reclamation operation. This Section is intended to clarify that the amount of such bond must be based on the estimated cost to the regulatory authority of completing all work at an operation in order to bring the site into full compliance with the Act, and not on the estimated cost to the permittee, since in the event of forfeiture, the regulatory authority will be required to do the work.

2. Revision of the proposed final regulations included combining the initial two paragraphs (a and b) of Section 805.11 for simplification. Also, the phrase "reclamation, restoration, and abatement work required of a person who conducts surface coal mining and reclamation operations under the Act, this Chapter, the regulations, and the permit" was changed as an editorial revision to more clearly express the intent of the Office regarding the scope of activities subject to the bond liability. This phrase is deleted in its entirety throughout the Subchapter. It is the intent of the Office that the initial bond amount, the amount retained after partial releases (Section 805.12(d)), and amounts forfeited (Section 808.14) be adequate to not only allow the regulatory authority to complete the backfilling, grading, topsoiling, and revegetation program contained in the approved reclamation plan, but also to restore any property damaged during the term of the permit

3. Several comments recommended that the bond amount should be sufficient to ensure an operator's compliance, but that it should be below the regulatory authority's completion cost. Section 509(a) of the Act specifically states that the amount of the bond shall be based on the regulatory authority's costs and not those of the operator. Therefore, these comments were not accepted.

4. A few commenters requested a definition of the bond penalty. The bond penalty is construed to mean the total liability under performance bond(s) applicable to a permit as set by the regulatory authority. The surety will always know the terms and conditions of the bond obligation before entering into a bond agreement because the amount is set prior to bond execution. Both Section 509(a) of the Act and Section 808.11 of the regulations require that the bond be conditioned upon faithful performance of all the requirements of the Act and the permit. Based upon this requirement, the bond may be viewed as a form of "penalty" and may be forfeited if the permittee fails to comply with any requirements of the Act or the permit. However, forfeiture is discretionary to the extent that it is not required by Part 808, and should be used as an enforcement tool only in serious situations. Based on this rationale, the comments were not accepted.

5. Several comments were received regarding the use of the words, "shall be based on . . .", in context with the regulatory authority's criteria. They felt that the words should be changed to "may be" to allow more flexibility for the regulatory authority to determine bond amount. These comments were not accepted because it was determined that sufficient flexibility exists within the existing process to be considered. Deleting consideration of any criteria would preclude a decision by the regulatory authority which would be inconsistent with all the factors required by Section 509(a) of the Act.

6. Section 805.11(a) also contains a non-exclusive list of criteria the regulatory authority must use in making its determination as to bond amount. First, the regulatory authority will use the estimated costs that the permittee submitted with the reclamation plan as required under 30 CFR 780.18 and 784.13. This change was made in response to several comments which pointed out that data provided by the applicant would assist the regulatory authority in determining bond amount. This is consistent with Section 509(a) of the Act which states that the "amount of bond required for each bond area shall depend upon the reclamation requirements of the approved permit."
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Several comments suggested adding a new subparagraph to consider the specific factors of topography, geology, hydrogeology, and/or the nature of the site since they appear or the need to bring additional personnel or equipment to the permit area.

In response to a few commenters' request, Section 805.11(a)(4) was added to provide for consideration of cost changes which may occur on the basis of changes during the preceding 5-year period. Failure to consider such changes would result in a bond which may not be adequate to complete essential reclamation activities because the period of liability is for 5-years after the completion of reclamation work, at a minimum.

Note that in this Section cost "changes" are considered, which reflects a language change from the proposed regulations. The original language stated that only cost increases would be considered. The change was made in response to a few commenters which pointed out that while cost increases may occur, the possibility exists for costs to decrease in the future as a result of improved technology or changes in the economic structure. In considering either prospective increases or decreases in costs, the regulatory authority must identify a five-year pattern of change as the basis for making future projections. Speculative changes not based on patterns of actual experience observed in the industry should not be used to project future change.

Section 805.11(a)(5) allows the regulatory authority to utilize other data that would be of assistance in determining the bond amounts. The regulatory authority can require an applicant to produce the data necessary for proper determination of bond amounts. It was made in response to a commenter who suggested that the regulatory authority should have the authority to require additional information if it was available.

The Paragraph pertaining to specific criteria for determining bond amounts for underground mining operations, as it appeared in the proposed final regulations under Section 805.11(b)(2), has been deleted from the final regulations.

Many comments were received relative to this Section recognizing the enormity and complexity of developing criteria for bonding the surface effects of underground mining. These pointed out that ensuring successful environmental protection from underground mining is made difficult by the two principal surface effects—subidence and mine drainage—and by the fact that they can occur over a very long time period. While the Office is cognizant of the arguments, no clear-cut solution was presented in the comments. Both the complexity of the issue and a present lack of adequate information to develop a special bonding program for underground mining has led to the deletion. Further study is required regarding the long-term effects of underground mining. Until a solution to this problem is found, general criteria for performance bonds will apply to both underground and surface mining operations.

§ 805.12 Minimum amount.

1. Section 805.12 is a statement of the minimum amount required for performance bonds for surface coal mining reclamation, restoration, and abatement operations. This Section follows the basic intent of the Act that bonds shall be used to assure the faithful performance of applicable performance standards in the Act and this Chapter. The Section also specifies, as does the Act in Section 509(a), that in no case shall the initial bond be less than the $10,000 per permit area, even if the amount determined by the standards set forth in this Section would be less.

2. Many comments were received in relation to the minimum $10,000 bond requirement, stating that this is discriminatory to small operators. The minimum bond amount is based on the Act and cannot be altered. Additionally, the bond is incrementally released as required under Part 807 and the $10,000 minimum does not apply to bond release.

To simplify this, proposed Section 805.12 was condensed to incorporate Subsections "a" and "b" into one paragraph.

§ 805.13 Period of liability.

1. Section 805.13 provides for the period of liability or duration of the performance bond applicable to a permit.

Under Section 805.13(a), bond liability continues until all reclamation, restoration, and abatement work has been completed (see discussion of the incremental release of bond under Section 805.11), and the bond liability has been released in accordance with Part 807 of the regulations. The reference to Part 807 reflects the views of several commenters who recommended reference to the requirements for release of performance bonds. There was one comment which requested that the initial phrase "at a minimum" be deleted from this Subsection since there is no reason to provide for time expansion of the potential bond. The phrase has been retained in context because this ensures compliance with other Federal or State regulations that may be of concern on a particular permit.

2. Under Section 805.13(b), the liability period for surface coal mining and reclamation operations is required by the Act and is coincident with the minimum period of liability for assessing future reclamation operations. Section 515(b)(20). That period is either five or ten years following the completion of reclamation work, depending upon the average annual precipitation in the area. This period is based on the minimum period because States have the discretion to extend the period of liability as a part of the regulatory program, or the regulatory authority may refuse to release the bond at the end of this period if any condition remains which would require retention of liability in accordance with Section 807.12(d).

The text of Section 805.13(b) also has been clarified to prevent termination of the five- or ten-year liability period in those circumstances where the regulatory authority has required the permittees to take further measures related to assuring the success of revegetation or to assure that the permittee has not failed to comply. The failure of the permittee to perform the additional measures might be the result of either a willful refusal to comply or an impossibility (e.g., unsuitable weather), but the permittee should not be relieved of liability in either case as long as work has been required prior to the termination of the liability period.

3. In Section 805.13(b), several comments also were received suggesting that the five-year period of liability for surface mining was too long. Because the Act is quite specific in its requirements for a five- or ten-year period of liability for surface coal mining and reclamation operations, these comments were not accepted. There were many comments received in relation to the ambiguity as to when the five-year or ten-year period before final release of bond commences. Section 515(b)(20) of the Act specifies that the permittee assumes responsibility for successful revegetation for a period of five or ten years following the last year of augmented seeding, fertilizing, irrigation, or other work. Thus, the period of liability is set in the Act. In an effort to add clarity the Section has been reworded.

§ 805.14 Adjustment of bond amounts.

1. Sections 509(a) and 509(e) of the Act require that the applicant's bond shall be adjusted by the regulatory authority from time to time to assure sufficient funds for completion of the reclamation plan if the work had to be performed by the regulatory authority in the event of forfeiture. A permittee or any person with a valid legal interest in the bond may request such an adjustment. Consistent with the decision not to pro-
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of permits in order to accommodate funds for reclamation through adjustments. In addition to not requiring a hearing for adjustments in the amount of performance bond liability, Congress has also specified no procedure for the regulatory authority to require compliance with its decision to accept a bond. If the permittee has chosen to increment his bond payments over the term of the permit, or if the operation will require a renewal of the permit, a decision by the regulatory authority to increase the amount of liability can be implemented by not accepting bonds filed in lesser amounts and refusing to allow mining to continue beyond the previously bonded area, or by withholding a permit renewal until the required amount is filed. No other procedures are explicitly provided for enforcement of an adjustment decision.

2. The regulations require the regulatory authority to review the bond amounts necessary. These comments were reviewed and were not accepted. One comment suggested that once the initial bond was set, any increase in reclamation costs (in the event of forfeiture) should be funded by the regulatory authority through the reclamation fund provided for by Section 402 of the Act. Section 402 of the Act applies only to bonds that were legally abandoned on August 3, 1977, therefore, funds under Section 402 are not available for operations that were active on or after that date. Since there are no provisions in the Act to provide funds as addressed by this comment, it was not acceptable. Several surety companies were concerned that the regulatory authority only notified the permittee and not the bonding companies. Sureties only are responsible for the amount of the bond they accept, and do not need to be notified of adjustments in the amount of liability under a permit by the regulatory authority. If the bond is increased, it is the responsibility of the permittee to get the additional bond to cover that permit area, not the sureties, so additional language to that effect was not required.

4. Word changes have been made in Section 806.15(d) so as to declare "underground mining" to include revisions of permits (rather than increases or decreases of acreage). Due to a comment received, it was decided that a decrease in acreage should be treated as a partial release of the bond, as it would remove the acreage from the permit area and thereby relieve the permittee of any further legal obligations with respect to such lands. Such a major change in status should not be allowed without initial notice to persons who might be affected and allowing them an opportunity to participate in the decision. The word "performance" was added to "bond" (as defined in 30 CFR 701.5) to clarify its application in Section 806.15.

Section 805.14(b) imposes a requirement on the permittee to prove that his activity justifies a reduction in the amount of the performance bond. A commenter suggested that any request for a reduction of bond be considered as a request for a partial release of bond in accordance with 30 CFR Part 307 of this Chapter. As the regulations were drafted, there appeared to be no provision for a partial release of bond due to a decrease in acreage and a partial bond release. Therefore, the comment was accepted and appropriate changes were made in this Section.

6. To simplify the intent of proposed Section 805.14 (c), (d) and (e), hearings and decisions on bond adjustments by the regulatory authority now are dealt with and expanded upon in Section 807. In contrast to the absence of a provision for adjudicatory hearings in cases where the amount is adjusted upon the initiative of the regulatory authority Section 805.14(b) requires that the procedures established in Part 807 for requests for bond release be followed if the permittee initiates an adjustment which would result in a reduction of the total bond liability applicable to a permit. The intent of the Office is to ensure that when a decision is made by the regulatory authority to release some portion of the original bond liability required as a condition for the commencement of mining, that persons who may be affected by that decision will be informed and will have an opportunity to participate in the decision.

The Office recognizes that providing this opportunity for public participation by incorporating the procedures in Part 807 also provides a permittee with an indirect opportunity to obtain an adjudicatory hearing with respect to the bond amount. A permittee is not restricted to any particular time or factual circumstances as a condition for making his request, except that his request is necessarily limited to bond liability already in effect and applicable to a particular permit. An unsatisfactory response by the regulatory authority would give the permittee the option to request an adjudicatory hearing in accordance with Part 807. In such a proceeding, the burden would be on the party opposing the decision of the regulatory authority to establish that the decision was arbitrary, capricious or inconsistent with law.

PART 806—FORM, CONDITIONS AND TERMS OF BONDS AND LIABILITY INSURANCE

Part 806 provides for the form, conditions, and terms of performance and liability bonds which a regulatory authority will accept, a surety bond and a collateral bond. Several commenters suggested using "may allow for either" instead of "shall allow for either", thereby giving the regulatory authority more flexibility in determining the form of the performance bond, and allowing States to use their individual standards for bond forms if they so desire. The regulations state that the regulatory authority shall allow for either a surety or collateral bond, but does not necessarily limit the acceptable bond form to these two types. Therefore, the preferred language
usage is "shall allow" because it as-
sures that at least these two types of bond forms shall be accepted, and
allows the regulatory authority to accept a self-bond which meets the cri-
teria of Section 806.11. In addition Section 806.11(c) allows the Secretary
to approve an alternative bonding system which meets the minimum cri-
teria in Section 806.11(c) (1) and (2). This would allow for alternative forms
of financial guarantees that are not considered surety bonds, collateral
bonds, or self-bonds.

2. When reviewing a State-proposed alternative form of financial guaran-
tees, the Office will evaluate the degree of certainty of the alternative
as compared to the regulatory scheme with respect to the two criteria of
review. For example, under the regula-
tory scheme, the certainty of having sufficient funds available to complete
reclamation depends primarily on the certainty that the surety will remain
solvent, or that a second surety can re-
place the first, if necessary, prior to
default by the operator. Such degree
of certainty is extremely high. An
alternative system must guarantee at
least an equal degree of certainty in
order to qualify.

3. Sections 806.11(a)(1) and
806.11(a)(2) have been shortened to in-
clude only the terms "surety bond," and "collateral bond" respectively.
This was done to avoid repetition of
Section 806.5 which was added to
define these terms in detail. Two com-
ments pointed out the volume of the terms which led to the clarifica-
tion.

4. Section 806.11(b) establishes crite-
rria for the self-bond, authorized under section 508(c) of the Act. Sixty com-
ments were received which referenced
the self-bond issue.

Several comments suggested deletion
of self-bonding entirely. The rationale
being that only a bond supplied by a
surety company would guarantee pro-
per funding for reclamation. En-
couraging self-bonding would allow
large operators to withdraw from the
bond market, thereby leaving surely
companies with the highest risk small
operators. Surety industry com-
menters concluded that they would
withdraw from the coal business if
most of the large coal producers were
allowed to self-bond, thereby forcing
most small operators out of produc-
tion.

One of the commenters did not want
self-bonding because of its inherent in-
adequacy for assuring completion of
reclamation. Alternatives include abol-
ishing the self-bond, or requiring that
a general reclamation fund be estab-
lished, but these options are not open
to the Office by law. A State clearly
has the option to abolish self-bonds if
it chooses. Such action would make
the State bond program more string-
ent than under Federal law. The
State also has the option to establish
additional conditions on the approval
of a self-bond.

5. An example of the problem which
was found is as follows: The Office
was forced to review a case in which
the Secretary of State refused to
approve a self-bond. The Secretary
was concerned that the operator had
either been indicted, or was not in a
good financial state. The Office dis-
agreed with the Secretary's position.

In re Blue Coal Corporation, Bankrupt: Shee, Trustee vs. Commonwealth of Pennsylvania, No. 79-7311 (DC; MD; PA; Jan. 18, 1979, per Gibbons, J.) the court stated:

"If the trustee elects to terminate the strip-mining of the bankrupt's
coal lands his responsibility for all practical purposes will be terminat-
ed. The Commonwealth will be left with the proceeds of its claim, what-
ever they may be. If the strip-mining continues the trustee must observe
the regulations set forth in the Surface Mining Act.

There is little doubt that Blue Coal would have been a prime candidate for
approval as a self-bonded operator in the early 1970's. However, as the litiga-
tion history of this company has been shown, a regulatory authority would
have found it very difficult to protect the legitimate interests of the public
in achieving successful reclamation when confronted with a management deci-

dion to liquidate. First, the agency is not informed of management's deci-
sion until the company's conduct at the mining operation becomes suffi-
ciently blatant to cause an observer to infer what management's intentions
are. Second, once it becomes reason-
able to suspect management's inten-
tions, financial resources may no
longer be available to complete all recla-

mation work. Third, forfeiture on the self-bond could force bankruptcy
which would make the bankruptcy
court's decision in Blue coal becomes the rule, would induce the termina-
tion of the operation thus leaving the
trustee with no duty to reclaim, hun-
dreds of miners out of work, and the
regulatory authority standing in line
with all its fellow creditors. The likeli-
hood of recovering the resources from
the bankrupt's estate to complete all
reclamation would be extremely small.
Such a result cannot be the result in-
RULING AND REGULATIONS

The legislative history in Senate report No. 95-128, p. 78, supports the view that self-bond provisions should accomplish the generally expressed goals of the bonding provisions. This cannot be accomplished without imposing strict conditions for the approval of a self-bond. Some of these conditions were explicitly required by Congress, others were initially proposed and now are modified in response to comments, and still others are new as a result of helpful ideas supplied by commenters.

The first is Section 806.11(b)(1) which is required by Section 506(c) of the Act, and which has been modified to assure that the agent of a permittee is in the state where the operation is located thereby assuring that the legal representative of the permittee is within the reach of the process of State or Federal courts.

The second condition, Section 806.11(b)(2), establishes a net worth test for the approval of a self-bond. This test was proposed as two times the total amount of self-bond obligations on all permits issued by the United States, but has been changed in response to comments from the surety industry and citizen representatives to six times the total of such obligations.

7. A few commenters were concerned with the reliance upon net worth as an adequate measure of financial ability to complete reclamation. This Section was amended in the proposed draft of the regulations and has been renumbered in the final regulations to Section 806.11(b)(2). Specifically, one commenter stated that the concept does not recognize serious financial restraints on hand. The comments were considered valid since otherwise the regulatory authority would be left responsible if the permittee goes bankrupt, dissolves, or leaves the country. Also, as shown by Pennsylvania's recent Blue Coal experience, a large group of closely held corporations can be robbed of assets. The financial vitality initially relied upon by the regulatory authority can be quickly dissipated. The regulatory authority must forfeit funds needed by the regulatory authority then becoming responsible for massive clean-up operations with little expectation that the full value of the bond will be recovered.

In the Senate Committee Report No. 95-128 (May 10, 1977), p. 78, the Committee specifically required the ‘‘depositor of cash and negotiable (bonds) . . . in lieu of posting a bond. These meet the objectives of the bond, i.e. laboring to complete the permitting process, just as effectively as a bond.’’ It is reasonable to conclude that Congress intended the Office to develop criteria for self-bonds to meet the objectives of the bond, . . . just as effectively as a bond.’’

8. One commenter suggested allowing the net worth of corporate parents to be included in the calculation. This comment was accepted provided that under Section 806.11(b)(6)(i)(D), the net worth of the applicant and its corporate parents both would be available to the regulatory authority in case of forfeiture. The net worth of the corporate parent is considered only if it is a guarantor of performance under the self-bond.

9. There were several comments referable to documentation of the applicant's net worth by a certified public accountant. The alternative suggested was amending Section 806.11(b)(2) to permit the certified financial statement from the last fiscal year-end to be accepted as the applicant's net worth. This was rejected because it would restrict the regulatory authority's discretion. The retained language allows the regulatory authority the option to use the last year-end statement as required, or to request a current statement where deemed appropriate.

10. Relative to Section 806.11(b)(3), the third condition for the approval of a self-bond is a requirement that the applicant grant to the regulatory authority a mortgage or security interest in property which has a market value equal to or greater than the bond obligation. This requirement was requested by a commenter concerned that the public might have to bear the expense of reclamation in circumstances similar to the Blue Coal case previously discussed. Also a time limit was included in the Wyoming self-bonding regulations which were submitted to the Office along with a request that the State requirements be incorporated into the Federal regulations. Reliable access comments were considered valid since otherwise the regulatory authority would be left responsible if the permittee goes bankrupt, dissolves, or leaves the country. Also, as shown by Pennsylvania's recent Blue Coal experience, a large group of closely held corporations can be robbed of assets. The financial vitality initially relied upon by the regulatory authority can be quickly dissipated. The regulatory authority must forfeit funds needed by the regulatory authority then becoming responsible for massive clean-up operations with little expectation that the full value of the bond will be recovered.
806.11(c)). The second criteria, i.e., "substantial economic incentive for the permittee to comply" can only be adequately accomplished by a combination of the security interests required by Section 806.11(b)(4) and personal liability for those officials or owners of a company who control its financial policies and operating conduct as required by Section 806.11(b)(6)(ii).

It is important that the interest of the regulatory authority in the property pledged to secure the performance of the permittee's duties be superior to all other claims against that property. Whenever recording or filing requirements are necessary in order to preserve a claim against subsequent purchasers for value, this shall be done. Where State law does not allow a claim to be preserved or given priority over a subsequent purchaser for value for certain classes of property, such property may only be pledged if delivered into and retained in the possession of the regulatory authority.

12. The fifth condition for obtaining approval of a self-bond is the satisfaction of Section 806.11(b)(5)(iv) of the proposed regulation did not require a history of financial solvency of continuous operation. Specific criteria for evaluating the compliance history of the applicant were dropped, but the regulatory authority will receive compliance reports under Sections 778.14 or 762.14 and may take it into consideration when reviewing a request for approval of a self-bond.

14. Additional criteria to be considered by the regulatory authority when evaluating the compliance of financial solvency and continuous operations has been satisfactorily demonstrated have been derived primarily from the Wyoming regulations. These have numerous provisions requiring information which is useful to the regulatory authority in evaluating an applicant's history of financial solvency and continuous operation, and predicting further financial capability required by Section 806.11(b)(5). These criteria, and related information include Section 806.11(b)(5)(ii), the history of the applicant's prior bond obligations in effect on each of its active coal mining operations in the United States. The proposed regulation would, however, require each board member to be personally liable for those officials or owners of the company who control its financial policies and operating conduct as required by Section 806.11(b)(6)(ii).

15. The final requirement for self-bonding in Section 806.11(b)(6) is that an indemnity agreement must be executed by the applicant and those individuals with responsibility for the mining operation, whether it is a corporation, partnership, individual, or any other form of ownership. This Section was renumbered from section 806.11(b)(4) in the proposed regulations to Section 806.11(b)(6) in the final. The purpose is to bind in agreement only the applicant, but also those individuals who have authority to make decisions relating to whether or not the applicant complies with the Act. It is the Office's intention to require those individuals to sign their individual capacity so as to create a strong financial incentive for all non-corporate operators who self-bond to comply to the fullest extent with the requirements of the act. Such personal liability is consistent with the traditional liability of proprietors and partners.

16. Several comments addressed the requirement for signatures of principal corporate officers on the indemnity agreement. Alternative 16 was selected.

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quire that the board of directors authorize the execution of the agreement.

17. A comment requested deletion of the requirement of execution of the indemnity agreement by a parent organization because it was unnecessary and unreasonable. This rationale was rejected because it is important to make liable on a self-bond those who are in a direct or indirect relationship to the financial policy or mining practices, especially when the permittee is a wholly-owned subsidiary. Of special concern are those situations where the permits: (1) to decide to liquidate the organization, leaving a valueless shell. Additionally, a frequent practice in Western States is for two or more large corporations to engage in a joint venture, which is itself either a corporation or partnership, to operate a large mine. Often for tax reasons, the capital equipment is leased to the venture company by its parents, the coal resource is owned by one of the parents or a third party, the venture company has few assets in its own name and is not intended to survive the life of the mine. In these circumstances, it is important to have a commitment from the parents to insure sufficient funds in case of forfeiture, and to act as an inducement for the operator to complete the work.

18. Concerning the requirement for execution of the indemnity agreement by the applicant and its parent organizations, Section 806.11(b)(4)(K)(C) as proposed (section 806.11(b)(6)(I)(E) as revised), a few comments stated that it was unnecessary for all parents to be held responsible for self-bonding. While it may seem burdensome, this is necessary to insure sufficient reclamation funds to the regulatory authority and to act as an inducement for the operator to complete the reclamation work. Clarification of this Paragraph was made to better identify the requirement.

19. Along similar lines, another commenter wanted deletion of Section 806.11(b)(4)(K)(E) (Section 806.11(b)(C) as renumbered), execution of the indemnity agreement by the applicant's spouse, if married. The comment was rejected because the rule was designed to avoid the transfer of an operator's assets to his or her spouse, thereby leaving the operator judgment proof. The rationale also addresses the concept of a closely held corporation, by its principal investors, its principal executive officer or officers, its principal financial officer, its controller or principal accounting officer as required in proposed Section 806.11(b)(6)(I)(DF) has been deleted from the final regulations. A few commenters suggested the deletion. It was decided that the section should be eliminated for the reasons recited above under Section 806.11(b)(6)(I)(A). The primary justifications for requiring the personal liability of closely-held corporations, i.e., to assure a recourse for the regulatory authority in the event the corporation is deprived of its assets, and to create a financial incentive for the owners to complete reclamation. The need for the new requirement for a security or mortgage interest in property pledged to guarantee performance of the bond obligation. A pledge of property is considered a far more secure form of commitment than the personal liability of the officers of small corporations. The pledge of property required by Section 806.11(b)(4) eliminates any further justification for the personal liability requirement.

21. Section 806.11(b)(4)(III) of the proposed regulations provided that "the indemnity agreement shall be a binding obligation, jointly and severally, on all who execute it." Several comments were received in the section because they felt it made self-bonding unworkable and defeated the intent of Section 509(C) of the Act. These comments were not accepted because to do so would have removed personal liability from all officers or parent organizations of the permittee. While liability for civil or criminal penalties under Section 518 of the Act is available, any obligation to personally fulfill any of the requirements for surety bonds which were drafted to prevent any abuse in the system that may leave the regulatory authority without an effective remedy. The result would be to remove the personal liability or the obligation from all officers or parent organizations of the permittee. While liability for civil or criminal penalties under Section 518 of the Act is available, any obligation to personally fulfill any of the requirements for surety bonds which were drafted to prevent any abuse in the system that may leave the regulatory authority without an effective remedy. This provision would relieve the parent of any subsidiary from being co-guarantor on a bond.

22. Section 806.11(e) implements the Section 509(c) of the Act requiring that the Office approve alternative bonding systems. Any alternative must meet, at a minimum, the two main goals of a bonding program. The first is to assure that the regulatory authority will have available, in the event of forfeiture, sufficient money to complete applicable reclamation, restoration or abatement requirements. Second, a bonding system must provide a substantial economic incentive for the permittee to comply with all reclamation and abatement requirements. Either a surety bond or a collateral bond makes the liability for which the operator may ultimately be responsible a significant incentive for him to comply with the act. In self-bonding, the requirement that the indemnity agreement provide joint and several liability for all individuals involved in a particular operation gives all of them a significant incentive to comply with the Act. An alternative system of financial guarantees must achieve the same incentive, and subject operators to the same threat of substantial penalty in the event of forfeiture, or its equivalent.

§ 806.12 Terms and conditions of the bond.

1. Section 806.12 contains the terms and conditions for bonds. Particular attention was given to provisions for surety bonds which were designed to prevent any abuse in the system that may leave the regulatory authority without an effective remedy. These comments were not accepted because it would be unreasonable to expect the surety to continue coverage if the permittee is bankrupt or fails to make payments. They claim that the requirements, as written, are objectionable to surety companies that they substantially limit companies willing to write such bonds and may increase the cost of surety bonds. Recommended alternatives were: (a) to allow cancellation providing there is written notification sent to the regulatory authority a certain time period prior to the cancellation; (b) to allow the surety to request cancellation and receive approval for the cancellation from the regulatory authority upon sufficient substitution by the permittee with another performance bond.

In response to these comments, Section 806.12(e)(1) has been amended to allow cancellation only of bond coverage for permitted lands not yet disturbed provided the surety gives at least 60 days notice to the regulatory authority and to the operator and regulatory authority prior to cancellation and receives approval for the cancellation from the regulatory authority. The regulatory authority may not require cancellation only if there is a replacement bond filed by the permittee or the regulatory authority. The surety's co-obligation for reclamation work on lands that have been disturbed cannot be cancelled because, even if the operator fails in business, the regulatory authority must be able to look to a financially stable and
secure guarantor for performance of the reclamation obligations under the permit, including collection at the time of bond forfeiture, if necessary.

3. In accepting a surety company as a guarantor of performance under a bond, the regulatory authority has a right to expect that for any disturbed land the guarantee will be good for as long as the applicable period of liability established for the particular mining activity involved. Therefore, the regulations are written to forbid cancellation of a bond on disturbed land. Allowing the surety to cancel a bond for undisturbed land is an opportunity for the surety to withdraw from any future liabilities with the permittee if it is desirable. The notice which is due 60 days prior to cancellation is necessary to give the permittee and regulatory authority time to secure and approve a new bond for the land or to reduce the permit to the area that has sufficient bond coverage. However, if arrangements satisfactory to the regulatory authority cannot be made, the burden will be on the permittee to compel the permittee to suspend operations to prevent the surety's obligation from increasing as new areas are disturbed. The regulatory authority will have no obligation to suspend operations because the bond will remain in effect until cancellation is approved under the regulation. This restriction is based on the first principle of surety law, i.e., the surety undertakes the obligation to stand in the shoes of the principal, and his obligation may not be rescinded or terminated without the consent of the party to whom the duty is owed. The restriction on this provision does not bar the placement of performance bonds (30 C.F.R. 806.13).

4. The second major restriction on surety bonds relates to the maximum single obligation (Section 806.12(e)(2)). In the Commonwealth of Pennsylvania, the maximum single obligation is defined as ten percent of the capital surplus account. A standard based on the capital surplus account is an indication of the liquid assets of a surety company. Most States have a maximum single obligation applicable to surety companies in order to assure that a surety company does not engage in the practice of writing bonds in excess of its ability to pay if there is a default. This Section has been drafted to reflect the fact that some States might have other requirements in terms of a maximum single obligation, or might not have any requirement, in which case the ten percent amount would be applicable.

5. The third major restriction on surety bonds is a requirement, in Section 806.12(e)(3), that the surety company not write bonds in excess of three times the maximum single obligation for any particular operator. The rationale for this requirement is that if a company were allowed to write bonds for many permit areas on behalf of a single operator in excess of this amount, the company could be forced into bankruptcy if the operator failed. It should be noted that when an operator fails on one permit, the operator may also default on every bond obligation at every permit site because failures are usually related to a failure in business, bankruptcy or the death of a principal. It seems clear that the total amount of bond obligations that might be assessed upon default against a particular surety company, if it is not limited to some reasonable amount as proposed, might very well overwhelm the surety and force it into bankruptcy. Such an occurrence would not adequately protect the regulatory authority's need to provide a safe source of funds should an operator fail.

6. Section 806.12(e)(4) as proposed would have allowed the regulatory authority to determine that the amount of the bond shall be confessed to judgment upon forfeiture if confession of judgment is authorized by State law. A few commenters suggested deleting this provision because there are substantial conflicts with due process when dealing with confession of judgment clauses which are illegal in many States. The surety should be allowed to assert any defenses to liability, to forfeit the bond, or meet the requirements of the bond in a compliance schedule. On the other hand a few commenters recommended making this provision mandatory, so as to assure the regulatory authority's collection of the forfeited bond. Although confession to judgment may be illegal in some States and may seem to be an unnecessary hardship for the surety, it is not mandatory. It is intended that this procedure be left entirely to the discretion of each State in the development of its State program. Even where effective, a confession of judgment clause can be avoided by exercising the right to appeal and requesting a stay of collection, or the option to set up a compliance schedule as specified in Part 808.

7. Section 806.12(e)(5) provides that the surety or an affiliated applicant be jointly and severally liable so that the regulatory authority can seek collection of the bond from either or both of these parties.

8. A new Section 806.12(e)(6) has been added in response to a commenter's inquiry regarding how the regulatory authority will restore adequate coverage if the surety fails in business. The provision clarifies the duties of the permittee, surety and regulatory authority. The burden is ultimately on the permittee to contin-

9. Section 806.12(f) sets forth conditions for collateral bonds. The first requirement, in Section 806.12(f)(1), is that the regulatory authority must keep custody of all collateral deposited by the operator. Without possession, the pledge of collateral may be nothing more than a hollow promise at the time of forfeiture, since the collateral would be sold to holders in due course under the Uniform Commercial Code without any recourse by the regulatory authority to whom they were pledged. The second requirement is that the collateral or securities be valued at current market value and not face value. Bonds may be discounted or otherwise have different values not at all related to the face value of the collateral. In order to properly assess the value of a bond related to the amount required, it is necessary to evaluate it at the current market value. If the market value falls while in possession of the regulatory authority, additional collateral should be required.

The third requirement relates to certificates of deposit and provides that such certificates of deposit must be assigned to the regulatory authority upon the books of the bank issuing such certificates. The assignment on the book is essential in order to validate the regulatory authority's control over the certificate, not merely for bond forfeiture, but also to protect it against third-party creditors who might try to attach to such collateral deposited with the regulatory authority. A commenter suggested that the regulations provide that interest on these certificates be transmitted to the permittee. The regulations were not changed as suggested because under normal banking procedures the Office assumes that any accrued interest belongs to the owner of the certificate and will be paid directly by the bank unless alternate arrangements are established in the indemnity agreement.

The fourth requirement is that individual certificates of deposit shall not exceed the amount of $40,000 or maximum insurable amount as determined by the FDIC or FSLIC. The maximum of $40,000 was selected because it is the maximum amount insured by FDIC or FSLIC. The last phrase was added in response to a comment, which would provide an opportunity to adjust if FDIC and FSLIC change their requirements.

The fifth requirement is that banks issuing such certificates of deposit waive all rights of set off or liens against the certificates. Under banking law, a bank does have a right of set off against deposits unless it is waived. In some circumstances an operator might go to a bank from which it has borrowed money to purchase these certificates.
of deposit in order to do business with one bank. If the bank fails to waive its right of set off, or its right to a lien, they may well maintain a prior right upon the failure of permittee because of prior obligations to the bank. In most cases, a collateral or a self-bond, or an operator to pay creditors would leave the bank in first position to take the certificates. The regulatory authority must always be in first position to take the certificates upon default and act subjects to any other prior creditor claims.

The sixth requirement for collateral is that certificates of deposit be automatically renewable. Some certificates may provide for maturity terms as little as six months of a year or for as long as eight years. If the regulatory authority does not hold automatically renewed certificates, it would be necessary for it to keep paying back and forth during renewal, the liability to every point of maturity or risk the possibility that matured certificates would be paid out to the owner. The constant changing of these certificates would be an intolerable administrative burden whereas no burden results from the requirement that they be automatically renewed.

10. Section 806.12D(7) provides that the regulatory authority will require the applicant to deposit sufficient amount of collateral, or self-bonds, that the certificates can be liquidated prior to maturity for 100 percent of the required bond amount. One of the implicit limitations on certificates of deposit is the requirement by the Federal Reserve that a penalty be assessed against such certificates of deposit for withdrawal prior to maturity. This penalty is a 90-day amount of interest that would otherwise be earned by the certificate. In addition, if the maturity prior to maturity, the bond or certificate could be valued, because of the penalty, between 92 percent and 95 percent of its face value.

11. A few commenters requested the addition of a letter of credit to the bond criteria. The alternative presented by the commenters was to insert the letter of credit using the following language change: "An irrevocable letter of credit in a form acceptable to the regulatory authority, on any bank organized or transacting business in the United States, if the applicant so chooses." Other alternatives considered were not to include letters of credit or to include a limited letter of credit. The chosen alternative was to add the letter of credit to the definition of collateral bond and to add conditions in a new Section 806.12(g), emphasizing the inability to obligate during the life of the mine. Also, the language was amended in Section 806.12(f) to exclude letters of credit from that Section. This concept was accepted because a letter of credit, irrevocable during the life of the mine and automatically payable upon forfeiture by the regulatory authority, unless released first under part 807, offers the same fund for the completion on the permitting or any bond. In order to establish approximately similar guarantees of payment, the same requirement restrictions applicable to surety companies in Section 806.12(c) (4), (6), and (9) are also to apply to banks offering letters of credit.

§ 806.13 Replacement of bonds.

1. Section 806.13 sets forth regulations in regard to replacement of one type of performance bond with other acceptable forms. Surety, collateral or self-bonds are interchangeable, providing that the criteria for each is met.

2. The proposed regulations had been modified to the effect that no Section 806.13 fix a period of one year or for as long as eight years. If the regulatory authority does not have the statutory authority to deny an applicant the right to substitute a self-bond for a surety or collateral bond if he or she qualifies and if the regulatory program provides for self-bonds. Alternatives considered were deleting the entire Section, modifying the provision to allow replacement with a self-bond, or adapting the provision as proposed. It was decided to modify the provision by changing the language so that the regulatory authority may allow replacement of a collateral or surety bond with a self-bond, providing the self-bonding requirements in Section 806.13(b) of the Act. Section 806.13(b) of the Act does not restrict replacement with self-bond, and the purpose of the performance bond is to assure compliance with reclamation obligations. Therefore, if the operator meets self-bonding requirements, no justification exists to deny that option.

§ 806.14 Terms and conditions for liability insurance.

1. Section 806.14 provides the terms and conditions for liability insurance. The authority is derived from Section 507(f) of the Act. Section 806.14(a) sets forth the minimum amounts for coverage. Several commenters suggested deleting the minimum insurance coverage because it is not addressed specifically in the Act. However, the Office believes that minimum coverage of reclamation as a surety bond insurance practices, should be included to provide a floor for the exercise of regulatory authority discretion in determining an adequate amount of coverage. These minimums reflect industry practices and prevent individual states from allowing inadequate coverages which will fail to assure the public protection intended by Congress. Thus, discretion to increase coverages as provided by Section 806.14(b) of the proposed regulations has been revised. The terms "bodily injury", "each occurrence", and "aggregate" have been substituted where appropriate. Another commenter suggested that inclusion for liability insurance for damage to water wells is beyond the scope of the Act. However, Section 509(a)(13) of the Act states that the ground-water quality must be assured and Section 507(f) of the Act states that the insurance policy shall provide for property damage, in an amount that would compensate any persons damaged as a result of surface coal mining and reclamation operations. Therefore, inclusion of damage to water wells as a specific example of the kind of liability intended to be covered by the policy has been retained.

3. Section 806.14(b) specifies that the policy shall remain in effect for the life of the permit or any renewal thereof. One commenter suggested maintaining liability insurance for a period of 25 years thereafter in order to protect adjacent landowners from damages which may not become apparent for a number of years after reclamation is completed. While the commenter had valid reasoning, the suggestion was not accepted because a 25-year extension is beyond the scope of the Act and would create problems in determining risk. Additionally, protection of adjacent landowners would be limited because the burden of proof will usually be on the victim.

4. Section 806.14(c) requires notification to the regulatory authority whenever substantial changes are made in a policy. A commenter declared this to be beyond the scope of the Act, and suggested it would result in regulation of the insurance industry and concluded that the provision should be omitted. The provision has been retained because it establishes an administrative procedure allowing the regulatory authority to be sure that the permittee will always maintain minimum coverage. The Office believes that this is not an effort to regulate the insurance industry, but rather a requirement that the permittee keep the regulatory authority informed regarding its insurance coverage.

5. Section 806.14(d) recognizes that the permittee may qualify under State self-insurance requirements in lieu of a public liability policy. Such State requirements must be included in the
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PART 807—PROcedures CRITERIA AND SCHEDULE FOR THE RELEASE OF BONDS

Part 807 adopts procedures criteria and a schedule for the release of performance bond liability and the termination of permits after completion of all liability periods required by law. The authority for this part is found in sections 102, 201(c), 501(b), 503, 504, 507(f), 509, 519, and 701 of the act.

Section 807.11 of the regulations is based upon Sections 519(a), (b), (c), (d), (e), (f), (g), and (h) of the Act. The basic structure outlined in Section 519 for bond release is: (1) application, Sections 519(a); (2) public notice, Section 519(a); (3) opportunity for objections and evaluation, Section 519(f); (4) inspection and evaluation of the site by regulatory authority, Section 519(b); (5) informal conference if provided for in the regulatory program, Section 519(g); (6) regulatory authority decision and notice of its decision, Section 519(b), (d), and (e): and (7) right to appeal the regulatory authority decision, Section 519(d).

Since neither the Act nor the regulation as proposed were organized sequentially, this section and the procedures set forth therein have been rearranged in the appropriate sequence.

§ 807.11 Procedures for seeking release of performance bonds.

1. With respect to section 807.11(a), a few commenters requested that a surety also be permitted to file a request for bond release. These comment have been accepted and the regulations rewritten to allow persons authorized by the permittee to file an application for bond release. This provision will allow the permittee and his or her surety, or the bank which issues a letter of credit, to establish a contractual relationship by which the permittee authorizes the surety or bank to file an application for release on his behalf. In the proceeding which follows, the party requesting release will always be the permittee, but by consent of the permittee the surety can be authorized to pursue the action. In order to accomplish the result desired by the surety company commenters, it will be necessary for them to secure the written consent of the permittee prior to his or her disability or incapacity which they fear might deprive them of a mechanism for being released from their obligations on the bond. In the absence of such consent, however, the Office does not think it is reasonable or appropriate to create a general right of sureties to file an application for release without the knowledge and consent of the permittee.

2. A few commenters suggested deletion of the requirement in Section 807.11(a)(1) to file for bond release only at appropriate times or seasons. These suggestions cannot be accepted since the regulatory authority is required to inspect and evaluate the reclamation work within 30 days of receipt of the completed application for release under Section 519(b) of the Act. This is possible only if the request is filed at an appropriate time or season to allow for proper evaluation. Without the 30-day time period it would be impossible for the regulatory authority to exercise its responsibilities to evaluate the site and determine the adequacy of reclamation, and to conduct its site inspection within the 30-day time period allowed. For this reason, the Office has elected not to delete the requirement. Such a rule is both necessary and reasonable under the circumstances. In order to avoid any confusion regarding the proper season, the regulation requires the proper times to be stated in the approved reclamation plan.

The considered alternative would be to require the regulatory authority to hold the release request until the appropriate time or season. This was rejected since it is inconsistent with the statutory 30-day time period for the inspection.

3. Several commenters recommended deletion or reduction of the requirement in Section 807.11(b) for advertising the request for bond release in a local newspaper. These comments were not accepted because the Act requires both advertisement and most of the procedures in the regulations. The additional procedures included in the regulations are necessary to retain consistency with public participation provisions in other parts of the Act and the regulations in this Chapter.

4. Several comments on Section 807.11(b)(7) suggested clarification regarding who is entitled to submit written responses to the notice of application for release of bond advertised in the newspaper. These comments have been accepted. Section 807.11(b)(7) and 807.11(c) have been revised to make it clear that submission is limited to affected persons.

5. Section 807.11(c) provides that written responses may be submitted to the permittee as an alternative to the term defined in the regulation. The definition reflects the criteria in Section 519(c) for determining who has standing to request a hearing.

6. A few commenters requested changing Section 807.11(d) to require the immediate publication of the request for bond release within 30 days of the notification and receipt of a completed application for release. These comments have been accepted since they are consistent with the language in Section 519(b) of the Act. The 30-day time period for the inspection begins when an application for a bond is completed. The application is not complete until the applicant has completed publication of all four notices and submitted proof of publication, along with a copy of the notice, to the regulatory authority.

Receipt of these documents by the regulatory authority then triggers the 30-day time period. One exception to the 30-day requirement is made to allow for weather conditions which would preclude the kind of evaluation necessary for the regulatory authority to make a reasoned decision rather than an arbitrary decision based on speculation and surmise. The Office intends to avoid a deadline for action when, for example, an unseasonal snowstorm obscures terrain features or covers vegetation, and prevents an evaluation of restoration of original contour or revegetation.

7. With regard to Section 807.11(d) a commenter recommended that the 30-day time period established in Section 519(b)(3) of the Act for action by the regulatory authority on the application for release be included in the regulations as a time limitation where no public hearing has been held. Since this time period is specifically set in the Act, the comment has been accepted and incorporated into Section 807.11(c)(2).

8. Several commenters recommended that an alternative vehicle for advertisement be included in Section 807.11(d)(3) for those States not having an official State publication. These comments have been accepted. Where no such publication exists, the notice can be made in a newspaper of general circulation in the locality of the mine site. This change was made wherever there is reference to any official State publication, i.e., Sections 870.11(c)(1), (g)(1)(d) and (2)(d).

9. A commenter suggested changing the regulation to provide for the town or city nearest the mine site by also allowing the regulatory authority to notify the municipality in which the coal mine is located. This language is consistent with the Act so the comment has been accepted. The regulatory authority shall notify the municipality regarding its intent to allow release of bond liability at least 30 days prior to the release.

10. Strong objections to proposed Section 807.11(d) through (h) were re-
received from a number of commenters representing mining industry, State, citizen and surety industry interests. In addition to the general lack of clarity and confusion caused by the proposed rules, mining industry commenters objected to the different procedures applicable to a hearing depending on whether it was requested by a permittee, in which case it was a "legislative" hearing, or by an affected person, in which case it was adjudicatory. Citizen commenters objected to the prospect that once they had waived their opportunity for a hearing, the permittee could then request a hearing from which "affected persons" might be excluded. Each objection was well taken and led to a major rethinking of the procedural elements of the Section. The initial text was based on a goal to effect a change to every provision of Section 519 of the Act, but created confusion and unfairness by establishing different procedural rights for different parties. In rewriting the Section, the Office began with two fundamental assumptions drawn from the Act: (1) every affected person and the permittee have an equal right to an adjudicatory hearing if requested (Section 519(d) and (f)) and (2) a hearing requested by an affected person must be granted before the bond is released (Section 519(f)). Based on these assumptions, the Office reconstructed a procedural scheme which attempts to treat all parties equally and fairly, while adhering as closely as possible to the time limits for action imposed by Congress.

The revised scheme preserves the opportunity for filing objections and requesting a public hearing, but separates them in the sequence of events. The time for filing comments is limited by the 30-day requirement of the first sentence of Section 519(f) of the Act (30 CFR 807.11(c)). A request for an informal conference must be filed at the same time, provided the regulatory program contains an option for such a conference (30 CFR 807.11(c) and (d)). Within 60 days after receipt of a completed petition for release (the date when the proof of publication of the four weekly notices is received by the regulatory authority), or 30 days after the close of the comment period, the regulatory authority will notify the parties of its decision to release the bond or to the proposal. If an informal conference procedure is provided in the regulatory program, then certain flexibility in the scheduling is allowed for holding the conference since such a conference might not be requested until the last day permitted by the regulatory authority to give notice to the conference, conduct the conference, evaluate comments, make its decision and give notice to all interested parties. Limits on this time period will be left to the development of each regulatory program (30 CFR 807.11(e) and (f)(3)).

After the decision of the regulatory authority, a hearing which would allow the release of some or all performance bond liability shall be nothing more than a proposed release until affected persons have had an opportunity for a public hearing as required by Section 519(f) of the Act and 30 CFR 807.11(c)(5)(ii) and (g). If such a hearing is requested, it shall be adjudicatory, conducted in accordance with the procedures in Section 519(h), and commenced within the time and at the place the permittee requests. Limits on this time period, the regulatory authority may release portions of the bond liability after the accomplishment of specific reclamation stages on the incremental areas. Bond liability on any incremental area is not released until all bonding operations on such an area are completed, as well as the adjacent area. Bond liability is fixed only after the incremental area is released. Therefore, while generally desirable, was not accepted. Such a procedural rule, while generally desirable, was not considered appropriate for this rulemaking. For hearings under Federal programs or the Federal lands program, such a requirement would be appropriate for consideration when the procedures of the Office of Hearings and Appeals are proposed. Under State programs, such matters are properly addressed by the Office and the permittee have an opportunity to comment before the bond is released (Section 519(f)). The Office believes that this scheme is the most reasonable response it could devise to meet the valid concerns of the various commenters, within the framework of the Act.

A few suggestions in the comments were rejected. A request to require the regulatory authority to respond to specific requests for findings of fact and conclusions of law proposed by parties at the time of the hearing was not accepted. Such a procedural rule, while generally desirable, was not considered appropriate for this rulemaking. For hearings under Federal programs or the Federal lands program, such a requirement would be appropriate for consideration when the procedures of the Office of Hearings and Appeals are proposed. Under State programs, such matters are properly addressed by the Office and the permittee have an opportunity to comment before the bond is released (Section 519(f)). The Office believes that this scheme is the most reasonable response it could devise to meet the valid concerns of the various commenters, within the framework of the Act. The basis for extending liability to the entire permit area is that until all mining and reclamation activities are completed, the purpose of the Act is not achieved. Consequently, Congress has not allowed such an extended period. The period provided for in 30 CFR 807.11(d) does not require the inspection to be completed until 30 days after the receipt by the regulatory authority of the permittee's proof of publication of the newspaper notices. This should allow the public an opportunity to participate in the inspection if they act quickly to contact the regulatory authority. § 807.12 Criteria for release of bond.

§ 807.13 Schedule for release of bond. 1. Sections 807.12 and 607.13 of the proposed rules have been rewritten and combined due to numerous comments concerning criteria and schedule for bond release. The alternative to rewriting and combining these two Sections was to attempt to make revisions within the framework of the proposed regulations based upon those comments which were accepted. However, the number and substance of the comments required that the Office generally rethink the overall content of the Sections, and accordingly it was necessary to rewrite them in order to properly organize and structure the regulations. Redrafted, these Sections are based on the concept that the permit area may be broken down into subareas and that these areas may be bonded incrementally during the term of the permit. Bond liability on any incremental area is not released until all bonding operations on such an area are completed, as well as the adjacent area. Therefore, while generally desirable, was not accepted. Such a procedural rule, while generally desirable, was not considered appropriate for this rulemaking. For hearings under Federal programs or the Federal lands program, such a requirement would be appropriate for consideration when the procedures of the Office of Hearings and Appeals are proposed. Under State programs, such matters are properly addressed by the Office and the permittee have an opportunity to comment before the bond is released (Section 519(f)). The Office believes that this scheme is the most reasonable response it could devise to meet the valid concerns of the various commenters, within the framework of the Act. The basis for extending liability to the entire permit area is that until all mining and reclamation activities are completed, the purpose of the Act is not achieved. Consequently, Congress has not allowed such an extended period. The period provided for in 30 CFR 807.11(d) does not require the inspection to be completed until 30 days after the receipt by the regulatory authority of the permittee's proof of publication of the newspaper notices. This should allow the public an opportunity to participate in the inspection if they act quickly to contact the regulatory authority. § 807.12 Criteria for release of bond.

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bond after it has determined that the required reclamation phase has been accomplished, but must retain such liability in effect as would be necessary to complete any reclamation, restoration, or abatement work needed to comply with all requirements. This provides the regulatory authority with discretion in assessing the cost and degree of difficulty to complete any remaining work before the reclamation is occurring or is likely to occur and the cost of abating such pollution, as required in Section 519(b) of the Act.

Since this review is specifically required by the Act, the bond release schedule and percentages cannot be made mandatory upon the regulatory authority. The requirement that the regulatory authority retain sufficient liability to complete remaining work is mandated by Section 509(a) of the Act, however.

3. Many commenters requested specific language allowing partial release of bond before the 80 percent minimum as stated in the proposed regulations. These comments were accepted and included in the rewritten regulations to conform with the incremental bonding provisions and the schedule for release of bond in accordance with the three major reclamation phases contemplated by Section 519(c) of the Act.

4. Many commenters requested clarification or deletion of the 25 percent release schedule set forth in Section 807.12(b) of the proposed rules. The regulations have been rewritten to clarify the mechanism for calculating the amount of bond to be released from each reclamation phase. As written the regulations in Section 807.12(b) establish three reclamation phases to define the periods when a permittee may seek release of bond liability. These correspond to the release of bond established by Section 519(c) of the Act. The regulatory authority may release an additional 25 percent of the total bond liability pertaining to the area for which the release is sought, after revegetation has been established in accordance with the performance standards and approved reclamation plan. This provides that, at a minimum, 15 percent of the total bond will be retained until all surface mining and reclamation activities are determined.

As previously discussed, the effects of mining and reclamation are cumulative with regard to the hydrologic system, so that the remaining bond liability will be applicable to the entire affected area within the permit area to ensure the success of the reclamation work in protection of the hydrologic system.

5. A few comments regarding the bond release criteria suggested deleting the one-year release schedule requirement. These comments were accepted and the regulations changed to allow bond release applications to be submitted in accordance with a schedule approved as part of the reclamation plan submitted with the permit application, after completion of a reclamation phase on an approved area for the incremental release of bond liability.

6. One commenter suggested deleting the topsoil replacement from the regrading requirements for the 60 percent release schedule of Section 519(c) of the Act. This comment was not accepted since spreading topsoil is a grading operation which should be approved for the proper depth and distribution of the topsoil prior to vegetating. The inspection for bond release will determine whether the topsoil has been properly spread.

7. A commenter suggested adding "planting" to the 60 percent schedule. This comment was not accepted since planting operations are distinct and possibly not coincident with regrading. The regraded topsoil should be approved prior to the planting and revegetation operations.

8. A few commenters suggested including criteria for evaluating revegetation in the bonding regulations. These comments were not accepted since such criteria are included in the performance standards. The bonding regulations need only refer to these standards, not reiterate them.

9. A few commenters suggested changing the release schedule from 60, 25, 15 to 40, 20, 10, 10. These comments were not accepted since the Act, in Section 519(c), provides that up to 60 percent may be released after backfilling and regrading, based on the discretion of the regulatory authority on a case-by-case review.

10. A few commenters suggested adding language to the criteria to refer, where appropriate, to the permit requirements, performance standards, requirements, of the Act.

11. A few commenters suggested changing the requirements for impoundments. As "dams as impoundments." This was not acceptable since the resulting definition would be too restrictive. Many impoundments resulting from coal mining practices, such as treatment facilities, require maintenance and protection against failure.

12. A commenter suggested adding language to the criteria for release of bond specifying compliance with all applicable laws and regulations. It is not always possible to refer throughout the regulations to other laws and other regulations. However, the bonding regulations refer, where appropriate, to the permit requirements, performance standards, requirements, of the Act.

13. A few commenters suggested changing the requirements for impoundments. As "dams as impoundments." This was not acceptable since the resulting definition would be too restrictive. Many impoundments resulting from coal mining practices, such as treatment facilities, require maintenance and protection against failure.

14. A commenter requested clarification regarding when the five-year period of responsibility begins. This comment has been accepted and the liability period clarified in the regulations.

15. A commenter suggested that the criteria for release did not adequately address the protection of the hydrologic system required in the Act and the performance standards. This comment has been accepted in that, the rewritten rules provide the mechanism to retain adequate bond liability for this concern as determined by the regulatory authority (30 CFR 807.12(d)).

16. In response to comments regarding the problems which might arise out of the failure by the permittee or third parties who made commitments under 30 CFR 816.133 or 817.133, 30 CFR 807.12(d) has been rewritten to include a special provision requiring the regulatory authority to evaluate the additional costs it might incur in case of forfeiture and to retain such liability as may be necessary to cover those costs. Unlike other performance standards, the performance standards for revegetation (30 CFR 816.116 and 817.116) contain a special exception for alternate post mining land-use plans approved by the regulatory authority. The exception allows permittees to meet a less stringent revegetation test for reclaimed areas that will be covered from the elements within two years following completion of topsoil. However, if the approved alternate land use is not implemented within the two years, it becomes necessary to comply with the full scale standards generally applicable to revegetation. Should the permittee or third parties default in their commitments under the alternate approved plan, and fail to obtain a permit revision under the Act, the regulatory authority would have to forfeit the bond and complete reclamation. Reclamation would require achieving full compliance with the revegetation standard, thereby resulting in greater costs than those anticipated by the permittee for the preparation of a development site.
PART 808—PERFORMANCE BOND FORFEITURE CRITERIA AND PROCEDURES

Part 808 adopts criteria and procedures for forfeiting performance bonds and determining the forfeiture amount as required by Sections 102, 201, 501, 503, 504, 509(a), and 519 of the Act. One commenter suggested that only those persons with valid legal interests should be able to petition for bond forfeiture. The procedures allowing petitions for bond forfeiture have been deleted. The regulation requires the regulatory authority to forfeit under certain circumstances, and allows discretion in initiating forfeiture in other circumstances. The regulatory authority may consider comments and petitions from persons with any interest in its decision-making process. If the regulatory authority refuses to forfeit a bond under circumstances where forfeiture is mandatory, any person with standing under Section 520 of the Act may sue to compel the regulatory authority to comply with the regulations and the Act. Therefore, the Act does not require citizen participation in the forfeiture decision, the petition process in the proposed rules has been deleted.

§ 808.11 General.

1. Section 808.11 contains the general provisions for bond forfeitures. Section 808.11(a) requires the regulatory authority to forfeit all or part of a bond according to the criteria set forth in Section 808.13. A commenter suggested requiring the regulatory authority to forfeit all of a bond in order to assure appropriate funding for reclamation. The Act, in Section 509(a), provides that the amount paid shall be sufficient to assure completion of the required reclamation work. This, in some cases, would not require forfeiture of the entire bond, especially where all of the area had not been affected or where some reclamation had been accomplished.

2. There were several comments directed at Sections 808.11(a)(1) and (2) of the proposed regulations, which had listed conditions under which forfeiture proceedings shall commence. The comments objected to these provisions because of the redundancy with Section 808.13(a). The suggested revision was accepted and the deletions made in the final regulations. Therefore, the regulations were written to allow the regulatory authority to either forfeit the entire bond, or set the amount of bond forfeiture according to the cost of the reclamation work.

3. Several commenters suggested that the regulatory authority should have more flexibility in determining whether or not a bond should be forfeited. Although the regulations in Section 808.11(a) mandate bond forfeiture action by the regulatory authority under certain conditions set forth in Sections 608.12(a) and 608.19(b), the regulatory authority has the discretion to withhold forfeiture if a binding compliance schedule is accepted by the permittee. It is always desirable to allow the permittee or surety to comply with his reclamation plan if it is at all possible, because the cost to the regulatory authority is usually in excess of what it would cost a permittee or surety, as discussed previously in Section 808.11(c). Amended that Section by the regulatory authority may be delayed for many years for a variety of reasons relating to collection upon the bond or contracting requirements to accomplish the reclamation. Therefore, this decision must be incentive for the permittee or the surety to come forward and agree to a compliance schedule, and allows the regulatory authority to engage in that option rather than proceeding to forfeit. The regulations were changed to include the surety in the agreement to secure its liability, as recommended by three comments.

§ 808.12 Procedures.

1. Section 808.12 specifies procedures which the regulatory authority shall follow prior to bond forfeiture, in the event forfeiture of the bond is required by Sections 808.11 and 808.13. A commenter recommended that Section 808.13 be made applicable to Sections 808.11 and 808.12 because it states the specific criteria for forfeiture. This suggestion was accepted and incorporated into the regulations.

2. The procedures for bond forfeiture in the proposed rules provided that the regulatory authority send written notification to the permittee and, if it is a surety bond, to the surety, of the determination to forfeit a bond, giving the permittee or surety an opportunity for the permittee and the surety, where applicable, to reach some compliance agreement. If the review of the appeal is denied, and waste the regulatory authority has the discretion to require the permittee or surety to comply with a compliance schedule. If the regulatory authority refuses to forfeit a bond under certain circumstances, the regulatory authority may consider comments and petitions from persons with any interest in its decision-making process. If the regulatory authority refuses to forfeit a bond under circumstances where forfeiture is mandatory, any person with standing under Section 520 of the Act may sue to compel the regulatory authority to comply with the regulations and the Act. Therefore, the Act does not require citizen participation in the forfeiture decision, the petition process in the proposed rules has been deleted.

§ 808.13 Criteria for forfeiture.

1. Section 808.13(a) identifies four areas where forfeiture would be mandatory. Several commenters suggested giving the regulatory authority more flexibility to determine forfeiture by changing "shall" to "may". The Office believes that the regulations will give the regulatory authority sufficient flexibility as provided in Sections 808.13(b) and 808.11(b) and, therefore, the use of the word "shall" is the preferred language.

2. The first set of requirements for which forfeiture is required are standard to the bonding industry. In those four circumstances the bond shall be forfeited because the permittee has indicated an inability to comply with the Act in a particular respect, unless it is possible to reach some compliance agreement and schedule with the operator. Some commenters suggested changing Section 808.13(a)(2) so that bond for-
feiture would be mandatory only when the permittee has substantially failed to conduct surface mining and reclamation in accordance with the regulations. Because the permittee is given the chance to set up a compliance schedule for violations, bond forfeiture is not necessary. One commenter claimed that revocation of the permit should not dictate bond forfeiture.

In response, Section 808.13(a)(3) has been amended to include the stipulation that the regulatory authority shall forfeit the bond if the permit has been revoked, unless the permittee or surety, where applicable, assumes liability for completion of reclamation work under a compliance agreement. This alternative is desirable because the permittee or surety can do the reclamation work, at much less cost and generally in less time than the regulatory authority, as previously discussed. Another commenter suggested changing "shall" to "may" in order to give the regulatory authority more flexibility in determining the amount of forfeiture. Because the regulatory authority may choose to forfeit either the entire bond or a portion sufficient to pay the necessary reclamation work, the Office believes the word "shall" is not restrictive and, therefore, has not changed the regulation. A few commenters suggested deleting Section 800.14 because it is too difficult to determine the exact amount required for reclamation and, by requiring the entire amount of the bond to be forfeited, the regulatory authority would be assured of having sufficient funds for required reclamation. These comments were not accepted because the necessary reclamation work involved may require only a portion of the bond amount and the amount is left to the discretion of the regulatory authority.

Section 808.14 provides for determining the forfeiture amount. A few commenters suggested changing "shall" to "may" in order to give the regulatory authority more flexibility in determining the amount of forfeiture. Because the regulatory authority may choose to forfeit either the entire bond or a portion sufficient to pay the necessary reclamation work, the Office believes the word "shall" is not restrictive and, therefore, has not changed the regulation. A few commenters suggested deleting Section 800.14 because it is too difficult to determine the exact amount required for reclamation and, by requiring the entire amount of the bond to be forfeited, the regulatory authority would be assured of having sufficient funds for required reclamation. These comments were not accepted because the necessary reclamation work involved may require only a portion of the bond amount and the amount is left to the discretion of the regulatory authority.

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Section 808.14 allows the regulatory authority to either forfeit all or part of the bond and return the unused portion of the bond if they so desire.

PART 809—BONDING AND INSURANCE REQUIREMENTS FOR ANTHRACITE SURFACE COAL MINING AND RECLAMATION OPERATIONS

This Part sets forth the general requirements for bonding and insuring anthracite surface coal mining and reclamation operations for States which regulate anthracite surface mining with environmental protection standards in existence as of August 3, 1977. Section 529 of the Act, from which the authority for this Part is derived, is believed to only cover and thereby exempt, Pennsylvania from certain provisions of the Act and this subchapter. As a result, this Part is only applicable to persons engaging in or seeking to engage in anthracite surface coal mining and reclamation operations in Pennsylvania.
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alphabetical subject index. Such an index has been prepared as an appendix to these regulations. OSM expects this appendix to be published in the Federal Register shortly after publication of these rules. No substantive change is intended by the deletion of Parts 811 and 812.

Part 821 would have provided an exemption procedure for mines in Alaska and the deletion was justified during the deletion process. OSM felt that the special problems of Alaska would be adequately resolved under Subchapter C by application of the "State window," if a State program is approved, or by consideration of Alaska's unique climatological and geological problems by the Secretary, before a Federal program is implemented. In any case, the statutory authorization for the variances proposed by Part 821 will have expired before or shortly after a permanent regulatory program is adopted for Alaska. Under Section 708(g) of the Act, variances could not be granted by the Secretary after August 3, 1980, at the latest.

Manuals were recently issued suggesting that OSM avoid specific design standards and instead adopt regulatory goals and allow operators to achieve the goals as they choose. These commenters criticized what they sometimes called the "cookbook" approach. In each of the regulatory standards for which the point was specifically made, the preamble addresses the specific issue. The discussion at this point addresses the issue in general.

To a substantial degree, the regulations as proposed, and to a larger degree as adopted, in fact establish goals rather than tight design standards. Moreover, when design standards are adopted they usually provide substantial flexibility to the operator.

For example, the standards in 30 CFR 816.45-816.47 and 817.45-817.47 for controlling sedimentation go beyond merely establishing efficient limitations. They do so because effluent limitations are a less successful regulatory tool for constantly moving coal mining operations than for fixed industrial plants. In requiring certain operational practices beyond the effluent limitations, the regulations do not adopt a rigid "cookbook" approach but provide a series of alternatives that leave the operator broad flexibility to design his sediment control system to suit the particular site and the operator's capabilities.

Section 816.45 explicitly states the regulatory goals and lists the major designs and operational techniques which an operator can adopt to reduce the need for treatment. Section 816.46 requires a final sedimentation pond but grants broad flexibility to the operator to design the pond efficiently in relation to related sediment control practices. For a more complete discussion of the flexibility and efficiency of sediment control requirement, see the preamble for Sections 816.45-816.47 and Section 817.45-817.47.

An example of design standards with less flexibility than sediment control are the regulations dealing with head-of-hollow and valley fills. Nevertheless these regulations contain more flexibility than is proposed, while at the same time providing equivalent public safety and environmental protection. As proposed, there were to be essentially two different construction techniques for excess stockpile ponds. The first was the fill constructed with a rock underdrain and all water diverted off or around the fill. The second was a fill constructed with a rock chimney core and water diverted to and through the rock core. As adopted, the regulations provide for four different construction types: (1) for flatter areas, only stability and sediment control goals are prescribed, and the engineer can design any structure that is believed to be safe; (2) the rock underdrain type; (3) the rock chimney core type; and (4) a dumped, homogeneous fill made of at least 80 percent durable rock.

The Office believes that design specificity is necessary in many places, especially where risk of injury to public safety or the environment is the greatest. For instance, in the design of fills on steeper slopes, failure is a real risk and could be such a catastrophic event that any conservative, specific design standards are necessary. Fills must be designed and constructed to last perpetually, since maintenance (after bond release) will not necessarily be performed. The filling may be impacted, undermined, or washed out by seepage from the fill.

On flatter slopes, failure is not as likely, although the operation may be more susceptible to seepage or washout by seepage from other fills. Also, the state-of-the-art in fill design has been evolving slowly, with most engineering innovation displayed only in the last couple years. On flatter slopes failure is neither such a risk nor as serious an event should it occur; therefore increased flexibility is appropriate.

On the other hand, specific design requirements may impede the operator's ability to reduce to a minimum the cost added to his operation by the regulations and may impede innovation. The Office believes that design flexibility contained in the regulations adopted reduces these adverse effects, and that any impediment to innovation is reduced to neglible by the experimental practices regulations at 30 CFR 785.13.

Thus, the question of "goals versus design standards" is one of balancing the need for a high degree of protection against increased flexibility for the operator. OSM has in almost all cases supplied substantial flexibility even where design standards are provided. The Office believes that the balance struck by the regulations adopted is correct and will provide a basis for the protection of public health and safety and the environment while recognizing the importance of an efficient and productive coal industry.

PART 810—PERMANENT PROGRAM PERFORMANCE STANDARDS GENERAL PROVISIONS

This Part is intended to provide an introduction to Subchapter K. It sets forth the general purpose of the Subchapter, the responsibilities of persons and agencies in connection with the Subchapter and its general applicability. To the extent more specific or contradictory provisions are found in Parts 815-828, those other provisions shall control.

Section 810.1 explains that Subchapter K applies to all coal exploration and mining under the program. The differences in language from the version proposed September 18, 1978 (43 Federal Register 41873) are intended for clarification only.

Section 810.2 explains the purposes to be achieved by the requirements of Subchapter K. All changes made in this Section since the version proposed in the September 18, 1978 Federal Register were made in response to comments and are discussed below.

Section 810.3 states that the role of the Secretary of the Interior under the Act is to approve or implement performance standards and design criteria for regulatory programs. This role is explained in Sections 503(b) and 504(a) of the Act. The importance of the differences between performance standards and design criteria is discussed in the preamble discussion for Section 701.11(e) relating to preexisting, nonconforming structures, and the reader is encouraged to review that discussion for a fuller understanding of this Subchapter.

Section 810.4 enumerates the roles of the Director, the State regulatory authority and the person conducting the regulated activities. The language is slightly changed from the version of Section 810.4 proposed September 18, 1978. The Sections as promulgated eliminates unclear references to the Assistant Secretary and the Minerals. OSM felt that mentioning that officer without setting forth the relationship of the Director to the Secretary or other Interior Department offices was more misleading than it was helpful. All changes in this Section are clarifications of the general introductory language.

A section-by-section analysis of concerns raised by the public comments and the review of the proposed regul-
tion conducted in response to those comments follows.

A commenter suggested that 810.1 be revised so that Federal lands governed by Section A of the Federal Coal Leasing Amendments Act of 1975 (90 Stat. 1085) would be exempt from the performance standards of Parts 816 and 817. This revision was unnecessary since the issue is dealt with in the Federal lands program, Subchapter D.

One commenter felt that Section 810.2(a) was superseding the Federal Coal Mine Health and Safety Act of 1969. Section 701.1(c)(12) of the Act gives OSM specific authority to be concerned with "the health or safety of miners." Section 810.2(a) does not supersede the Federal Coal Mine Health and Safety Act of 1969, but complements it.

A commenter contended that Section 810.2(h) was without statutory authority and should be deleted. This contention was rejected. Section 810.2(h) is authorized by Section 522(a)(3)(B) of the Act. However, Section 810.2(b) has been revised to implement all of the wording in Section 522(a)(3)(B) of the Act.

Several comments suggested that a new paragraph be added to Section 810.2 which assures that a balance will be reached between protection of the environment and agricultural productivity and the nation's need for coal. This suggestion was accepted. Section 102(f) of the Act states that one of the purposes of this Act is to strike a balance between protection of the environment and agricultural productivity and nation's need for coal as an essential source of energy. The addition of paragraph (f) to Section 810.2 helps more clearly establish how OSM will proceed in Subchapter D. A revision of Section 810.3 would not add anything to the regulations, since this Subchapter does not, by its terms, apply on Federal lands. The extent to which these standards will apply on Federal lands is set forth in Subchapter D. Accordingly, the commenter's request was rejected.

Concern was expressed that Subchapter B does not specify whether operators must comply with both general performance standards (Parts 816 and 817) and applicable special standards (Parts 818-828). It was noted that the interim performance standards do have such a specification at 30 CFR 716.1(a)(2). In order to avoid ambiguity in interpretation of the permanent program performance standards and to ensure that all operations comply with all relevant performance standards, Section 810.11 was added to specify that Parts 816 and 817 apply to any operation unless specifically exempted in Parts 818-828.

**PART 815 PERMANENT PROGRAM PERFORMANCE STANDARDS—COAL EXPLORATION**

Part 815 contains minimum performance requirements applicable to persons engaged in coal exploration which substantially disturbs the natural land surface. This Part is closely related to Part 776 (Coal exploration notices and approvals) and the definitions of "coal exploration" and "substantially disturbs" contained in Section 701.5. The reader should review the preamble discussion of those provisions, as well as the language of those regulations, for a complete understanding of the permanent program's effect on coal exploration.

The purpose of this Part is to ensure that coal exploration is conducted in a manner which results in minimum environmental harm. OSM has attempted to balance the need to allow exploration to proceed so that the Nation's energy needs and the Act's are balanced, against the risks of environmental damage. Under the Act, exploration will continue to occur on lands where mining is prohibited, under Subchapter F. Since many lands unsuitable for mining are fragile, special precautions to preserve fragile resources are required. The brevity of this Part reflects OSM's intent to focus its regulations only on those activities which present the greatest potential risk to the environment and to frame the final rules in terms of general applicability.

One commenter suggested that Part 815 be deleted entirely on the grounds that Section 512(a) of the Act states that exploration is to be conducted under "exploration regulations issued by the regulatory authority." The commenter argued that OSM is not the regulatory authority at this stage of the implementation of the Act, and therefore this Part is beyond OSM's authority. OSM disagreed with this commenter's argument, so Part 815 has not been deleted. Section 502(b) of the Act requires the Secretary to promulgate regulations "establishing requirements for . . . approval of State programs." Section 512(a) requires that each State's Federal program contain exploration requirements, including "at a minimum . . . provisions for reclamation in accordance with the performance standards of Section 515 . . . ," OSM has promulgated this Part to set forth the minimum requirements which must be contained in a State or Federal program before it will be approved. The regulations of a regulatory authority will be enforceable under the Act, once they have been approved by the Secretary.

Other commenters contended that OSM adopted a "cookbook" approach in the proposed regulations that would result in greater harm to the environment than would occur if its regulations did not have to be met. These commenters recommended an "engineered option" approach whereby the performance standards can be met by the operators in any way they choose so long as the standards are met. A related comment requested that Section 815 only contain what is required under the Act. OSM decided that Section 512(a) of the Act requires the Federal government to indicate its authority or its responsibilities under the statutory scheme.

One commenter requested that the requirement of this Part should reflect regional climatic differences. The final regulations of this Part have not been changed in response to this request, since OSM believes that the authority contained in Section 701.11 of these rules. OSM does not believe Part 815 exceeds either its authority or its responsibilities under the statutory scheme.

Another commenter felt that under the regulations, this Part did not allow sufficient flexibility. In responding to these comments, OSM has attempted to frame the requirements broadly, so that they are of general applicability, and permit those who use them to determine how the reclamation will be managed and adapted to the specific conditions of the particular exploration operation.
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Several comments suggested that OSM consider applying the performance standards of Part 815 only to operations in which over 250 tons would be removed. OSM was offered no technical basis to show that the environmental damage resulting from exploration, which removes less than 250 tons, is any less than the damage from exploration where more coal is extracted. In fact, Section 512 of the Act makes no distinction between the performance standards to be applicable to over 250-ton exploration land and 250-ton exploration. The only difference is whether one needs prior written approval from the regulatory authority before commencing operations. The final committee report on the Act makes it clear that performance standards are to apply to operations under 250 tons (H. Rep. No. 95-218, p. 173).

§ 815.1 Scope.

Section 815.1 states the scope of the Part. The language has been modified from the proposed version (43 Federal Register 41878). In addition to non-substantive changes made for clarification only, the language has been revised in several significant ways. The limitation of the Part to activities outside a permit area has been deleted because, after revision of the rest of the Part in response to comments as discussed above, it became clear that written approval need be obtained only in operations under 250 tons. These comments were allowed and the language of Section 815.1 was revised accordingly based upon the explanation in the final report which accompanied H.R. 2 and the plain meaning of Section 512 of the Act. This explanation clarified that only operations which substantially disturb the natural land surface and are required by Section 512C(b) of the Act need be considered in this Part.

Several commenters felt that Part 815 should be applicable only to exploration operations which substantially disturb the natural land surface. These comments were accepted and the language of Section 815.1 was revised accordingly based upon the explanation in the final report which accompanied H.R. 2 and the plain meaning of Section 512 of the Act. This explanation clarified that the detailed regulatory scheme ensuring compliance with the performance standards must apply to all exploration operations, even those which substantially disturb the natural land surface. The limitation of the Part to activities outside a permit area was deleted because, after revision of the rest of the Part in response to comments as discussed above, it became clear that written approval need be obtained only in operations under 250 tons. These comments were allowed and the language of Section 815.1 was revised accordingly based upon the plain meaning of Section 512 of the Act.

Other commenters asserted that the special category and exemption for exploration of less than 250 tons should be eliminated because exploration of any size or amount can cause extensive environmental harm, especially in the steep slope areas of Appalachia. For these commenters, the section limitation on the amount of coal removed does not necessarily reflect the size or intensity of a disturbance since a very small area causing little environmental harm or a very large area causing extensive harm are both possible with the removal of less than 250 tons. These comments contended that any coal exploration operation should be required to file obtain written approval and abide by the same environmental standards for explorations removing more than 250 tons of coal.

Other commenters contended that Part 815 fails to reflect the limitation contained in Part 776 which provides that written approval need be obtained only in operations in which more than 250 tons of coal are intend- ed to be removed in any one location. The Office agreed that the issue was unclear and modified Section 815.11 so that it parallels the requirements of Part 776. The revision made to Section 815.11 clearly indicates that it is not the intention of the Office to require approvals of all exploration without regard to the 250-ton removal criterion required by Section 512(d) of the Act, but only if more than 250 tons of coal are to be removed from one location. Exploration operations, regardless of size, which substantially disturb the natural land surface shall comply with the intent for all location operations standards set forth in Section 815.11.

§ 815.11 General responsibility of persons conducting coal exploration.

Comments received on proposed Section 815.4 are discussed earlier in this preamble together with comments received on Part 776. Requirements proposed on September 18, 1978 (33 FR 22,1978) were moved to Section 815.4, as proposed, which provided that person intending to conduct coal exploration operations file a notice of intent to explore. Other commenters objected to the requirement of prior notice of intent for exploration operations. For these comments, the phrase “which substantially disturbs the natural land surface” was included in the wording of Section 815.11(a) and (b). It should be noted, however, that OSM believes that a core drilling program can cause substantial disturbance, which will require prior notification to the regulatory authority. By comparison, in most instances, aerial exploration alone will not cause the kind of disturbance requiring notification.

Several commenters contended that Section 815.11(a) of the proposed regulations did not reflect the limitation contained in Part 776 which provides that written approval need be obtained only in operations in which more than 250 tons of coal are intended to be removed “in any one location.” Rather than limiting the criterion to a single location, proposed Sec-

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Several commenters contended that Section 815.12 of the proposed regulations should be revised to apply only to coal exploration operations which remove more than 250 tons of coal. As discussed above in connection with Section 815.1, the language of Section 512 of the Act and the legislative history are clear in that the performance standards must apply to all exploration which substantially disturbs the natural land surface, no matter how many tons of coal are removed during or after exploration operations. Section 815.12 of the proposed regulations became Section 815.15 of the final regulations.

Proposed Section 815.12(a) has been deleted. Several commenters asserted that the requirement of proposed Section 815.12(a) of recording the coal removed in an exploration program that will not exceed 250 tons, seems needless since the projected total coal tonnage to be removed would be required as a part of the notice of intent to explore as defined in Section 776.11(a). These commenters asserted that so long as the coal tonnage is significant below 250 tons and the proposed program is adhered to, the records required under proposed Section 815.12(a) of the proposed regulations will not burden the person conducting exploration with additional record keeping that would serve no useful purpose. Other commenters further remarked that in the case of more than 250 tons of coal being removed, the amount to be mined would be stated in the application for approval. Other commenters wanted to amend proposed Section 815.12(a) of the proposed regulation to require recording of coal removed "from a specific location" during coal exploration, since cumulative amount as stated in the proposed regulation is ambiguous and restricts large exploration activities even when there is no damage to the environment. Adding "specific location" to the regulation would stop mining under the guise of exploration. Other commenters contended that the requirement of proposed Section 815.12(a) that the operator record the "cumulative amount of coal removed during exploration" is inconsistent with Part 776 of the regulations and Section 512(d) of the Act, which provide that written approval needs to be obtained only in operations in which

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Several commenters contended that Section 815.11(a) of the proposed regulations would have enlarged the concept to "exploration area." OSM agrees and has deleted the term "exploration area" from Section 815.11 of the final regulations. It was not necessary, as several commenters suggested, to amend Section 815.11 to include the words "in any one location" because under the final wording of the sections referred to in Section 815.11(a), the area to be explored is designated in the notice of intent to explore required under Section 776.11 for operations involving removal of less than 250 tons and, in the case of operations removing more than 250 tons, Section 815.11(b) specifies in the area described by the written approval from the regulatory authority.

Several commenters contended that Section 815.11(b) of the proposed regulations would lead to undue interference in the process of coal exploration operations if "any agent or employee" of the regulatory authority was given the authority to request from the person conducting the coal exploration operations the receipt or written approval of the regulatory authority for undertaking the activities granted under Section 776.12. Some commenters wanted proposed Section 815.11(b) amended so that the agent or employee of the regulatory authority would be required to present credentials to the person conducting coal exploration before being allowed to see the receipt or written approval of the coal explorer. The Office agreed with the above comments and has rewritten the requirements of proposed Section 815.11(b) in Section 815.13 of the final regulations so that the written approval to undertake activities granted under Section 776.12 will be "available for review by the authorized representative of the regulatory authority or the Office upon request." Authorized representatives of the regulatory authority do carry identification which the coal explorer can demand to see. It is not, therefore, necessary to amend the regulation to require presentation of such credentials.

Section 815.11(a) of the proposed regulations would have required an explorer to carry a receipt showing that the required notice of intention to explore had been filed. Some commenters contended that Section 815.11(a) of the proposed regulations was ambiguous as to what type of receipt from the regulatory authority would be required. Some commenters contended that the requirement of a receipt would add an unnecessary burden. These commenters argued there are various other means of establishing, by written documentation, that an operator has in fact compiled with the notice requirement of the Act. Furthermore, these commenters contend that the proposed rule would have created a process which is tantamount to a permitting procedure because unless and until an operator receives a receipt, he or she presumably would not be authorized to commence exploration. Other commenters contended that unless the receipt required by proposed Section 815.11(a)(1) is an automatic response to the filing of a notice, the regulatory authority would be unable to require prior written approval of exploration involving less than 250 tons of coal contrary to Section 512(d) of the Act. These comments convinced the Office that proposed Section 815.11(a)(1) was not clear. Accordingly, the proposed Section 815.11(a)(1) requirement that the person conducting coal exploration possess a receipt has been deleted. Section 815.11(a) of the final regulations requires only that the person conducting coal exploration in which 250 tons or less of coal are removed shall file the notice of intent required under Section 776.12 and shall comply with Section 815.15.

§ 815.15 Environmental performance standards for coal exploration.

The philosophy of Section 815.15 is that any person who engages in coal exploration activities, which substantially disturb the natural land surface must conduct such activities with the least resultant damage to the environment. To accomplish this purpose, Section 815.15 explains minimum performance standards and design requirements which shall be required of persons who engage in coal exploration activities. Since these are minimum and flexible standards, coal exploration activities may, at the discretion of the regulatory authority, be further required to comply with the applicable performance standards and design requirements specified in CFR part 815. However, the amount to be removed is stated in Section 776.12(a), from which these minimums are generally derived.

Many comments were received on the proposed version of these regulations. In the proceeding, these comments the Office has deleted, added, and rewritten substantial parts of the proposed regulations on performance standards for coal exploration. It became necessary, for the sake of clarity, to rewrite and renumber the regulations proposed on September 18, 1979. The table below indicates how the proposed regulations were reorganized into the final regulations.

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more than 250 tons of coal are intended to be removed in any one location. These commenters argued that the cumulative requirement of proposed Section 815.12(a) and the use of the exploration area in Section 815.11(a) of the proposed regulations would circumvent the Congressional intent to establish a reasonable objective criterion of 250 tons and would tend to subject operations to the cumulative effect of the 250 ton criterion, depending on the size of the area of exploration. Other commenters contended that difficulty will arise in trying to weigh each coal sample taken during a drilling program. These, a simple calculation could determine the thickness of seams and, possibly, a close approximation of total reserves. This would substantially reduce the competitive edge of the company performing the exploration and would, for these commenters, be contrary to Section 512(b) of the Act. These commenters wanted proposed section 815.12(a) amended so that the amount of coal removed from each hole would be recorded and cumulated, but the operator would be required only to divulge whether the cumulative total of the operation is greater than or less than 250 tons, since any more detail would unnecessarily prejudice the competitive position of the operator.

OSM decided to delete proposed Section 815.12(a) from the final regulations based on the above comments and to be consistent with its decision to delete the term "exploration area" from Section 815.11(a) of the proposed regulations. The reader is referred to the preamble discussion in Section 815.11(a) for the reasons "exploration area" was deleted. OSM believes that the violations of Parts 776 and 815 are adequately addressed by Section 776.15(b) of the final regulations. The reader is referred to the preamble discussion on Section 776.15(b) for the explanation of the regulations covering violations of the exploration regulations contained in Parts 776 and 815. State regulatory authorities have, in the discretion given to them by the Act, the authority to delete proposed Section 815.12(a). These commenters contended that if the final section either be deleted or specify types of habitats which must be protected. The U.S. Fish and Wildlife Service "strongly recommends" to OSM that the proposed Section not be changed. OSM decided to change the proposed regulation only to clarify its meaning. Therefore the final regulation extends the definition of "unique habitat" by including a reference to 780.16(b) of the final regulations. Coal explorers are clearly required to conduct their exploration operations so as not to damage important wildlife habitat. OSM also would contact their regulatory authority if they need assistance in determining whether their area of coal exploration may contain unique or high value habitats. The regulatory authority is required by Section 779.20 to be in contact with Federal and State wildlife and land management and resource agencies for consultation in determining unique and high value wildlife habitats. The reader is referred to the preamble discussions of Sections 779.20 and 780.16 for further explanation of wildlife habitats.

Section 815.15(b). A few commenters requested proposed Section 815.15(b) (proposed Section 815.12(h)) should be deleted or amended because there was no statutory authority for requiring environmental data gathering during exploration activities. Other commenters contended that exploration personnel are not generally biologists, soil scientists, hydrologists, or meteorologists, and are frequently totally unqualified to make studies in the areas required by the proposed regulation. These commenters concluded that any such studies performed by the exploration personnel would lack validity. Other commenters contended that if it was the intention of the proposed regulation that the person conducting exploration send a team of biologists, geologists, soil specialists, etc., into each explored area to ensure that the exploration is either unnecessary or redundant. These commenters contended that if a decision is ultimately made not to obtain a mining permit, it would be unnecessary for the detailed studies to be conducted. Some comments were made that the proposed regulations were objectionable in that it requires the gathering of extensive environmental base data prior to any commitment, however tentative, by the operator. The proposed program was pointed out that exploration may preclude actual mining by decades, and quite commonly exploration is made with no immediate mining objectives. For example, a drilling project designed to provide assurance that an acquisition program. In these instances, the commenters alleged, it is inappropriate, premature and costly to accumulate details on such items as overburden acidity, hydrologic conditions, etc. These comments concluded that if a coal exploration operation is contemplated to develop a coal reserve, it is the obligation of the mining concern to provide the requisite base data. However, it should remain the privilege of the operator to decide at what stage to gather this data.

Some commenters argued that the environmental data required by the proposed regulation would be entirely irrelevant to a deep mine or surface mining permit. It is, thus, pointless to require surface mine environmental baseline data for a deep mine prospect. Other commenters contended that the environmental monitoring effort should be made after exploration has determined whether or not an area has a reserve base sufficient to support mining. Some commenters wanted the proposed section amended so that the determination of environmental characteristics would be at the regulatory authority's expense. The Office declined to accept those comments. It seems that the commenters do not fully understand the intention of the proposed regulation.

The proposed regulation would have required that environmental data be collected during coal exploration activities so that the explorer would be able to determine and minimize the...
environmental effects of the exploration activities, as well as to collect the data needed if a decision to apply for a permit to mine is reached. Part 815 is not an exemption from the requirement to minimize environmental damage for coal exploration activities which do not intend to apply for a mining permit or which do not result in a decision to apply for a mining permit.

In response to the comments discussed above, OSM has rewritten the proposed regulation to clarify this intent. As for the comments suggesting that the regulatory authority bear the expense of environmental data gathering, OSM declined to accept this suggestion because the data being gathered is not primarily for the benefit of the regulatory authority, but rather is the responsibility of the operator. The Act does not contemplate government gathering, bearing costs of compliance by operators or explorers during the permanent program.

Some commenters contended that the phrase "to the maximum extent possible" in proposed version of Section 815.15(b) should be deleted because, if deleted, the operator will in fact comply to the maximum extent practical. For these commenters, the phrase "maximum extent practical" would amount to a "loophole" which the operator could use to argue that "maximum practical" data has been gathered. The intent, for these commenters, would be that the coal explorer could make little effort to gather and record data. The suggestion of deleting in its entirety the phrase "to the maximum extent practical" because it would amount to a "loophole" was rejected, because these commenters, like those discussed in the previous paragraph, are misreading the intention of the proposed regulation. As discussed previously, the primary purpose of the regulation is to minimize environmental damage occurring during the course of exploration activities and not to provide comprehensive environmental data for the regulatory authority or the public.

Other commenters contended that the requirement of proposed Section 815.15(b) (final rule 815.15(b)) to measure the "maximum extent possible" important environmental characteristics implies a wasteful activity for the operator, because once important environmental characteristics of the exploration area are measured, additional measurement to the "maximum extent possible" does not significantly increase the ability to minimize environmental damage or to submit an application under 30 CFR 773-791. For these commenters, the proposed regulation already sufficiently outlines the measurements to be performed. OSM agreed with these later comments and deleted the word "maximum" from the final regulation.

Other commenters contended that final rule 815.15(b) (proposed Section 815.12(b)) is too general for environmental impact statement for coal exploration activities. These commenters viewed such a requirement as unnecessary for exploration activities, and for providing adequate information for a mining permit application which may never be submitted. These commenters conceded, however, that the measurement of important environmental characteristics may be necessary for environmental impact statements for the regulatory authority. OSM agreed with these commenters that the regulatory authority should be required to determine the environmental characteristics which would have to be measured under proposed Section 815.12(b). OSM did not believe it necessary, as several commenters suggested, to write the final regulation so as to require a determination of the environmental characteristics to be measured based on agreement between the person conducting the coal exploration and the regulatory authority. The philosophy of Part 815 is to set minimum and flexible performance standards, which the regulatory authority may add to as it deems necessary or advisable under its climatic, geologic, or environmental conditions. Requiring consultation between explorer and regulatory authority would come close to requiring a determination which is beyond the intent of Section 512 of the Act, at least for exploration under 250 tons.

A proposed regulation 815.12(h) would have required all monitoring data collected during exploration to be submitted to the regulatory authority. The U.S. Fish and Wildlife Service strongly recommends to OSM, without accompanying rationale, that this requirement be changed. Other commenters suggested that this obligation be limited to supplying data only when the person conducting exploration applies for a permit. The rationale offered was that the exploration entity was in a speculative position with respect to future intent to mine until a decision to seek a permit is made.

Another commenter, although not recommending an explicit limitation, suggested that much data obtained in coal exploration is strictly related to the economic value of the coal deposit and does not concern the potential environmental impact of mining those deposits. Other commenters insisted that exploration activities are concerned with evaluating coal quality and reserves and do not have as their primary goal the collection of all environmental monitoring data necessary for preparation of the permit application. Many exploration activities, according to these commenters, are terminated at the point when adequate information on the coal quantity and quality has been obtained without regard for doing further exploration work to obtain additional environmental monitoring data at that very preliminary stage of the investigation of the site. These commenters further alleged that due to the emphasis on environmental conditions, exploration activities are conducted in enough detail to be used in a decision to apply for a mining permit or which do not result in a decision to apply for a mining permit.

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Some commenters requested that the data submission requirement of proposed Section 815.12(i) be amended to exempt environmental monitoring data collected during coal exploration from confidentiality protection. These commenters stated that it seemed to be an enormous waste of time, money, and useful information to require environmental monitoring and then not require the resulting data be collected in some central place where persons wishing to analyze the data could have access to it. These commenters did not believe that trade secrets are involved and that the only reason for requiring confidentiality would be to shield from the public any information pointing to adverse environmental impacts. These commenters wanted the regulation to require the coal explorer to submit, to the regulatory authority, all environmental monitoring data instead of merely requiring the operator to make such data available. To one commenter, data available would require the regulatory authority to take some initiative in order to acquire it. These commenters conceded that it may be "unfair" to require the coal explorer to pay the cost of providing environmental monitoring data and therefore suggested that the coal explorer be reimbursed by either the regulatory authority or by OSM for the costs of producing and possibly for the cost of gathering the data. These commenters asked if money-collected from civil penalty fines could be placed in a fund to reimburse coal explorers for gathering and providing environmental monitoring data. The commenters also suggested that all environmental monitoring data be placed in a separate file system since they have found it difficult and costly to compile data which is filed individually for each well. Other commenters recommended that proposed Section 815.12(i) be amended, under authority of Section 512(c) of the Act, to include appropriate confidentiality protection for data submitted to the regulatory authority. The Office agreed with these latter comments and deleted Section 815.12(i) of the proposed regulations because the issue of public availability of information is now covered in Section 776.17 of the final regulations. The reader is referred to the preamble of Section 776.17 for a discussion of the reasons for rules governing public availability of information. As for the comments suggesting that OSM use money collected from civil penalty fines to reimburse coal explorers for gathering and making available to the public environmental monitoring data, OSM's response is that it cannot legally do this since money collected from civil penalty fines goes to the general account of the U.S. Government and not to OSM.

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As for the suggestion that all environmental monitoring data be placed in a separate file, OSM does not believe that it should tell State regulatory authorities how to set up their filing systems.

Section 815.15(c). Several commenters stated that Section 815.15(c)(1) (proposed Section 815.12(c)(1)) is not necessary. The standards for vehicular traffic are acceptable as proposed, because these standards reflect the practices of conscientious coal exploration operators. One commenter further indicated that in his company's experience these practices have avoided environmental harm to the natural land surfaces traversed in the course of coal exploration. Other commenters recommended that this provision of the proposed regulations be revised because it would severely limit exploration activities. As worded, no off-road prospecting could be done on rainy days. These commenters alleged that States with much precipitation during the year could not, because of the proposed regulation, allow exploration for four or five months out of the year. Moreover, according to these commenters, roads that are not graded or surfaced can be adequate for all weather travel. The purpose of proposed Section 815.12(c) was to protect the environment from significant damage due to vehicular traffic. As several commenters pointed out, the danger of surface damage from vehicular traffic would be increased during and after precipitation. The increased damage varies depending on other factors such as terrain, slope, soil characteristics, rainfall, ground cover and vehicle weight. Commenters contended that numerous private, timber and utility service roads are neither surfaced nor graded but, as a result of fortuitous combinations of factors mentioned above, can be traveled at times of precipitation by light utility vehicles without damage to vegetation or the surface. These commenters requested that OSM recognize this variability and suggested that vehicular travel be restricted during and after precipitation only when such travel could result in excessive surface damage. Other commenters contended that the proposed regulation would in practice result in gravel roads and in times of precipitation would dramatically raise travel expenses and necessitate a much greater pre-drilling time delay. Moreover, if the road has to be regraded because of rutting, all of the gravel would be lost and thereby contribute to the expense of the operation as well as result in more disturbance to the environment. These commenters suggested that it will be necessary to remove the gravel before reseeding and thereby add additional expenses to the operation. Other commenters contended that having to attain grade limitations will result in the coal explorer potentially having to deal with numerous landowners instead of few landowners because in the process of crossing a mountain with switchbacks to attain grade, more landowners will be contacted. Other commenters contended that the grading of roads as required by the proposed regulation would result in the unnecessary disturbance of mifles in land surface allowing a rain event the time to place an exploration drill rig on site, thus creating a greater potential for erosion and environmental degradation more than that created by present methods.

The above comments convinced OSM of the need to clarify and rewrite the proposed rule. The final regulation requires that travel shall be confined to graded and surfaced roads during any periods when excessive damage to the environment could result. Based on this revision, it would be possible for a person to conduct coal exploration activities following a rainfall or snowfall provided the area was stable enough to allow vehicular traffic over it.

One commenter requested that the proposed regulation be amended to include the words "where applicable" after the phrase "travel shall be confined." Since this commenter did not give a reason for the requested amendment and OSM did not consider it relevant, the suggestion was rejected. The wording in Section 815.15(c)(1) would not severely limit exploration activities and would not require the construction of haul roads, as concluded by one commenter, except in certain cases when excessive damage to the environment existed. These cases would be rare and as a result the operator could delay planned activities until conditions for exploration were more favorable. Another commenter felt that "excessive" rutting should be added to Section 815.15(c)(1). This suggestion was rejected because OSM believes that the avoidance of any excessive damage should be regulated and not "rutting" alone, as might be incorrectly inferred if the word were inserted as proposed. Other commenters requested that the proposed regulation be limited to federally owned surface land. OSM rejected this request because Section 815.15(c)(1) makes it clear that this Part does not apply on Federal lands. The reader is referred to the preamble discussion.
for Part 740 for further elaboration of this issue.

Some commenters suggested that proposed Section 815.12(c) would effectively prevent a person from returning from the field for an indeterminate period if a sudden thunder-shower occurred while that person was off a graded and surfaced road. OSM did not believe it necessary to write an exemption in Section 815.15(c)(1), of the final regulations to cover persons on ungraded or unsurfaced roads who are caught in unexpected weather, since it would be unreasonable for the regulatory authority to charge such person with violation of Section 815.15(c)(1). OSM assumes that any excess damage caused by persons trying to escape from emergency weather conditions will be repaired by these persons.

One commenter requested that proposed Section 815.12(e) be amended to qualify the phrase "absolutely necessary," because it could be strictly interpreted to mean that no travel may be accomplished except on public or private graded and surfaced roads. In support of this contention, the commenter gave the example that the regulatory authority could argue that it is not absolutely necessary to drill test in a particular area if some, even though minimal, information had already been gleaned from prior drilling or other sources. This commenter suggested that the phrase "absolutely necessary" be qualified that travel necessary to accomplish the purposes of the exploration, which is to determine the geology of the area with a high degree of accuracy. OSM rejected this request because the intention of Section 815.15(c)(1) of the final regulations is not to allow the regulatory authority to determine whether there should be coal exploration. But rather if the requirements of Part 716 are met, the regulatory authority should confine itself to activities which, as stated in the regulation, are "absolutely necessary to conduct the exploration (emphasis added)." The phrase "to conduct the exploration" clearly qualifies the term "absolutely necessary" and does not permit the regulatory authority the discretion to disallow coal exploration or to determine the scope of exploration operations under the guise of Section 815.12(c) of the proposed rules or Section 815.15(c)(1) of the final rules. One result of the final regulation is to require that the exploration be conducted so that a minimum area will be disturbed by access routes and when road building is required (that is, when heavy equipment must be employed to move or remove trees, shrubs or earth materials), resultant new roads would then have to meet the performance standards of proposed Section 815.12(d)(1), (d)(2), (d)(3), (d)(4), and (d)(5). Several commenters were received on proposed Section 815.12(d)(1), which would have regulated the location of roads, limiting them to the flattest and most stable slopes. These commenters requested the provisions be deleted in their entirety. These commenters contend that they have no way of establishing when maintenance may be required and have no right of way on private, Federal, State, and local roads without permission. Moreover, these commenters contend that since State, Federal and local roads are maintained under existing laws and regulations, there is no need for coal explorers to have to maintain the roads they use. Other commenters contend that since very often a landowner will request a road be left in consideration for the use of his surface land during coal exploration operations, the landowner should be allowed to decide where and how the road should be constructed and not OSM. For these commenters, private roads on private property are not meant to be regulated by Congress. Other commenters requested that these provisions be limited to Federal lands since surface owner consent should cover the situation. For the reasons stated above, these rules do not apply on Federal lands. Other commenters wanted to amend proposed Section 815.12(d) because they questioned the definition of "road." For these commenters there are many instances where exploration activity can be conducted within a short distance of established county, State, or Federal highways. In these cases, coal exploration sites are commonly entered through a farmer's field and require no road-building activity at all. These commenters suggest that access routes cannot properly be considered "roads" as the term was used in proposed Section 815.12 or defined in proposed Section 701.15. For these commenters, the requirements set forth in these provisions would have regulated the location of these routes on Federal lands. Other commenters requested that these provisions be limited to public or private graded and surfaced roads, limiting them to the flattest and most stable slopes. These commenters requested amending proposed Section 815.12(d) so that roads could be located utilizing the most direct route to the drill site to minimize the area disturbed by construction and the resultant erosion. According to these commenters, the areas placed too great an emphasis upon the slope of a drill site access road while ignoring the length and area of such a road. These commenters contend that in highly mountainous regions, locating an access road on the flatter slope may result in the construction of a longer access road, exposing a larger area to erosion and increasing construction and reclamation time with a corresponding increase in the time a road would be exposed to the effects of erosion and making costs associated with reclamation and construction prohibitive in extreme cases. To minimize the potential for erosion by reducing the area disturbed and the time such disturbed area is exposed to erosion, these commenters would, as indicated above, amend the proposed regulation so that the area to be disturbed is considered equally with the flatness and stability of the slope in the design of temporary drill site access roads.

Numerous comments were received on proposed Section 815.12(d)(2), relating to stream crossings for roads. Several commenters requested that the proposed regulation be deleted entirely. Some of these commenters argued that since streams are being forded by vehicles of all kinds on numerous occasions, to require every single crossing of an active stream to be approved first by the regulatory authority will cause unwarranted delay and expense where limited stream channel crossing is involved. Other commenters contended that the requirements of proposed Section 815.12(d)(2) might be more disturbing to the natural land surface than the exploration operation because of the regulation to construct permanent culverts or other structures. For these commenters, occasional fording of stream channels would be preferable to the disturbance associated with the construction of culverts or bridges. Other commenters contended that proposed Section 815.12(d)(2) would be especially troublesome if applied to environmental studies, where vehicle access to widely distributed sampling stations is essential in order to obtain sufficient data. Some commenters suggested amending proposed Section 815.12(d)(2) to exempt "occasional" stream crossings. For these commenters, "occasional" stream crossings in the course of exploration for coal may be required and would not be the cause of significant degradation. Some of these commenters acknowledged that regular crossings would require greater attention by the regulatory authority but argued that some flexi-
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bility must be allowed to the coal explorer. Other commenters suggested amending the proposed regulation so that vehicles would be required to keep crossings of active stream channels to a minimum. Some of these commenters would further amend the proposed regulation so that if a permit application is submitted, then specific crossing locations must be approved by the regulatory authority as temporary routes. These commenters contend that the impact on a stream from a vehicle crossing is extremely limited (even if it is assumed to have water in it at all times), since the time necessary for a crossing is limited. Use of ond ods limits the disturbance that a crossing can cause. These commenters further contended that in operations involving less than 250 tons of coal, removing the stream crossings would typically be accomplished by small numbers of light four-wheel drive vehicles that do little or no damage. For these commenters, only in the event that more than 250 tons of coal would be removed would they request that stream crossings be removed. For mining operations, necessitating larger numbers of heavy vehicles, would the stream crossings become numerous enough and produce enough disturbance to warrant examination and regulatory review by regulatory authorities. Other commenters contended that their “drill site flagging and preparation procedures” would depend on the discretion and availability of an inspector regarding stream crossings. For these commenters, if impact on stream crossings is a concern, the mining site must be temporarily disturbed and then replaced to not only significant increase costs, but in many circumstances cause greater disturbance to the environment than vehicular travel. For these commenters, if inspection of the mining site is a concern, the site must be temporarily disturbed and then replaced with water bar as necessary.

Several commenters contended that removal and storage of topsoil before use of the land for full operating life would be counterproductive in the Appalachian region. These commenters alleged that Appalachian soils are generally classified as “Ochrepts” and are shallow with a poorly developed “A” horizon. Due to the steep topography, removal of the surface soil would require the disturbance of 3 to 5 times that needed to build a road using the present techniques. This additional time required for these operations would also increase the needed service life of these roads well beyond the 1 to 2 weeks normally associated with coal drilling operations, and thereby expose the disturbed area for a longer time period before reclamation could be completed. These commenters further contended that the removal of topsoil would disrupt wildlife, and environmental values or site productivity because by removing soil moisture retention, run-off may result in increased particulates in area streams.

Moreover, these commenters asserted topsoil removal may reduce grazing grasses and greatly increase the impact and duration of what would normally be a short-lived operation. These commenters concluded that proposed section 815.12(d)(2) could greatly increase the cost factors involved in exploration and may eliminate the ability of small operators to conduct coal exploration. Other commenters contended that topsoils on relatively steep slopes, such as those in eastern Kentucky, are usually shallow and stony and the underlying “B” horizon is generally clayish material, impermeable, and often pyritic which would constitute an obstruction to plant growth. These commenters contended that the “C” horizon, when topsoil is removed, generally offers the best soil environment for plant growth. Therefore, these commenters conclude, a regional variation for mountaneous areas should be added to the short term requirement for exploration roads.

Several commenters were received on proposed section 815.12(d)(4), which required sedimentation control for roads and required strict standards for these operations. Some commenters contended that the proposed regulation should be amended to allow the regulatory authority to have discretion to determine the nature of roads that are to be constructed which, if permitted, will be consistent with the post mining land use without simply assuming that permanent roads must be of the nature described in Part 816. These commenters asserted that they do not classify such roads as permanent in mountainous areas where the existing land use is grazing. The only road existing outside of permit areas are essentially ranch trails that are used periodically by drivable vehicles and stock. For these commenters, where the post mining land use will also be grazing, it would be valuable to ranchers to have additional ranch trails left of a similar nature to those roads that preexisted.

Other commenters requested deleting from the proposed regulation the phrase “best technology currently available” and substituting the phrase “established and generally accepted engineering technique.” For these commenters, the phrase “best technology currently available” is vague in its requirements and in the powers vested in the regulatory authority because “best currently available technology” may be so new as to be unproven in all cases yet required by the regulatory authority. Moreover, “best technology currently available” may become available after a project has been initiated and thereby require re-engineering, delays, and reconstruction in addition to possibly a large amount of additional investment with providing only marginal increase in effective utility over a more common accepted method. In addition, these commenters contended that best technology in one area may adversely affect another...
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area and best technology may be subject to differences of opinion depending on the application and parameters examined. These commenters concluded by using techniques that are necessary to plan exploration operations in advance of execution, and a solid base for these plans can provide adequate protection to environmental factors by the use of "established and generally accepted engineering techniques." Other commenters indicated that they were unclear as to the intent of the proposed regulation regarding permanent roads which are "modified." These commenters viewed the proposed regulation as implying that preexisting access routes, such as gas line service roads or old timbering routes, that are used by an exploration crew, would be subject to the stringent construction requirements of proposed Sections containing performance standards, for roads in Part 816, if these roads were "modified." These commenters believed that the performance standards should carefully distinguish between "new road" and "existing roads." "Permanent roads" should, for these commenters, be clarified by OSM to include only new roads constructed during or for exploration that will remain after exploration is completed and the definition, use, and modification of existing roads should be covered by a separate section of the regulations.

Several commenters requested that proposed Section 815.12(d)(5), relating to use of existing roadways, be deleted entirely and be replaced by new Sections 815.12(d)(5) and 815.12(d)(6). These commenters contended that existing roads are not to be treated or regulated by the same rules as "new roads." These commenters were uncertain as to what constitutes an "existing road," i.e., is it meant to include and entirely free from further use existing roads only (improved roads) or does it include private roads, old fire lanes, timbering roads, power or gas line service roads or the like? These commenters suggested a separate section to clarify the rules for use of existing roads from the rules for construction, maintenance and use of new roads. While it was clear to these commenters that restoration of new roads is expected, including but not limited to revegetation and removal of and replacement of topsoil, these requirements may not be appropriate or desirable for existing roads used temporarily as access routes to drilling sites. For these commenters, it is not uncommon, especially in the Appalachian coal fields, to use existing roads (such as gas line service roads or old timbering trails) for access to drill sites. These commenters believed that their procedure is practical, inexpensive, and eliminates much road construction activity and to the extent that these roads are not materially altered by such use, it is environmentally sound to use existing roads for exploration purposes. These commenters requested that proposed Section 815.12(d)(5) be amended to require that existing roads may be used for exploration activity in compliance with applicable Federal, state, and local requirements. Moreover, these commenters requested that, if these roads are not substantially altered or modified for use and if these roads do not contribute to suspended sediments, soil loss, or runoff outside the permit area, the exploration operator is required "only" to return these roads to their original, pre-exploration condition following exploration use.

Other commenters would add a new section to the regulations that would provide that if existing roads are significantly altered (including, but not limited to, change of grade, widening, or change of route, or if the use of existing roads contribute additions to suspended sediments, soil loss, or runoff outside the permit area) then existing roads should be subject to the provisions of proposed Section 815.12. Moreover, these commenters would point out in a new section that if significantly altered existing roads remain as permanent roads after exploration activities are completed, then these roads shall be designed, altered, and maintained in accordance with proposed Sections 815.15(c) and (d) relating to permanent roads. For these commenters there are instances when access routes for multiple transits are needed, or when terrain and vegetation are such that some surface disruption is required to lay out a route. But in most cases, these temporary access routes will not be used for other than exploration efforts. These commenters do not believe that for such temporary, low impact road uses, it is necessary to establish the same standards as proposed for use of existing roads, other than the requirement that the road be restored to return existing roads to a condition equal to or better than their pre-exploration condition.

Section 815.15(c) of the final regulations respond to the comments submitted in this section by providing that existing roads are not to be treated or regulated by the same rules as new constructed Class III Roads. Although it may be desirable to ameliorate environmental problems caused by existing roads which are used for coal exploration, OSM decided to require only that coal explorers repair any damage which they do to the roads while they are using them. Coal explorers are, therefore, required only to return existing roads to a condition equal to or better than their pre-exploration condition.

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In reviewing the above comments dealing with proposed Section 815.12(d)(3), OSM decided to reference to require no post-use reclamation activities to new Sections 816.150-176. These Sections consider road location, design and construction, drainage, surface, maintenance, and restoration based on the volume of use, speed, and frequency of use. Class III roads, such as those used in coal exploration activities, were considered to be of short duration, subject to low speed and light weight use, and restored productivity quickly. If conditions exist where less than 250 tons of coal is shipped out of the area for test processing, no approval is required and the coal may be hauled over the same roads used for coal exploration. Roads used for coal exploration may be used later for mining purposes and must meet the criteria compatible to its later use and class.

New Class III Roads constructed for coal exploration must meet the provisions of Sections 816.170-816.176. A new section 815.15(c)(3) was added to cover existing roads which are significantly altered or improved in road grade, width, alignment, drainage or surfacing and remaining as a permanent road after coal exploration activities are completed. According to this new section, the person conducting exploration shall ensure that these improved existing roads meet the provisions of 30 CFR 815.15(c) and CFR 816.150-816.166.

For existing roads that are not significantly altered or improved, that are used essentially as found, Section 815.15(c) provides that existing roads are not to be treated or regulated by the same rules as new constructed Class III Roads. Although it may be desirable to ameliorate environmental problems caused by existing roads which are used for coal exploration, OSM decided to require only that coal explorers repair any damage which they do to the roads while they are using them. Coal explorers are, therefore, required only to return existing roads to a condition equal to or better than their pre-exploration condition.

With respect to general topsoiling requirements contained in paragraph (e) of section 815.15, several commenters recommended that proposed Section 815.12(d)(3) be deleted because the regulation inferred that there is a need for continued coal exploration and the protection of the environment from coal exploration activities. Keeping with the philosophy behind Part 815 of setting minimum rules in broad terms of general applicability, Section 814.15(c) of the final regulations maintains the discretion of regulatory authorities to set more stringent requirements in their particular jurisdictions.

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changed the final regulations because the "State window" contained in Section 731.13 and the requirement in Part 736 to consider regional differences in plant species and topography. Section 815.12(e)(1) required the State to develop a plan for revegetation that will be used in mining). 816.21-816.25 (topsoil requirements), 701.11(c) (existing, non-conforming structures), Part 776 (documentary requirements for exploration and § 701.5 (definition of "best available restoration technology currently available"). Particular attention should be paid to the rationale underlying Section 816.170-816.176, which OSM believes will be the requirements applicable to the majority of roads constructed for exploration.

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Rules and regulations for coal exploration activities, including the regulation by eliminating the requirement that water used in coal exploration be treated. In all cases, care must be taken to minimize the amount of drilling fluid released and to reduce its adverse environmental effects.

Several commenters contended that the proposed version of this paragraph required approval of a plan for every type of exploratory operation, and that Part 776 requires only the filing of a written notice of intention where less than 250 tons are involved and does not include approval of a plan. Other commenters requested the following amendments to the proposed regulations:

1. In areas where surface mining is to be practiced, boreholes should be plugged by placing an artificial bridge or packer six to eight feet below ground level, backfilling with drill cuttings to within two feet of the surface and sealing by implantation of a metal cap overlain by one foot of cement and one foot of topsoil.

2. In areas where underground mining is to be practiced, boreholes should be cemented from bottom to top.

The comments convinced OSM of the need for greater flexibility in the regulation. OSM therefore modified the regulations. OSM also made changes to the foot cement cap requirement and making capping more flexible by referencing, in Section 815.15(h), Sections 816.13, 816.14, and 816.15. The reader is referred to the preamble discussion of these sections and Sections 817.13, 817.14, and 817.15, for the rationale and bases of these requirements.

Additional comments were received on proposed Section 815.12(k). These suggestions were rejected because they were based on a misinterpretation of proposed Section 815.12(k). Section 815.12(k) was proposed to allow equipment and/or facilities to remain on the site unless the exploration operator requested the regulatory authority that they remain on the site. The regulatory authority would allow this equipment and/or facilities to remain on the site for certain purposes. Section 815.15(l) allows equipment and facilities to remain on site only after a determination by the regulatory authority following a request by the explorer.

Section 815.15(l). General hydrologic balance protection is required under Section 815.15(l).

Several commenters contended that the construction of treatment facilities at the time of large-scale disturbance caused by the exploration would cause greater disturbance than the exploration itself. These commenters contended that the operators should be afforded the opportunity to use other materials and devices (straw bales, pole dams, etc.) which would meet the effluent limitations of Sections 816.42(a). Other commenters requested that proposed Section 816.42(k) be amended to exempt small amounts of drilling fluid, because under normal drilling conditions the amount of drilling fluid used is not great and is generally confined to the immediate vicinity of the drill site. One commenter requested that the requirement of a treatment facility be clarified to recognize the existing technologies and practices of "mud fills, decantation and fill." Another commenter contended that it is not clear whether the proposed regulation would apply to pumping of wells. Other commenters stated that the proposed regulation was not clear. One commenter contended that the requirement to have a treatment facility and to control exploration activities may need to be treated is excessive. This commenter suggested that only ambient levels be met.

Based on the above comments, proposed Section 815.12(k) was modified by incorporation into Section 815.15(l) of the final regulations provisions to allow for different sediment control measures than those referenced in Section 816.45 or sedimentation ponds. Several commenters contended that the regulatory authority should not be required to reimburse the operator for the cost of the facilities, assume the cost of operation and maintenance, and assume all liability for these facilities and/or equipment which remain on the site.

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which will be applicable under a State or Federal program for surface mining activities. Surface mining includes methods commonly known as contour mining, area mining, auger mining, mountaintop removal, box cut, open pit, and removal of coal from waste piles.

§ 816.1 Scope.

1. Commenters requested that existing nonconforming structures (now simply referred to as existing structures) be exempted from the performance standards of Part 816. The reader is referred to the preamble discussion of Sections 701.11(e), 780.12 and 786.21 for a full explanation of how this Part applies to existing structures.

2. Other commenters requested that Parts 816 and 817 be combined into a single Part. This request was not accepted. The Act, Section 610(d), recognizes the difference between surface and underground mining and mandates the "modification of requirements, permit approval and bond requirements as are necessary to accommodate the differences between surface and underground coal mining." This has been done, and the requirements are sufficiently different that separate Parts are the clearest way to present the requirements. Also, OSM wants a separate set of rules for each category of mining, which will be self-contained and complete so that the operator need not read or retain copies of requirements not applicable to the particular operation.

3. A comment that all coal exploration or exploration holes be excluded from Part 816 was rejected. Exploration holes to be drilled within a permit area are governed by the requirements of Section 515(b)(10)(A)(ii) of the Act. This activity falls within the definition of mining operations under Section 701(26) of the Act, as opposed to exploration, which is an activity not subject to permit requirements. Holes outside the permit area are governed by Part 815.

§ 816.2 Objectives.

These objectives derive from Sections 102 and 515 of the Act. A commenter requested striking the word "enhance" from this Section since it was not in the Act. The Act states in Section 515(b)(24) "to the extent possible using the best technology currently available minimize disturbances and adverse impacts of the operation on fish, wildlife and related environmental values, and achieve enhancement of such resources where practicable." Based on this wording in the Act, "part 816" was not removed from Section 816.2, since improvement of conditions is a goal Congress clearly intended be achieved, where possible.

§ 816.11 Signs and markers.

This Section specifies requirements for identification and warning signs and for markers of permit perimeter, buffer zones, and topsoil storage piles. The regulations seek to balance the desire to reduce cost and bother to the permittee against the need for ample identification in the interest of citizen participation, inspection by the regulatory authority, employee guidance, and protection of the public. Proper markings of perimeters and working areas will be particularly valuable in preventing equipment operators from inadvertently entering areas not authorized for disturbance and should help eliminate arguments over location of perimeters. Properly posted signs and markers reduce hazards to the health and safety of the general public and mine personnel and prevent adverse effects on the environment.

The statutory authority and purpose for this Section are found in Sections 102, 201, 301, 401, 501, 503, 515, 513(d) and 701(17) of the Act.

Literature on which the requirements are based include the following:
1. 30 CFR 77.1202.
3. Maryland Department of Natural Resources, Geological Survey-Bureau of Mines, Bituminous Coal Strip Mine and Auger Mine Regulations of 1972, 08.06.01(03).

The provision of Section 816.11(a) was adopted by OSM to assure that signs and markers used during surface mining activities comply with local ordinances and codes, and to clarify that these regulations are not intended to exempt operators from other applicable laws.

§ 816.11(a). Maintenance of signs and markers shall be the responsibility of the permittee until the final bond is released on the permit area. OSM adopted this provision because it will be necessary for the regulatory authority to know who is responsible for the permit area, the boundary of the permit area, and the location of buffer areas, blasting areas, and topsoil stockpiles, in order to make thorough inspections. Without continued maintenance of these signs and markers, inspection of the permit area would be difficult.

§ 816.11(c). The authority for this Section is found under Section 517(d) of the Act. The placement of identification signs at points of access to the permit area from public roads will identify to the regulatory authority and public the location of surface mining activities.

§ 816.11(c). The authority for this Section is found under Section 517(d) of the Act. Several commenters felt that Section 816.11(c)(2) should only require that a current surface mining permit be specified. As proposed on September 18, 1978, all permits had to be identified. The commenter's sugges-
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requires everyone to be removed from a blasting area before a shot is fired unless shelters are provided. If the whole mine was labeled a blasting area by OSM, a strict interpretation of the MSHA rule would require everyone on the mintsite to leave or take shelter. On the basis of this recommendation, Section 816.11(f) was amended to eliminate potential conflict between regulations of two Federal agencies. Originally, the proposed regulations stated that signs reading “Blasting Area” should be displayed at the edge of blasting areas along roads within the permit area. This provision appeared to be ambiguous, so OSM accepted the suggestion that “Blasting Area” signs be displayed along the edge of blasting areas which come within 50 feet of roads within the permit area or within 100 feet of any public road right-of-way, in accordance with Section 761.11(d) of these regulations. The 50-foot distance was chosen for mine roads, since employees will be using those roads instead of the public. All employees on the operation should be informed when the blast is to occur. As a result, the suggestion was more appropriate for posting the “Blasting Area” signs. These specific distances were adopted to further clarify the situation in which “Blasting Area” signs should be displayed. The implementation of these distances will make the inspection and enforcement process simpler. Section 816.11(f)(2) was implemented to be in conformance with the provisions of Section 816.65(c). The reader is directed to the preamble on Section 816.65(c) for further discussion. Because of the minor conflict with MSHA regulations, instead of requiring a sign reading “Blasting Area” at all entrances to the permit area from public roads, a sign reading “Warning! Explosives in Use” will be required, as stated in Section 816.11(f)(3).

816.11(g): Adequate marking of topsoil storage areas is required around all areas utilized to stockpile topsoil or other designated subsols pursuant to Section 816.23. A few commenters felt that requirements for topsoil markers should be deleted in their entirety. Section 515(c)(5) of the Act specifies the removal of topsoil from the land in a separate layer and requires attention to topsoil handling, storage, and preservation. Such attention suggests clear identification of topsoil storage areas. Topsoil identification will assist operators in complying with the regulations and will aid citizens and regulators to understand the basis of this rationale, Section 816.11(g) was not changed.

§816.13-§816.15 Casing and sealing of drilled holes.

Except for the differences noted below, Sections 816.13-§816.15 are substantially identical to the underground mining performance standards in Sections 817.13-817.15. The reader is referred to the portions of the preamble for Part 817 which discuss Sections 817.13-817.15, for information concerning the technical basis, alternatives considered, statutory authority and disposition of comments for these Sections. In addition to the Sections of the Act cited in those portions of the preamble, these Sections are based on Section 515 of the Act. While the Office considers the effects of improperly protected holes and entryways to be sufficiently similar in surface and underground mining to warrant substantially identical performance standards, the distinct differences between surface and underground mining operations do require that certain parts of these Sections reflect these differences. This is illustrated by the references in Section 817.15 to shafts, drifts, adits, and entryways—references not specifically stated in Section 816.15. Additional differences are shown in Sections 816.14 and 816.15, which deal respectively with the temporary sealing of drilled holes and other underground openings and the permanent sealing of drilled holes and other underground openings.

§816.21-§816.25 Topsoil.

Authority for these regulations is contained in Sections 102, 201, 501, 503, 504, 507, 508, and 516 of the Act.

The technical literature used in preparing Sections 816.21-§816.25 includes the following:


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Plains, Jour. of Soil and Water Cons., Vol. 33, No. 2, pp. 59-74.

These sections contain regulations for achieving the requirements of Sections 815(b) (5) and (6) of the Act, as well as certain of the provisions relating to revegetation, protection of the hydrologic balance, minimization of air pollution, and prompt reclamation. These sections require that persons conducting surface mining activities remove topsoil or other approved plant-growth material before beginning mining operations, save it for later use in a manner conducive to protecting the primary root medium from contamination and erosion, and redistribute it in a manner which will enhance its productivity. Systematic handling and storage practices can protect physical and chemical characteristics that are necessary to maintain vegetation while it is in storage and after it has been redistributed onto the regraded area. These regulations are intended to minimize water pollution and provide a medium for plant growth capable of returning mined land to a condition and/or use equal to or higher than that before mining.

§ 816.21 Topsoil: General requirements.

Numerous commenters voiced concern that Section 816.21(a) could prevent mixing of the B and C horizons or other supplemental materials, and that selected overburden materials should not be removed before surface disturbance. According to these commenters, the requirement "as a separate operation" could also restrict movement of topsoil materials during regular mining operations and increase cost of production. The phrase "as a separate operation" is not intended to require an operation separate and apart from the regular ongoing mining program, but the topsoil to be saved must be removed as a separate layer and as a logical step in the mining process. Thus, when practical, the material should be moved only once from its original location to the place where it should rest permanently as a part of the new soil. Nor was the intent to prevent the mixing of the soil strata if the resulting soil has been determined to be equal to or more suitable for vegetation as provided in Section 816.21(e). This Section has been revised to better assure that its intent is clear.

A commenter suggested that there was not an obvious, impelling reason for emphasizing that A horizon materials should constitute the definition of topsoiling material. The Office agrees that topsoil is a general term that is used in at least four ways (Agricultural Handbook, No. 18, p. 185). In an effort to provide clarity, the Office has elected to define topsoil in accordance with one of those common usages and to use the term "topsoil or substitute materials" when making reference to specific topsoiling materials. Further, the Office recognizes that some sites may not contain topsoil as defined in these regulations and, when that is the case, paragraph 816.22(c) is applicable.

A commenter suggested that OSM require removal of topsoil (as well as subsoil) to be saved and used to separate the topsoil from the spoils in all reclamation. This commenter felt that only in this way could the operator be sure that the subsoil is nontoxic. The Office decided that topsoil removal is not warranted since under the requirements of Sections 816.22, 816.48, and 816.103 which assure, respectively, that enough topsoil or a combination of topsoil and a substitute material is preserved to enhance productivity, that toxic materials are promptly identified and properly disposed of, and that at least 4 feet of nontoxic or substitute material remains after mining. Commenters recommended that a clause be added to this Section exempting premining activities from the separation of vegetation from the topsoil materials in order to avoid a costly soil removal. The Office has determined that a statement in Section 816.21 or 816.22 that would exempt activities that "normally precede mining operations" from topsoil removal is not warranted since applicable exemptions are set forth in the regulations for the activity involved (see, for example, Sections 816.152(d), 816.162(d), and 816.172(d) which provide for mixing of materials associated with road construction).

Several commenters suggested deleting the reference to Section 816.23 from Section 816.21(b) because Section 816.23 requires stockpiling only when it is impractical to redistribute topsoil immediately. The Office believes that reference to Section 816.23 is needed to further identify the topsoil storage and stockpile requirements. Therefore, the commenters' suggestion has been rejected.

Several commenters were concerned that it may not be desirable or environmentally sound to respread topsoil material "immediately" following the final grading. They contended that topsoil material should not be respread until the graded area has had time to settle; thus, the word "immediately" should be removed from Paragraph (b) of this Section. The Office has rejected these comments because the regulatory authority can rely on the term "when it is impractical to promptly redistribute" of Section 816.23 and require stockpiling if it appears that immediate respreading would be impractical because of potential settling problems.

§ 816.22 Topsoil Removal.

The requirements of Section 816.22 are essential for reconstructing a plant growth medium (soil) that will create the most favorable qualities for plant growth. Soil profiles vary widely in thickness, from mere films to those many feet thick. Some, and perhaps deep layers may need to be examined because of their importance to drainage and other factors (Agricultural Handbook No. 18, p. 147). Also, plant roots require soil horizons that are able to supply adequate water, air, and nutrients (Agricultural Handbook No. 18, p. 249). Thus, the friable nature of the A horizons makes them the most favorable material for seedbeds among existing materials at surface sites.

McCormack (1976) stated: "In most areas, the A horizon of natural soil is vastly superior to any underlying soil horizon or geologic strata. Even if it is only 3 or 4 inches thick, careful handling and return of this horizon to the surface is required for most successful reclamation. The soil survey indicates the thickness of the A horizon and properties that are important to reclamation, including texture, structure, organic matter, and depth. If the A horizon is removed and used in other areas, it can easily be replaced." Thus, the friable nature of the A horizon, during removal, could be counterproductive to restoration of the disturbed area to a level at least equal to the premining capability.

The regulatory authority might require removal and separation of the B horizon or portions of the C horizon or other substrata if necessary to obtain soil productivity. Flass (1978, p. 87) stated that "most modern mining operations may involve the removal and storage of the B, C, and D horizons. McCormack (1976, p. 19) states that "instances where the geological strata is better suited for the productive growth of plants, although uncommon, do exist in a few areas and should be recognized before final plans for excavating and regrading are made." Similarly, the Montana rules and regulations (sections 26-2.101(10)c(3), (6), and 26-1.100(10)(a)304(6)G) provide for the use of plant-growth materials, other than topsoil, when those materials are determined superior in production potential to the topsoil of a disturbed area.

Agricultural Handbook No. 16 states that "Some plant roots penetrate to much greater depths than commonly believed." Also, McCormack (1976) wrote that "Most A horizons are less than 10 inches thick—too thin for a fa-
vorable root zone for most plants. Other favorable material must be placed below the A horizon in order to create favorable root zone several feet in thickness. In most areas the B horizon is more satisfactory in the root zone than is material from geologic strata, but McCormack says these materials need evaluation and the one most suited to restoring productive thickness. Thus lower horizons ordinarily possess qualities that are less favorable for plant growth. Thus, to mix these materials will ordinarily lessen the productive potential.

The mixing of topsoil and selected overburden is an acceptable practice when the mixture produces a soil medium more suitable for land-use capability than the topsoil. Alternative strata may be used as a rocky soils; operator safety on steep

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says "more suitable." This was a valid comment and the Section has been re-written accordingly.

A number of commenters responded to the requirement that qualified soil scientists segregate substitute materials. One suggested that additional professionals, such as geologists and foresters, should be added to this list. Other commenters stated there were no standards for approving laboratories; therefore, it would be sufficient to have the soil tests performed by a laboratory using standard testing procedures. The Office has determined that the regulatory authority approval of a laboratory using standard procedures is adequate to assure reliability of the test results because standard laboratory procedures exist that are regionally accepted for soil analysis.

A commenter suggested deleting "segregated" from paragraph (e)(4). It was suggested that this change was necessary to allow the mixing of strata in areas that should be shown by the mixed overburden is equal to or more suitable for the approved post-mining land use than is the available topsoil. The Office has determined that these regulations provide for the mixing of strata under paragraph (e)(1) and that the wording of (e)(4) should be retained to assure that substitute materials are segregated when necessary to protect the substitute materials from contamination by materials unsuitable for plant growth.

Paragraph (f): Limits on topsoil removal area. A commenter suggested deleting paragraph (f)(2) because it is inconsistent with the heading "topsoil removal" and is duplicative of Section 816.24(b)(3). The provisions of paragraph (f) provide guidance for limiting the size of the area from which topsoil is removed. Furthermore, the Office feels that paragraph (f)(2) of Section 816.24(b)(3) relates to redistribution after removal. Thus, the Office elects to retain paragraph (f)(2) of Section 816.22 to provide for limiting the size of the area of topsoil removal so that it can be controlled, thereby minimizing air pollution and disturbance to the hydrologic balance that could result when extensive areas of topsoil are removed before actual mining of the area.

A commenter suggested adding a new paragraph called "Toxic Topsoil" to Section 816.22. The paragraph, as proposed, would require toxic topsoil to be treated like all other toxic materials. Section 816.103 of these regulations provides direction in handling all acid and toxic-forming materials. The Office has determined that the toxic surface layer would be considered as toxic material under Section 816.103 and that the proposed addition to the regulations is not necessary.

§ 816.23 Topsoil Storage.

Section 816.23 is intended to protect the physical and chemical qualities of topsoil while that material is being stored. Plass (1978, p. 57) writes that "planned placement may segregate materials suitable for reclamation," and McCormack (1976) states that burying the A and B horizons under many feet of spoil during a surface mining operation is not compatible with full restoration of productive potentials.

The requirements of this Section are essential for protecting the quality of the topsoil and other materials that are to be distributed as the surface layer. Thus, initial placement must be selective so as to protect the material from wind and water erosion and protect the physical and chemical qualities of soil materials while those materials are being stored. For example, a vegetative cover is required immediately after a portion of the stockpiled material is in place, if the growing season permits or if it is required for stability and to keep important nutrients from breaking down and leaching out.

The removal prohibition is intended to minimize chemical and physical losses that may occur when soils are handled excessively. Likewise, the Office recognizes that it may sometimes be necessary to move stockpiled materials before they are redistributed. These regulations allow removal from one stockpile area to another area after regulatory authority approval is obtained.

A commenter proposed that stockpiling of topsoil for roads associated with coal exploration be eliminated from the regulations. It was argued that only a minimal amount of surface material need be moved and the low 4-wheel-drive vehicles to get to and from the site and that the surface material can be pushed to the side of the road and redistributed immediately after the drilling site is evacuated. The commenters' concerns are dealt with in the preambles to Part 815 and Sections 816.150-816.176.

Comments suggested that requiring both annual and perennial plants to be seeded may not be appropriate, realistic, or cost effective. The Office concurs that the seed to be used should be determined according to site conditions and operational situations, and those situations are provided for under Paragraph (b)(1)(ii).

A commenter wanted this Section to require that stockpiles be seeded or planted immediately, or that perhaps used when temperature is too low to establish vegetation when needed to control erosion. Section 816.113 of the regulations requires seeding or planting during the first normal period following mining of the area.

§ 816.24 Topsoil Redistribution.

This Section requires that regraded land be scarified or otherwise treated, as required by the regulatory authority, to eliminate slippage and promote root penetration. Scarification may be conducted after topsoiling when the regulatory authority approves. A person conducting the surface mining activity is required to use the soil and other materials to a uniform stable thickness, to prevent excessive compaction, and to protect the topsoil from wind and water erosion before and after it is seeded and planted.

McCormack (1976) writes that "of greater importance than any other factor in achieving successful reclamation of surface mined land is the nature of the soil left at the surface after mining. The nature of this soil determines the choices available for plant species." McCormack then stated that "Soils should be reconstructed so as to have a sequence of horizons chosen from the best available soils and geologic strata. This will create the most favorable qualities for plant growth." The topsoil must be uniformly redistributed in a manner that assures placement and compaction compatible with the needs of the area.

Lull (1959, p. 27) found that soil compaction drastically reduces the pore space through which water, air, nutrients, and life forms can move, thus, infiltration and percolation, increasing runoff, and encouraging erosion. Baker (1977, p. 27) said the growth of hardwoods depends on the following soil factors: (a) Soil physical condition, (b) moisture availability during growing season, (c) nutrients available, and (d) aeration. These same factors must be considered so that the redistributed soil layers will support the vegetation required under Sections 816.111-816.117. Under Section 816.24, compaction that restricts root penetration must be avoided during topsoil redistribution since closely packed soil can be relatively impermeable (Powers and others, 1976, pp. 71-72). Numerous commenters argued that the requirement for scarification in all cases is unnecessary and that the slippage potential is low or nonexistent on level or nearly level lands and that the need for scarification depends upon site conditions such as soil type, soil depth, compaction of spoil, climate, and topography. Thus, rocky or sandy overburden often is too loose and uncons-
udated to create slippage surfaces. Hence, mandatory scarification before replacement of topsoil may not serve the objective of protection of topsoil from contamination on all sites. Further, it was contended that compaction depends upon equipment used and overburden material characteristics. The regulation as written provides that graded land shall be scarified or tilled. The Office believes a change in the regulation is not necessary, since the method to be used to eliminate slippage may be determined on a site-by-site basis.

§ 816.25 Topsoil: Nutrients and soil amendments.

This Section sets forth soil nutrient and amendment provisions to ensure that the surface soil layer will support the revegetation requirement of the postmining uses. The soil tests that are used to determine soil productivity and fertilizer and soil-amendment needs are to be performed by a qualified laboratory using standard methods approved by the regulatory authority.

Like Section 816.22, Section 816.25 provides for utilization of the results of soil tests, trials, analyses, and surveys required by Section 779.21 of these regulations. The availability of mineral elements essential to plant growth varies considerably in strata of the overburden. This wide variation in available plant nutrients makes it advisable to sample the surface material to determine if the proposed land use and vegetative plan is feasible (Plass, 1973, p. 58). If the strata of overburden contain good supplies of mineral nutrients, these materials if properly used on the mined and graded lands will provide adequate nutrients. However, some soil materials will require the addition of amendments to establish vegetation that can be sustained on the site. (Grand, 1973, p. 64, and Aldon, 1978, p. 78).

A commenter suggested a rewrite of this Section that would specify the necessary chemical analysis. The provisions of this new section, as suggested, would include guidance on representative samples, limestone fineness and depth of incorporation, and frequency of testing. The Office believes that the suggested language is duplicative of the provision contained in Section 816.22(c), and that the analysis details should be developed by the regulatory authority; therefore, the commenter’s alternative has not been accepted.

A commenter suggested deletion of the phrase “in the amounts determined” and the inclusion of “if shown to be required” by soil tests “and known plant nutrient requirements” to assure that the basis for making lime and fertilization recommendations was correlated with crop responses in the field. Further, it was stated that many native species of plants have not been extensively analyzed for nutrient requirements and that the methods cannot provide enough information to prescribe nutrients. The Office rejects this recommendation because the Section clearly indicates that the recommendations are to meet the revegetation requirements and are not a blanket requirement to apply nutrients or amendments.

Numerous commenters expressed various opinions on requiring that soil tests be certified by a soil scientist or agronomist. Some contended that laboratories conducting soil tests may not have agronomists or soil scientists on their staff, yet the laboratory is qualified to conduct soil tests. Other commenters said that approval of the laboratory was not necessary, only the certification by a soil scientist or soil scientist; and a third group said that the regulatory agency should be restricted to approving the testing methods.

After careful consideration, the Office has determined that the requirement for certification by a soil scientist or agronomist is not necessary when soil testing is a major activity of the laboratory and the laboratory is approved by the regulatory authority. Therefore, the Office has deleted the requirement for certification by a soil scientist or agronomist because other specialists (for example, analytical chemists or soil scientists) may be equally well qualified to certify the soil-testing procedures and results. To assure that soil tests are conducted by qualified personnel, the Office has accepted the recommendation that tests be performed by a qualified laboratory using standard methods approved by the regulatory authority. This requirement will produce results that can be compared and will be the only necessary control since regulatory authority approval of the laboratory amounts to approval of the qualifications of the laboratory personnel.

§ 816.41–816.57 Hydrologic balance.

These Sections require that surface coal mining and reclamation operations be planned and conducted so as to minimize disturbance to the prevailing hydrologic balance. The purpose of these requirements is to ensure that both long-term and short-term adverse changes in the hydrologic balance, that could be caused by mining and reclamation activities, will be prevented or minimized both on and off the mine site.

The authority for these Sections is set forth in the Act at Section 102, 201, 501, 503, 504, 507, 508, 509, 510, 515, 517, 519, 522, 701, 717.

The literature used in writing the performance standards to protect the hydrologic balance includes, in addition to other works cited within the preamble text:


5. Bone, S.W., et al. (no date). "Ohio erosion control and sediment pollution abatement guide." Ohio State University, Ohio Cooperative Extension Service Bulletin 594. 19 p. (Sec. 816.45(a–g))


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in Appalachia." American Society of Agricultural Engineers, Winter Meeting, Dec. 10-13, 1974, Chicago, Ill. Paper No. 74-P56. 29 pp. and appendices. (Secs. 816.42(a), 816.45, 816.46(b), 816.47, 816.49(a)(b), 816.56)


24. Curtis, W.R. 1972(a). "Chemical changes in streamflow following surface mining in eastern Kentucky; (U.S. Department of Agriculture, Forest Service, Northeastern Forest Experimentation Station)," in Fourth Symposium on Coal Mine Drainage Research, April 25-27, 1972, Mellon Institute, Pittsburgh, Pa. (Secs. 816.41(b), 816.45, 816.46(b), 816.49(a)(b), 816.55)

25. Curtis, W.R. 1972(b). Strip-mine increases flood potential of mountain watershed, in National Symposium on watersheds in Transaction professional Paper 969, 39 pp. (Sec. 816.41(b), 816.45, 816.46(b), 816.49(a)(b), 816.55)


40. Feder, G.L. and Saindon, L.G. 1976. Geochemistry of ground waters
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42. Galbraith, A.F. 1973. A water yield model of channel stability and bank erosion procedure—Kootenai National Forest: U.S. Department of Agriculture, Forest Service, Kootenai National Forest, Montana, 38 pp. (Secs. 816.41(a), 816.43(c), 816.44(b)).


44. Gary, M.; McAfee, R., Jr.; and Wolf, C.L; editors. 1974s. Glossary of geology. American Geological Institute, 805 pp. (Gen'l Sec. 816.41-57.)


46. Gasper, D.C. 1978s. Upper Bucknannon River Acid Sources. 21 pp. (Sec. 816.48).


48. Gilley, J.E., Gee, G.W., Bauer, A., Willis, W.O., and Young, R.A. 1977. Runoff of Characteristics of Surface-Mined Sites in Western North Dakota. Amer. Society of Agricultural Engineers, Transactions Vol. 20, No: 4, pp. 697-700, 704. (Secs. 816.41(a, b, d), 816.45(a-g)).


53. Haan, C.T. and Barfield, B.T. 1978. Hydrology and Sediment Control from Surface Mine Areas, College of Agriculture, University of Kentucky, Lexington Chapters 1-6, Various Pagings, (Secs. 816.46(b-d), 816.47, 816.49(a)(b), 816.56)

54. Hamilton, D.A., and Wilson, J.L. 1977. A generic study of strip mining impacts on groundwater resources. Massachusetts Institute of Technology, Department of Civil Engineering, Ralph M. Parsons Laboratory for Water Resources and Hydrodynamics, Report No. 229 (R-77-29). (Secs. 816.50, 816.51)


60. Janik, H.K. 1975. Purification of waters from strip mine waters in Polish-U.S. Symposium on Environmental Protection of Open-Pit Coal Mines, May 27-29, 1975, Denver, Colo., University of Denver Research Institute, Proceedings, pp. 50-56. (Secs. 816.42(a), 816.55(b)).


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82. McKenzie, G.D. and Studnick, J.R.J. 1977. Determination of Spill-Bank Erosion Rates Using Interbank-Sediment Accumulations. Ohio State University, Department of Geology and Mineralogy, Columbus, Ohio, 15 pp. (Sec. 816.45(a-g))


99. Pfunkhuch, D.J. 1975. Stream reach inventory and channel stability evaluation—a watershed management program. U.S. Department of Agriculture, Forest Service, Northern Region, 26 pp. (Secs. 816.43(a), 816.44(b))

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110. Shumate, K.S.; Smith, E.E.; Dungan, P.R.; Brand, R.A.; and Randles, C.I. 1971 Acid mine drainage formation and abatement. (Prepared by the Ohio State University Research Foundation.) U.S. Environmental Protection Agency report DAST-42. 82 pp. (Available from U.S. Department of Commerce, NTIS PB-189 835.) (Secs. 816.48, 816.50, 816.51)


119. Turner, W.R. 1958. The Effects of Acid Mine Pollution on the Fish Population of Goose Creek, Clay County, Kentucky. Prog. Fish Cult. Volume 20, No. 1, pp. 45-46. (Secs. 816.42(a), 816.48(a)(b), 816.50, 816.52(b), 816.55(b))


130. U.S. Department of the Interior. 1977. Surface Mining and Our Environment. A special report to the nation. 296 pp. (Secs. 816.41(c), 816.53)
137. U.S. Environmental Protection Agency. 1977(c). EPA comments and analysis of final EIS on proposed 20-year plan of mining and reclamation, Westmoreland Resources Tract III, Crow Indian Ceded Area, Montana, transmitted July 26, 1977, from EPA Regional Administrator, Region VIII to Acting Director, U.S. Geological Survey. 21 pp. (Secs. 816.42(b), 816.53, 816.51, 816.55(b))
138. U.S. Forest Service. 1972. Forestry research—toward a quality water supply: U.S. Department of Agriculture, Forest Service, Forestry Science Photo Story No. 10, 4 pp. (Northeastern Forest Experiment Station, Upper Darby, Pa.) (Secs. 816.45(a-g), 816.53(a-c), 816.54)
140. U.S. Forest Service. 1973b. Soil resource inventory procedures (applicable to Rocky Mountain coal mine region): U.S. Department of Agriculture, Forest Service, Southwest Region, Albuquerque, New Mexico. Various pagers. (Secs. 816.41(d), 816.45(a-g))
nia Department of Transportation for Federal Highway Administration. Report 72-21), U.S. Department of Commerce, NTIS Report PB-253 640. 27 pp. and appendix A. (Secs. 816.46Cb, 816.47, 816.49(a)(b), 816.50)


157. West Virginia Department of Natural Resources. 1975. Drainage handbook of surface mining. West Virginia Department of Natural Resources. 75 pp. and appendixes I-IV. (Secs. 816.50(a)(b), 816.51(b)(c), 816.56)


159. Wilber, C.G., 1969. The biological aspects of water pollution. Charles C. Thomas, Publisher, Springfield, lll. 256 pp. (Secs. 816.45(a) 816.47, 816.57(a))


816.41 Hydrologic balance: General requirements.

Section 816.41 sets forth in general terms the hydrologic requirements for surface mining activities. In light of the testimony presented before Congress and during deliberations over the Act, the requirements of the Act, and State regulations on the subject, details are provided which are believed to be sufficient to ensure that, on a national basis, all surface coal mining and reclamation operations are conducted in an environmentally acceptable manner. The process of surface mining involves a number of changes in land cover, drainage pattern; and nature of the overburden that may markedly alter the hydrology of an area. (See the Environmental Impact Statement accompanying these rules, Section III-B, Water).

Past studies have documented changes in flooding, base flows, sedimentation, and water quality in streams draining mined watersheds (Curtis, 1972a, b; p. 1973, p. 3; 1974, p. 4; Davis, 1967, pp. 426-428; Gilley and others, 1974, p. 2; Flas, 1975, p. 18; Simpson, 1977, p. 8). In addition, adverse impacts can occur to the groundwater resource and in downstream stream flow and erosion characteristics by mining (Dyer, 1977, p. 13), although these latter changes are less easily documented and usually become a consideration only when large areas are mined. These various impacts result because interruptions in one or more components of the hydrologic system can affect other components in the system (Gregory and Walling, 1973, p. 456). For example, the changes in water yield associated with removing vegetation to expose soil in surface mining activities can result in stream channel instability problems (Galbraith, 1973, p. 21). Other examples are discussed in the Environmental Impact Statement, Section III-B, Water). Therefore, it is important that the hydrologic balance of an area to be mined be altered as little as possible as a result of surface mining.

The regulations are structured on the premise that the applicant for a permit will research and understand the hydrologic balance in the mine plan and adjacent areas prior to mining, as well as understand the potential impacts of mining on that balance, so that operations are planned and conducted to minimize disturbances to the hydrologic balance both on site and off site. Since the hydrologic balance may be restored only after long periods of time (Surface Mining Control and Reclamation Act, House Report No. 95-218, p. 113), it is necessary for the permitting agency to project long-term implications of the mining.

The primary source of legal authority for rules is Section 515(b)(10) of the Act.

1. Several commenters suggested that the language of Sections 816.41(a) and 817.41(a) be changed so that it would be necessary to plan for the greatest disturbance of the hydrologic balance both on site and off site. Since the hydrologic balance may be restored only after long periods of time (Surface Mining Control and Reclamation Act, House Report No. 95-218, p. 113), it is necessary for the permittee to project long-term implications of the mining.

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surface drainage channels' because constraints on individual elements of the hydrologic system are not necessary to preserve the overall hydrologic balance. The Office rejected this proposal, because the regulations do not require that the exact ground water levels be maintained, but rather that changes brought about by mining are required to minimize the disturbance to the prevailing hydrologic balance (Section 817.41(b)).

6. One commenter suggested that Section 816.41(c) be deleted since it is not necessary in order to require compliance with other applicable laws and regulations. This suggestion was rejected since this Section provides guidance of the general requirements that the permitting must meet, and further OSM is required to ensure protection of the hydrologic balance as may be required by these other laws.

7. Several questioned the provisions of Sections 816.41(d). The commenters were divided on their position; some felt that this Section should be expanded to cover more details on seeding and mulching, others felt paragraphs (d)(1) and (d)(2) should be shortened or be completely deleted from the regulations. One alternative which was considered was to expand this Section to be more specific and make it inclusive as far as the stated practices to control and minimize pollution. This alternative was rejected because Section 816.41 discusses alternative practices for protecting the hydrologic balance and is not exclusive. Details and specifics of the topics mentioned here are adequately addressed in the Sections following 816.41, and in particular Sections 816.111-816.117. Another alternative considered was to entirely delete this Section; the commenters felt there was no need for this Section since it was alleged to lack specification, consisting of only practices which may be used to achieve the requirement of the Act. However, since this is a general Section which is designed to provide both rationale and guidance to achieve the required performance standards, it was decided to reject this alternative and to retain the language of the proposed regulations. This discussion also applies to Section 817.41(d).

8. One commenter noted that Section 816.41(d)(1) requires emphasis of practices that prevent or minimize water pollution and changes in flow in preference to the use of water treatment facilities. A general Section which is being considered for the treatment of waters is responsible for treatment is clarified in Section 816.42.

§816.42 Hydrologic balance: Water quality standards and effluent limitations.

A. Introduction

1. Authority for this Section is Sections 102, 201, 501, 503, 504, 505, 507, 509, 510, 515, 517, 519, 622, 701, 702, and 717 of the Act.

2. This Section specifies water pollution control standards and adds the general requirement that the intent of this Section was at 43 Fed. Reg. 41744-41745 (Sept. 18, 1978). To provide clarity to the reader, the Section was restructured from the proposed version to include discrete alphanumeric paragraphs.

3. Paragraph (a) of Section 816.42 establishes several important standards for the protection of the hydrologic balance from surface mining activities. Under 816.42(a)(1), all drainage from the disturbed surface areas is to be passed through sedimentation ponds prior to discharge. That Section provided that the administration of this Section is as defined in Section 701.5, with the modifications provided by Section 816.42(a)(4). That modification exempts certain areas from 816.42 which are to be regulated with respect to sedimentation and acid or toxic mine drainage by other provisions of Part 816. See, e.g., Sections 816.43, 816.44, 816.45, 816.47, 816.48, 816.150 et seq.

4. Of course, in addition to sedimentation, persons must use treatment facilities to reduce acid or other toxic content of drainage from the disturbed area, for the purposes of the drainage of Section 816.42(a)(7) for pH, iron, and manganese, and any other pollutant parameters limited by applicable State or Federal law. See Sections 816.41(c), (d)(3), 816.42(a)(7). Sedimentation ponds utilized to satisfy the requirements of 816.42(a)(1)-(2), are to be designed, constructed, operated, maintained, and relocated to remove according to the requirements of Section 816.46. They are to be constructed before the commencement of mining operations. See Section 816.42(a)(5). Use of sediment ponds, in conjunction with other control measures, are to implement the Act's requirements for use of the Best Technology Currently Available for limiting sedimentation (Section 816.42(a)(10)(b)) and protection of fish and wildlife (Section 816.42(a)(24)) of the Act, and to minimize disturbance of the hydrologic balance during and after mining (Section 815(b)(10)). The preamble to Section 816.46 contains a detailed explanation of the Office's determination regarding Best Technology Currently Available with respect to sedimentation.


6. Sediment ponds and other treatment facilities are to be utilized until regulatory authority approval for their removal is granted under Section 816.42(a)(2), which principally implements 515(b)(10) and 519(c)(2)-(3) of the Act. Exemption from the requirements of Sections 816.42(a)(1)-(2) only may be authorized for drainage from "small" areas under Section 816.42(a)(3), to avoid causing more disturbance of land to construct sediment ponds than will result from the small area itself. However, even this exception can only be authorized if the drainage will still meet applicable effluent limitations and water quality standards for receiving waters.

7. Under Section 816.42(a)(b), both drainage from disturbed areas which is mixed with drainage from other areas together must achieve the effluent limitation of Section 816.42(a)(7). This is specified to avoid ambiguous interpretation, as may have resulted with the proposed version of Section 816.42(a). That Section provided that "discharges of water from disturbed by surface mining activities shall be made in compliance with all applicable regulations . . . ." Proposed Section 816.42(a) also provided that all surface drainage from the disturbed area, was to be passed through a sedimentation pond.
or a series of sedimentation ponds before leaving the permit area.

The Office has experienced interpretative questions in the field under the interim program regarding responsibility of operators for discharges of drainage from sedimentation ponds, which mix drainage from areas disturbed by current surface coal mining and reclamation operations with drainage from other areas undisturbed by those operations, such as previously mined land. The Office interprets the relevant provision of its interim regulations, 30 CFR 715.17(a), to impose on the operator, in such circumstances, the obligation to achieve the effluent limitations for all of the mixed drainage, not just a portion of it.

Section 715.17(a) and proposed Section 816.42(a) require that "discharges from areas disturbed by surface coal mining and reclamation operations must meet all applicable Federal and State laws and regulations..." (emphasis added). Under Section 301 and 401 of the Clean Water Act, as amended (33 USC 1341(b)), any drainage from current-coal mining operations and other areas disturbed from a sediment pond is deemed to be a "point source" and, therefore, required to meet the relevant EPA effluent limitations, including application of such limitations in the case of commingling drainage from "active" and "inactive" areas as defined by EPA (40 CFR 434.32(c) 1978, 30 CFR Section 715.15(a) and proposed Section 816.42(a)) implied) that mixed discharges must not be violative of "...applicable Federal...laws and regulations...".

In addition, Sections 715.17(a) and proposed 816.42(a) required that all discharges from areas disturbed by surface coal mining and reclamation operations must meet, at a minimum, certain specified effluent limitations for total iron, total manganese, total suspended solids, and pH. The Office interprets these provisions to cover all discharged drainage that is mixed with drainage from the disturbed area. Without this interpretation, severe damage to the hydrologic balance will result from the unregulated discharges of polluted water from disturbed areas mixed with water from other sources. Moreover, field investigatory and monitoring techniques are not adequate to allow for necessary precision in separating out, at the entrances and exits of sedimentation ponds, the pollutant loads of individual waters. The impracticality in the field of treating or testing a portion of the drainage discharged from the disturbed area as greater portions of the permit area are mined, therefore, requires the interpretation that all mixed drainage meet effluent limitations, in order to assure that all discharges from the disturbed areas meet the effluent limitations before leaving the permit area.

Clarification of Section 816.42(a)(6) will ensure that where the sedimentation pond or series of ponds is used in a manner as to result in the mixing of drainage from disturbed and undisturbed areas, all of the mixed drainage will have to meet the effluent limitations at the point of the last discharge from the permit area. Except to the extent that discharges from undisturbed areas are mixed with discharges from disturbed areas, discharges from undisturbed areas are not subject to the effluent limitations of 816.42(a). Thus, discharges from undisturbed areas need not meet effluent limitations where the permittee has designed diversions or other procedures to avoid the mixing of discharges from disturbed and undisturbed areas.

Section 816.42(a)(7) specifies the standards by which the quality of discharges of drainage from the disturbed area are to be measured. First, discharges are required to meet all applicable requirements of Federal and State law. Second, at a minimum, certain specific effluent effluent limitations are to be achieved, according to the table at the end of 816.42(a)(7) and the interpretive material in footnotes to that table. USEPA regulations implementing the Clean Water Act's Section 402 NPDES permit system (see 40 CFR 434) were the base for development of the effluent limitations at Section 816.42(a)(7). However, the Office's limitations are based on the authority of the Surface Mining Control and Reclamation Act and have been modified from USEPA regulations to fully implement the provisions of the Act.

Section 816.42(b) is promulgated to set forth the circumstances under which discharges subject to 816.42(a) may be allowed to deviate from the effluent limitations of Section 816.42(a)(7). The exemption provided for is to provide equitable relief from the effluent limitations when the discharge is subject to an extraordinary precipitation event, if the drainage involved, in fact, results from such an event.

10. The Office has coordinated these regulations with the EPA and has received that Agency's written concurrence to these regulations as they relate to EPA's water quality standards. Both agencies will strive to minimize duplicative efforts in standard setting, permit issuance, monitoring, enforcement, and reclamation.

Regarding coordination and minimization of permitting, the OSM regulations require that regulatory programs permitting systems under the Surface Mining Act be closely coordinated with NPDES permit requirements under the Clean Water Act. See 30 CFR 770.12, 778.19/783.19, 786.11(b)(c)(4); 786.12. These procedures should serve to insure that unnecessary duplication is prevented on a case-by-case basis. Discharger monitoring requirements have been coordinated as discussed in the preamble to Sections 816.52 and 817.52. Standard permitting programs are to be carefully coordinated with EPA.

B. Analysis of Comments and Alternatives

1. Many commenters were concerned with the quantitative effluent limitations proposed by OSM at the table in 816.42(a)(2). They recommended that these be deleted so that discharges from disturbed areas would comply only with all "applicable" Federal and State laws and regulations, or that responsibility for specifying effluent limitations be left entirely to the Environmental Protection Agency (EPA) under EPA's Effluent Guidelines and Standards for the Coal Mining Point-Source Category under the National Pollution Discharge Elimination System (NPDES) Permit Program (40 CFR Part 434). These recommendations were carefully analyzed and rejected, for several reasons.

2. (a) Under Sections 301, 304, and 401 of the Clean Water Act, coal mining operations must obtain NPDES permits and comply with EPA's effluent limitation regulations (40 CFR Part 434) for point-source discharges of pollutants to surface water of the "United States." These regulations, however, do not apply only during the active phase of mining operations and do not extend to the reclamation phase of mining. Further, neither the NPDES permit system nor EPA's regulations cover "nonpoint" source discharges to surface water, any discharge to ground water or to watercourses discharging to surface waters that do not meet the agency's definition of "waters of the United States."

(b) The NPDES system also assumes the existence of a point source discharge before applicable effluent limitations attach to the discharge. This system would leave entirely unregulated any non-point discharges, of which surface and underground mining activi-
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ites have many, largely resulting from the storm water runoff over surface areas and ground waters exiting underground mine workings. Under Sections 102, 306, 510, 515, 516, and 517 of the Act, however, all water discharged as a result of coal mining and reclamation operations which could materially damage the hydrologic system are to be regulated through a permit system and reclamation program. Section 208 of the Act provides that this regulation will require the application of non-point runoff and treatment to limit discharges of pollutants to ground or surface waters. H.R. Rep. No. 95-218, 95th Congress 1st Session at 114; USEPA (1976 b), vol. 1 at 19; USEPA (1978 d) at 156-157. Pursuant to Sections 515(b)(10) and 516(b)(9) of the Act, coal mining will be regulated through both the mining and reclamation phases. Therefore, the requirements of 816.42 included the effluent limitations already applicable to coal mining point sources and also provisions to fill gaps not now covered under the national EPA regulatory program. (See In re Surface Mining Regulation Litigation, 456 F. Supp. 1301, 1313-1315 (D.C.D.C., 1978)).

3. It is noted that "non-point source discharges to surface waters and some discharges to groundwater could be regulated by USEPA. Section 304(e) of the Clean Water Act provides for the development of programs controlling nonpoint source discharges from mining. Section 304(e) of the Clean Water Act allows EPA to control runoff from surface areas. If the runoff contains toxic or hazardous pollutants and is ancillary to operation of an industrial establishment which itself causes "point source" discharges. Section 403(b)(X)(D) of the Clean Water Act authorizes permits for activities which control the disposal of pollutants into "wells." Sections 1421-1424 of the Safe Drinking Water Act (SWDA) authorize EPA and States approved under Section 1422(b)(B) SWDA to issue regulations and permits to control underground injections (subsurface emplacement of fluids by well injections). Section 1424, SWDA establishes a mechanism for sole source aquifer protection and protection through withholding of Federal financial assistance. Subtitle D of the Resource Conservation and Recovery Act may, upon promulgation of the regulations, include controls over environmental contamination from coal waste disposal including protection against both surface water and ground water pollution.

However, EPA has not implemented, by regulations and State plans, any of these statutory provisions as to coal mining nor is it expected that this will occur on a national basis in the near future. Moreover, EPA national policy is to utilize programs, developed under Titles IV-V of the Act (SMCRA) to satisfy the Section 208, Clean Water Act's State program plan requirements with respect to coal mining. Thus, the effluent limitations requirements of 816.42 will be used to satisfy 208 requirements, by inclusion of Title V of SMCRA's State or Federal programs as 208 plans by USEPA.

4. A number of commenters objected to the application of the proposed effluent limitations to all surface drainage from the "disturbed areas" which is defined to include areas that have been graded, seeded, or planted. These objections resulted primarily from the application of such limitations to surface drainage from areas disturbed by mining after final backfilling and grading.

In contrast, EPA effluent limitations for the Coal Mining Point Source Category applies to the well permit system (40 CFR Part 493) apply only to active mining areas. As defined in EPA's regulations (42 FR 21383), "active mining areas" refers to "a place where work or other activity related to the extraction, removal, or recovery of coal is being conducted except, with respect to surface mines, any area of land on or in which grading has been completed to return the earth to its original contour and reclamation work has begun." Commenters asserted that no basis exists for extension of effluent limitations to discharges from mining operations in a "non-active" (or "reclamation") phase and that such an extension was not necessary to ensure protection of the hydrologic balance under the Surface Mining Act.

(a) There is no substantial basis in the Surface Mining Act or the record supporting a distinction between "Active" and "reclamation" phases of mining and reclamation operations for the purpose of excluding the application of effluent limitations or of justifying less stringent effluent limitations.

Under Section 515(b) of the Act:

"(b) General performance standards shall be applicable to all surface coal mining and reclamation operations and shall require the operation as a minimum to . . . (10) minimize the disturbances to the prevailing hydrologic balance at the mine site and in associated offsite areas and to the quantity and quality of water in surface and ground water systems both during and after mining and after surface coal mining operations and during reclamation . . . . (emphasized added).

Similar protection is afforded by Section 515(c)(2) of the Act with respect to underground mining. In addition, Section 515(c)(3) of the Act provides that "no part of the (performance) bond or deposit shall be released . . . so long as the lands to which the release would be applicable are contributing suspended solids to streamflow or runoff outside the permit area in excess of the requirements set by Section 515(b)(X10) of the Act. These sections clearly require runoff from the permit area to meet necessary requirements to protect the hydrologic balance throughout mining and reclamation operations.

However, EPA is not expected to apply this responsibility for any portion of the permit area or restrict the requirement to only "active mining areas."

(b) A number of commenters recommended that further data collection and analyses were necessary before the subject effluent limitations, could appropriately be applied to discharges from areas undergoing "reclamation." Once commenter recommended that if additional studies were begun, discharges from disturbed areas be required only to comply with pre-determined ambient, water quality levels for receiving streams during the reclamation period.

OSM believes that the control technology required to meet effluent limitations for discharges from the "active mine area" is very similar or the same as that necessary to meet effluent limitations for discharges from the "active mine area" or same "area under reclamation." See preamble to Section 816.46. In addition, compliance with the reclamation standards specified in the Act and regulations (816.109-816.117) should minimize problems for discharges from the "active mine area" or "area under reclamation." See preamble to Section 816.46. In addition, compliance with the reclamation standards specified in the Act and regulations (816.109-816.117) should minimize problems for discharges from the "active mine area" or "area under reclamation."
drainage will be reduced under the regulations. This results from backfilling, compacting, grading, and covering bare spoils, piles, coal in mid- and toxic-forming materials which are susceptible to acid generation and the formation of other pollutants. (Grim and Hill, 1974 at p. 154 and p. 98-200; Hill and p. 10-13.) The regulations also require that if necessary, such materials shall be treated to neutralize toxicity in order to prevent water pollution.

Moreover, various State regulatory agencies have extended similar effluent limitations to discharges from lands that have been graded, seeded, and planted, but which have not been relieved of their presence, by other permit requirements. The term definition of such requirements is normally tied to the release of other permit requirements. This is often at the final stage of permit issuance. In a survey of eleven coal-producing States, it was found that those States specifically extend effluent limitations on water quality criteria to all phases of coal mining and reclamation operations. These States included Alabama, Colorado, Illinois, Maryland, Montana, North Dakota, Ohio, Tennessee, West Virginia, and Wyoming.

(a) Arkansas—Section 7(c), Open Cut Land Reclamation Act of 1977;
(b) Kentucky—402 Ky. Adm. Reg. 1055—Section 2 (July 2, 1975), pH: 6-9; iron: 1mg/L; no net acidity; turbidity limits)
(d) Massachusetts—Section 251h(2), Rules of Texas Surface Mining and Reclamation Commission (Feb. 23, 1976) (suspended solids);
(e) Virginia—Section 809, Virginia Surface Coal Mining Reclamation Regulations (1977), QP: 6-9;
(f) West Virginia—Surface Mining Reclamation Regulations—Ch. 206,

1 Series V. Section 7B.02: (pH, iron, turbidity).

As was discerned from the survey and cited State laws, application of effluent limitations to all discharges from "disturbed areas," until such time as the requirements for achieving successful reclamation are met, is common practice supporting Section 816.42(a).

5. Several commenters asserted that sedimentation ponds may not be necessary to meet the effluent limitations of this section and to maintain water quality standards for downstream receiving waters, suggesting there is no responsibility of the operator to show that the effluent limitations and water quality standards could be met and maintained. Furthermore, commenters argued that, if these effluent limitations could be met, then all operators should be extended the opportunity to meet this exemption. Related to the requests for elimination of the sediment pond requirements of Section 816.42(a), were comments suggesting that the requirement be modified to expressly allow for use of "appropriate" sediment control facilities, rather than ponds.

Recommendations for exemptions from the requirement that all drainage from the disturbed area be passed through a sedimentation pond or a series of sedimentation ponds before leaving the permit area, were considered by the Office and rejected. An exemption was maintained for cases where the disturbed drainage area within the total disturbed area is small (816.42a)(2)(3)(A).

The requirement that all drainage from disturbed areas should be passed through sedimentation ponds, with very limited exceptions, was retained, because commenters established a basis to modify the office's determination that sedimentation ponds represent an essential element of the "best technology currently available" to prevent, to the extent possible, additional contributions of suspended solids to streamflow or runoff outside the permit area, which is required by Section 515b(10)(B)(3)(A) of the Act, and control acid or other toxic drainage under Section 515b(10)(A) of the Act. In general, use of sediment ponds is one of the facets of best available control technology under Sections 515b(10)(B)(3)(A) and 515b(10)(A) of the Act. Such facilities are a necessary element of effluent control acid and toxic mine drainage treatment. (USEPA-1976a at 97-99, 169-170, 245, 248; Hill, 1976 at 1-2.)

Moreover, commenters submitted no evidence necessary, to meet the effluent limitations of 816.42a(3) could be met without the use of sediment ponds. To the contrary, available data shows that untreated sediment discharges will ordinarily far exceed the effluent limits. See e.g., Hill, 1976 at 1-2.

In response to comments, OSM did consider modifying the language allowing an exemption from the general requirement for sediment ponds when the disturbed drainage area to be exempted is "small", and it can be demonstrated that ponds and treatment facilities are not necessary to meet effluent limitations or applicable State and Federal water quality requirements for downstream receiving waters. The modification was specifically provided an exemption where the disturbed area is small relative to the size of the ponds, which would have to be constructed to comply with Section 816.46.

The Office considers this modification to the proposed exemption to be unnecessary, because the language of the more general exemption provides greater latitude for a determination of what is "small" and also meets the intent of the Office to recognize that, on isolated corners of operations, the building of sedimentation ponds may not be necessary to meet effluent limitations or water quality requirements and may create more deleterious effects to the local hydrologic system than the mining disturbance itself. It should be noted that, in such cases, other sediment control measures, as discussed in Sections 816.41 and 816.45 are required.

Some commenters expressed the concern that the small area exemption will be abused to the extent of becoming the rule. The intent of the Office is that this provision, like many others, is possibly subject to abuse and will attempt to review exemptions to determine, if modifications in the exemption language are necessary. Further, an added measure of control over the use of this exemption is provided by requiring a demonstration by the operator that effluent limitations and water quality requirements will be complied with without sedimentation ponds or treatment facilities.

6. A number of commenters expressed concern as to the criteria of the proposed rule for allowing removal of sedimentation ponds and other treatment facilities at the conclusion of reclamation. The concerns did not focus on the proposed requirement that the revegetation criteria of Sections 816.111-816.117 be met prior to removal, but rather on the water quality requirements that were proposed as an additional criterion for authoriza-
ing removal of treatment plants and release of bonds. As proposed, Section 816.42(a) required that the discharges meet "the ambient surface water quality standards established by regulations of the [State]". The reference to Section 816.52 lead to confusion, because it did not specifically contain standards for ambient surface water quality standards. The Office recognized that there may be situations where the State water quality standards are quite stringent. The Clean Water Act and Sections 120, 130(f), 131(b), and 303 of SMCRA require compliance with those standards. Where there are no numerical stream water quality standards for the receiving waters of a particular operation, the Office will apply a policy of judging the effluent limitations for ponds according to the first alternative discussed above, with appropriate modifications. Thus, in those situations, the permittee will be required to demonstrate that untreated drainage from the disturbed area does not cause an increase in levels of suspended solids, net acidity, total iron or other relevant pollutants above the ambient, pre-mining levels of the receiving water. The pre-mining level is to be determined by excluding unusual, aberrational measurements of pollutants in the stream.

A number of commenters suggested an alternative to the effluent limitations proposed in Section 816.42(a). Specifically, commenters recommended that effluent limitations for total suspended solids or pH be derived on a case-by-case basis, to allow for circumstances where water is introduced to discrete and, therefore, easily measurable points where "background" conditions can be established. In contrast, surface mining activities involve the movement of overland surface and shallow groundwater (e.g., nonpoint source) flows into and over disturbed areas. No single, discrete points exist for establishing a "background" level. (See, e.g., USEPA, 1976(b), E.L. 1-2; USEPA, 1976(a)). In underground mining, water enters the workings by percolation over large areas down from surface areas through strata overlying the workings. (USEPA, 1976(c)). Again, no discrete points exist to routinely sample for establishing "background" levels.

In addition to the impracticability of establishing "background" levels of sediment entering disturbed areas, the Act nowhere requires such a result.

Second, Section 515(b)(10) of the Act requires that discharges of suspended solids from areas disturbed by mining operations be limited by the use of the "best technology currently available." Section 515(b)(24) of the Act requires similar technology to prohibit pollution from human action and environmentally sensitive areas.

In addition to this alternative, the Office recognizes that there may be some situations where the State water quality standards are quite stringent. The Clean Water Act and Sections 120, 130(f), 131(b), and 303 of SMCRA require compliance with those standards. Where there are no numerical stream water quality standards for the receiving waters of a particular operation, the Office will apply a policy of judging the effluent limitations for ponds according to the first alternative discussed above, with appropriate modifications. Thus, in those situations, the permittee will be required to demonstrate that untreated drainage from the disturbed area does not cause an increase in levels of suspended solids, net acidity, total iron or other relevant pollutants above the ambient, pre-mining levels of the receiving water. The pre-mining level is to be determined by excluding unusual, aberrational measurements of pollutants in the stream.

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The legislative history indicates that Congress understood this to be the preferred interpretation, because Congress specifically rejected language in Section 512(b)(10)(B) of the Act that would have tied the reduction of suspended solids to "natural levels." Such a provision in the 1977 Senate bill (S. Rept. No. 95-128, 95th Congress, 1st Sess. at 115 (1977)) was eliminated in the Conference Committee. Further, the House Committee, whose bill became this portion of the Act, specifically recognized that use of best available control technology could result in discharges at levels better than receiving streams. See H.R. Rep. No. 95-128, 95th Congress, 1st Sess. at 115 (1977).

OSM realizes that potential does exist for increased instream erosion resulting from discharges with low suspended solids concentrations. However, the OSM discharges, adopted in the context of the requirements for effluent limitations, specifies a maximum level of suspended solids concentrations. The OSM specifications may include the required effluent limitation or may provide for the discharge of suspended solids at levels lower than "natural levels." EPA recognizes that such a specification for effluent limitations is not a requirement for discharges from mining operations. EPA's special Western category regulations (40 CFR 434) establish a separate category for mineral mines in the Western United States.

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Arizona and New Mexico. This change has been incorporated into the foot-note to assure consistency with the scope of EPA's special effluent limitations regulations for discharges from Western mining operations.

10. Several commenters suggested that the exemption from the required use of an automatic neutralization device or process, as provided for in Section 816.42(a)(1), be extended to operators who demonstrate compliance with only the requirement of Sections 816.42(c)(1) and 816.42(c)(3) of the proposed regulations. That is, it was recommended that mine production rate criteria (i.e., less than 500 tons per day) to qualify for the exemption be excluded. In support of this recommendation, EPA's "Development Document for the Coal Mining Point Source Category" (EPA, 1976 a, p. 4) was cited, which states that waste loads from coal mining operations are unrelated or only indirectly related to coal production quantities. Therefore, the final regulations relating from automatic neutralization, provided for in 816.42(c), have been revised to exclude any mine size criteria and to include only criteria with respect to the degree of required treatment and assurance of treatment.

11. Several commenters expressed concern as to the wording of the large precipitation event exemption provided for in proposed Section 816.42(b)(1). This exempts an event to the requirement that discharges from disturbed areas be subject to effluent limitations when the discharges result from a precipitation event larger than a 10-year, 24-hour precipitation event or a snowmelt of equivalent volume. A number of commenters noted that the term "snowmelt of equivalent volume" led to unnecessary confusion with respect to interpretation of the exemption. The final regulations, therefore, have deleted reference to this term in 816.42(b)(1). The definition of precipitation event, in Section 701.5 of the regulations, provides clarification on the application of the exemption to snowmelt run-off.

OSM has been made aware that the proposed rules exemption was not totally consistent with the similar exemption in EPA's Effluent Limitations Regulations for the Coal Mining Point Source Category (40 CFR 434). EPA's regulations allow for an exemption when the discharge results from a precipitation event equal to or larger than a 10-year, 24-hour precipitation event. To provide consistency with EPA's regulations, Section 816.42(b)(1) has been accordingly revised. Regarding comments that OSM's exemption is inconsistent with the EPA exception because OSM's exemption is tied to the occurrence, in fact, of a large precipitation event, OSM believes that matter is resolved by the Agency's regulation of new source effluent limitations regulations which adopt an exemption identical to OSM and indicates that the EPA Best Practicable Control Technology regulations will be accordingly revised. See 44 Fed. Reg. 2587-2588 (Jan. 12, 1979).

One commenter recommended that the given duration of some mine operations (e.g., over 40 years), utilization of a large precipitation event exemption with a recurrence interval of 10 years does not meet the requirements of Section 816.42(b)(1)(i) of the Act. The commenter recommended use of a recurrence interval for the exemption which is more in line with the expected duration of the mining activity controlled by the sediment pond. The office has determined that the 10-year, 24-hour precipitation event meets the intent of the Act, because sedimentation pond designs are based for a 10-year, 24-hour event to comply with the EPA regulations and is needed to achieve a conservative design for a structure which contains water. See the discussion in the preamble to 816.46. Moreover, Section 816.42 does not authorize the industry to use sediment ponds to treat run-off from an area larger than that which is disturbed and unclaimed over a ten-year period. To the extent that an operation will last over a ten-year period, the permittee is only allowed to drain into a pond sized for a 10-year precipitation event from an area which is limited to land mined in the last ten years.

The recurrence interval for the large precipitation event exemption may be revised, if it is found by the Office that the hydrologic balance is not adequately protected as a result of frequent discharge of storm water from disturbed areas during the course of mining activities.

12. Some commenters noted that EPA regulations under the Effluent Limitations Guidelines for the Coal Mining Point Source Category (40 CFR 434) allow for a variance to the EPA effluent limitations (i.e., more or less stringent limitations) to provide for site-specific cases of existing mining which represent fundamental differences between pollution which were considered in the development of the USEPA regulations. Such different conditions essentially would include factors relating to the equipment or facilities involved, the process applied, and other site-specific characteristics different than those considered in the Development Document (USEPA, 1976 a). This variance is included in 40 CFR 434.42. The Office has not revised Section 816.42(a), after analysis of these comments.

First, it is noted that no variances are allowed under the Clean Water Act from effluent limitation regulations for new sources. E.I. du Pont de Nemours & Co. vs. Train, 430, U.S. 132, 138 (1977). Thus, there is no difference between EPA and OSM regulations on the variance question as to new coal mining operations. As to existing mines, the Office believes that no variance should be provided in its regulation, because Congress did not intend that the regulation involved be subject to case-by-case waivers. Moreover, it has not been demonstrated that the variance provision suggested by the commenters is appropriate or necessary for OSM's effluent limitations. No showing was made that EPA has ever found it necessary to grant variances from its effluent limitations. No showing was made that EPA regulations are based for a 10-year, 24-hour precipitation event exemption to provide for slte-specific cases or existing mining operations which materially different conditions than those considered in the USEPA regulations under the Effluent Limitations Guidelines for the Coal Mining Point Source Category (40 CFR 434) allow for a variance to the EPA effluent limitations (i.e., more or less stringent limitations) to provide for site-specific cases of existing mining which represent fundamental differences between pollution which were considered in the development of the USEPA regulations. Such different conditions essentially would include factors relating to the equipment or facilities involved, the process applied, and other site-specific characteristics different than those considered in the Development Document (USEPA, 1976 a). This variance is included in 40 CFR 434.42. The Office has not revised Section 816.42(a), after analysis of these comments.

As noted in USEPA, 1976 a, treating discharges from coal mining operations to meet the effluent limitations specified in 816.42(a)(7) for iron, manganese, total suspended solids and pH should result in effective treatment and control of some of the additional pollution.
metals listed by commenters. (Id., pp. 66, 71, 170, and 172), as a result of precipitation of the metals in the neutralization process as insoluble hydroxides. As for sulfate, USEPA (1976a) states that sulfate in discharges from coal mining operations, although occasionally above accepted standards, are not normally at concentrations which will produce effects on water uses (Id., pp. 1 and 53). In addition, the cost of necessary technology to provide reduction of this constituent at the concentrations observed in relation to coal mining discharges is not presently considered (Id., pp. 97-99, 139-144, and 170-171).

One commenter recommended that the table of Section 816.42(a)(7) be revised to include total dissolved solids and specific numerical effluent limitations applied to this water quality parameter. The commenter noted that control of total dissolved solids has special significance to the Western United States, particularly the Colorado River system where increased salinity concentrations have been identified as having deleterious impacts on agricultural, industrial and domestic water uses. The EPA Development Document (pages 82, 102-119, and 167) identifies elevated concentrations of total dissolved solids in discharges from coal mining operations. However, this report also notes that the cost of treatment technology observed did not warrant the reductions obtained (Id., pp. 97-99 and 139-144).

It should be noted that 816.42(a)(7) also requires that discharges be in compliance with all Federal and State laws and regulations. This requirement may result in specific effluent limitations applied to this water quality parameter. The commenter noted that control of total dissolved solids has special significance to the Western United States, particularly the Colorado River system where increased salinity concentrations have been identified as having deleterious impacts on agricultural, industrial and domestic water uses. The EPA Development Document (pages 82, 102-119, and 167) identifies elevated concentrations of total dissolved solids in discharges from coal mining operations. However, this report also notes that the cost of treatment technology observed did not warrant the reductions obtained (Id., pp. 97-99 and 139-144).

§ 816.43 Hydrologic balance: Diversions of overland flow: shallow ground water flow.

1. Section 816.43 provides for protection of the hydrologic balance of the mining area by establishing design, performance, and reclamation standards for the diversion and conveyance of overland, shallow ground water, and ephemeral stream flows. Diversions represent an important environmental tool. The commenter pointed out, for example, from a 6-hour storm: in one area to a 24-hour storm in another. Thus, diversions under 816.43 will have to be sized to safely contain and pass the peak flows resulting from the storm which produces the largest peak flow in a particular location. The permittee is not, of course, required to divert flows which exceed the required storm design under these paragraphs.

2. The basis and purpose of this Section was explained, in general, at 43 Fed. Reg. 43746 (Sept. 18, 1978). Technical literature relied upon by the Office for this Section includes the material listed preceding the discussion to 816.41 material discussed above.


3. Several commenters suggested that ephemeral streams be included in the scope of overland flow and shallow ground water flow diversions. Ephemeral stream flow diversions require precautionary handling in order to avoid excessive sedimentation and erosion (USEPA, 1976, Erosion and Sediment Control, Vol. 1 at 35; Vol. 2 at 1-10). Because ephemeral streams are smaller than perennial and intermittent streams and more nearly like overland flows, the Office has decided that ephemeral streams should be regulated similarly to overland flow. Therefore, the Office had added ephemeral stream diversions to paragraph 816.43.

4. Several commenters suggested that the disturbed areas which include diversion ditches, sedimentation ponds or roads be excluded from regulation under Section 816.43, as they are excluded from the definition of disturbed area under Section 816.42(a). Diversion ditches, sedimentation ponds and roads, however, must be installed, in accordance with provisions of Part 816 other than 816.42(a), to prevent environmental damage. To the extent possible, especially important is that diversions be designed, constructed, operated, and maintained utilizing the best technology currently available to control sedimentation (See Section 816.43(b)) of the Act. Where these diversion ditches, sedimentation ponds, and roads are properly installed and maintained, the other requirements of Section 816.42(a) are achieved; therefore, no change in the regulation was deemed necessary.

5. Paragraphs 816.43(a)-(b) specify minimum requirements for sizes of diversion facilities, with respect to the volumes of water resulting from precipitation events that both temporary and permanent diversions must achieve. Regarding the size the precipitation events involved, Section 816.43(a)-(b) refer to "peak runoff," "peak elevation," and "recurrence interval," without specifying durations of those events, as the Office's intent is to require design of diversion channels which pass safely the maximum precipitation runoff rates that occur in different regions of the country. These may vary, as one commenter pointed out, for example, from a 6-hour storm in one area to a 24-hour storm in another. Thus, diversions under 816.43 will have to be sized to safely contain and pass the peak flows resulting from the storm which produces the largest peak flow in a particular location. The permittee is not, of course, required to divert flows which exceed the required storm design under these paragraphs.

6. Recurrence intervals. In the proposed rules, 3-year and 10-year recurrence intervals were specified as design precipitation event criteria for temporary and permanent diversions, respectively, under 816.43(a)-(b).

Several commenters noted that the 3-year storm recurrence interval was not readily available from the National Weather Service and suggested that the Office should use a two- or five-year recurrence interval as a standard, in line with National Weather Service data. Because temporary diversions are expected to be in place for a limited period and are of lesser hydrologic significance, a 2-year storm recurrence interval is a desired minimum, ("Engineering Design Manual—Coal Refuge Disposal Facilities", U.S. Department of Interior, D'Appolonia Consulting Engineers, table 6.8, page 6.80). The regulatory authority may increase this minimum standard where significant environmental harm may occur.

The 10-year minimum recurrence interval specifically for permanent diversions has been adopted from the long established record of the U.S. Soil Conservation Service, as stated the U.S.S.C.S. comments to the proposed rules of September 18, 1978 and proposed rules of July 21, 1978.

7. Section 816.43(b) also provides for requirements concerning the gently sloping banks of permanent diversion channels and lining requirements of those channels. These requirements are important, because they will result in a stabilized diversion channel thus reducing the sediment derived from channel cutting and reducing the potential for diversion failure. (USEPA, 1976, Erosion and Sediment Control, Vol. 1, at 35; Vol. 2, at 8.)
8. Commenters suggested that the permittee be allowed to innovatively use asphalt, concrete or similar channel lining material, to prevent seepage or to maintain stability. The regulations have been changed to allow this flexibility, with the approval of the regulatory authority.

9. Section 816.44 implements the requirements of Section 515(c)(b)(10)(b) of the Act with respect to diversions. Several commenters suggested that the wording, "...prevent to the extent possible using the best technology currently available," be deleted from this Paragraph. This language is, however, required by Section 515(c)(b)(10)(b)(1) of the Act. Thus no change was made in the final regulations.

10. To achieve the requirements of Section 515(c)(b)(10)(b)(1), Section 816.43(c) specifies sediment control practices that may be used singly, or in combination. The preamble to Section 816.45 of the final rules explains the utility of these practices, in general. See USEPA, Supra., Vol. 1 at 33-36; Vol. 2 at 1-13.

Commenters noted that proposed Section 816.43(c) seemed to require the use of all specified measures in every case, which was not the Office's intention. As a result, the final rule was worded so that any of the measures "may" be used, so long as the requirements of Section 515(c)(b)(10)(b) of the Act are achieved.

11. Section 816.43(d) implements Sections 515(b)(3), (4), (10), (21), and (22) of the Act, with respect to those diversions regulated under 816.43. The proposed regulations did not allow diversions to be built across slides. However, it was pointed out by several commenters that slides occur which cover spring areas, thus building up hydrostatic pressure. The regulations have been changed to allow diversions to be built across slide areas, where approved by the regulatory authority, if hydrostatic head is to be reduced to safe levels.

12. Section 816.43(e) provides for reclamation requirements of temporary diversions, to insure that lands affected by those diversions are restored in accordance with the Act. Section 816.43(f) specifies certain diversion design requirements.

In the proposed regulation, Section 816.43(f)(1) required freeboard of the diversion ditches to be set according to a formula adopted from "Design of Small Dams", U.S. Dept. of the Interior, page 291. Several commenters noted that a critical element of the formula, one-third power of the depth, (D), had been omitted from the proposed rule and should be reincorporated. Other commenters suggested the freeboard required be 1.8 feet, which would only have been slightly less than the ordinary solution to the proposed freeboard formula. Upon review by OSM, the proposed freeboard formulation was shown by commenters to increase the actual capacity of diversions to approximately four times the design discharge in some instances. This was judged to be excessive for new diversion design and used to divert over a few feet, half the designed criteria of 0.3 foot freeboard in U.S. Soil Conservation Service diversion design, as mentioned in the above-cited SCS comments. According, the Office established 0.3 foot as the minimum freeboard, based on the standard of the U.S. Soil Conservation Service which has been tested by many years of experience throughout the U.S. See also, USEPA, supra., Vol. 2 at 8.

13. Section 816.43(f)(2) also specifies that diversions are to be designed to provide for flow transition and to protect critical areas. For those cases where critical areas are protected by a Hydrologic balance as described above. Diversions may be justified to prevent overtopping of the diversion. USEPA, supra., Vol. 1 at 7. Therefore, the final regulations allow for establishing a higher freeboard requirement to be specified by the regulatory authority.

14. Section 816.43(f)(3) requires installation of energy dissipators where diversion discharges intersect natural streams, and is to be implemented in greater detail in the preamble to Section 816.47. See USEPA, Supra., Vol. 1 at 36. As proposed, dissipators were required for all diversion discharges. Several commenters pointed out that energy dissipators are not always needed at every diversion outlet into a stream. Energy dissipators are needed only where velocity differences in the diversion and intersecting streams differ appreciably, causing disruption to the stream channel and riparian ecology. The Office agreed and has amended the final regulations to clarify this point.

15. To insure that Section 816.43 is administered consistently with the rest of the provisions of Part 816, Section 816.43(g) was added to the final rules to cross-reference the applicability of Section 816.55.

§ 816.44 Hydrologic balance Stream channel diversions.

This section established design, performance, and reclamation standards for diversions of perennial and intermittent streams, under authority of Sections 102, 201, 501, 503, 504, 506, 507, 508, 509, 610, 515, 519, and 522 of the Act. The terms "diversion," "intermittent," and "perennial" streams are defined at Section 701.5 of the regulations. The requirements of Section 816.44 were explained at 43 Fed Reg. 41746 (Sept. 18, 1978). Regulation of stream diversions under Section 816.44 is deemed necessary because of the significant alteration of the hydrologic balance that may occur if these are not properly designed, maintained, and reclaimed. See H.R. Rep. No. 95-216, 95th Cong., 1st Sess. at 116 (1977); S.Rep. No. 95-229; USEPA, 1976, Erosion and Sediment Control, Vol. 1, at 25. Technical literature used in the development of Section 816.44 includes the literature listed at the preamble discussing of 816.41, the material cited immediately above, material cited in the preamble to Section 816.43, and additional literature discussed below.

1. It was suggested by commenters that diversions of intermittent streams with a drainage basin of less than one square mile in an area be permitted without regulatory approval. In the final rules (section 701.5), intermittent stream is defined as either (a) stream draining a watershed of at least one square mile, or (b) a stream which reaches both below the local water table and obtains flow from both surface and ground waters. Thus, to the extent that a stream to be diverted constitutes an intermittent stream, the first half of the definition of intermittent stream, Section 816.44 would apply. The Office has not exempted such diversions, because Section 515(b) of the Act requires protection of all aspects of the stream, not just larger intermittent streams.

In arid areas, where surface waters are particularly limited, protection of small intermittent streams is particularly critical. See H.R. Rep. No. 95-216, 95th Cong., 1st Sess. at 116 (1977). In humid areas, even intermittent streams can cause flooding problems; therefore, requiring regulation (See the preamble to Section 701.5).

2. Several commenters suggested that the area of the stream which was also included under this section or Section 816.43 with the approval of the regulatory authority. In the final rules ephemeral stream diversions are to be regulated under Section 816.43 as is explained in greater detail in the preamble to that section.

3. Section 816.44(a)(1)(f). Several commenters pointed out that the proposed regulation provided that the regulatory authority could approve stream channel diversions only if the diversion was necessary to achieve compliance with other performance standards. They argued that the rules did not recognize many legitimate uses of diversions in and around mine sites for reasons other than protecting water quality, slope stability, or treatment facilities.

The Office agreed that this limitation was not appropriate and the Office adopted the criteria of Section
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816.57, pertaining to maintenance of stream buffer zones as more appropriate. Under that section, streams may be divided between Section 816.44, a requirement waived by the regulatory without, under certain conditions, if necessary to facilitate mining operations. Thus, if the permittee can satisfy the requirements for waiver of the buffer zone under Section 816.47, it will also satisfy Section 816.44(a)(1).

4. Section 816.44(a)(2)-(3). These provisions will insure consistency in the use of diversions under Section 816.44 with other applicable legal requirements. Under Section 816.44(a)(2), the regulatory authority and permittee are to insure that diversions comply with the other requirements of this subchapter and with all applicable non-SMCRA requirements, particularly those of the River and Harbor Act of 1899 (33 USC Secs. 401 et seq., and the “dredge and fill” permitting requirements of Sections 208 and 404 of the Clean Water Act (33 USC Secs. 1251, 1254). These requirements, coupled with Section 816.44(b)(2), are to be followed for those diversions authorized under Section 816.44(a).

5. Section 816.44(b) establishes detailed design, performance and reclamation standards which are to be followed for those diversions authorized under Section 816.44(c). Under Section 816.44(b)(1), the diversion is to remain stable and to prevent the conveyance of suspended solids outside the permit area according to the requirements of Section 816.43(b)(3) of the Act. (See USEPA, Erosion and Sediment Control, Vol. 2 at 9.) The second sentence of Section 816.44(b)(1) has been modified in the final rule to delete the phrase “in any event,” as it was redundant in view of the rest of that sentence. No change in meaning of the sentence is made by this revision.

6. Section 816.43(b)(2) is the keystone of this Section. The sizing of diversions to adequately contain flows of water is defined in Section 816.43(b)(2), (a) itself (33 USC Secs. 1288, 1404). As explained in their comments to the proposed rule, many commenters were concerned with potential overlap of other State and Federal regulation of stream diversions, especially the Corps of Engineer/Environmental Protection Agency’s Section 404 Clean Water Act program. It is true that streams which fall under the 404 program of the Clean Water Act will in some cases also be covered by Section 816.44. However, the Office does not believe that conflict exist between Section 816.44 and requirements applicable under Section 404, Clean Water Act, nor did commenters specify any such conflicts. Rather, the Office views Section 816.44 as an important complement to Section 404 programs, particularly because the Office’s regulation is tailored specifically to coal mining.

§ 816.45 Sediment control measures.

This Section of the final regulations specifies the sediment control measures to be utilized in conjunction with sedimentation ponds as best technology currently available to achieve and maintain the water quality standards of the Act. In addition, implementations of sediment control measures with proper demonstrations to the regulatory authority in accordance with Section 816.46 can result in reductions of requirements for sediment storage volume and detention time for sedimentation ponds.

Acceptable sediment control practices include: (a) distributing the smallest practicable area at any one time during the mining operation, through progressive backfilling, grading, and prompt revegetation; (b) stabilizing backfill material to promote a reduction in the rate of volume of runoff; (c) retaining sediment within the disturbed area; (d) diverting runoff away from the disturbed area: (e) diverting runoff using protective channels or pipes; (f) using straw fills, riprap, check dams, mulches, vegetative sediment filters, dugout ponds, and other measures to reduce overland flow velocity, reduce runoff volume, or trap sediment; and (g) treating with chemicals. Grim (1974) pp. 101-114; USEPA, Erosion and Sediment Control, (1976) Vol. 2, pp. 1-51; USEPA, Erosion and Sediment Control (1976) Vol. 1, pp. 1-84.

Authority for this Section is contained in Sections 102, 201(e), 501(b), 503(a) and 518(b) of the Act. The preamble discussion supporting the proposed rule is incorporated herein by reference. 43 Fed. Reg. 41746 (Sept. 18, 1978).

1. Some comments on this Section overlapped comments on Sections 816.42 and 816.46. To this extent, responses to comments on such Sections are incorporated herein by reference. Other comments on this Section are discussed below.

2. One commenter said the use of “appropriate sediment control measures” and “best technology currently available” was redundant, and one or the other should be deleted. “Best technology currently available” is defined in Section 701.5, and is a requirement for the operator to examine a number of methods, recognized as being effective. See preamble discussion to Section 701.5. “Appropriate sediment control measures” promotes the implementation of the selected methods.

3. One commenter recommends inserting words to assure that one or several of the sediment control techniques may be used but all are not necessary. The Office does not believe it necessary to clarify that such additional sediment control measures are necessary to achieve and maintain water quality standards and efficient limitations of the Act.

4. Another commenter said that this Section of the regulations was open.
ended, implying that other measures not listed may be required. To assure flexibility and promote the development of innovative control techniques, the Office has decided to retain the aspect of the regulation which implies that other unlisted sediment control measures can be implemented.

5. Commenters suggested substituting the word "stabilizing" for "shaping" in Section 816.45(b). The rationale for this change was that shaping was only one of several stabilizing techniques used for erosion control. The commenters felt that shaping might be combined with other approximate original contour requirements. The Office has decided to adopt this recommendation. Stabilizing by mechanical and vegetative techniques are only two of many methods which can be used to reduce the rate and volume of sediment transport.

6. One commenter said "treating with chemicals" should be reworded to say "utilization of flocculating agents." The Office has decided that the term chemicals is broad enough to include not only organic polyelectrolytes, but could also include such other chemicals as lime or alum that could possibly be used to increase floc size and which may at the same time improve other water quality parameters.

7. One editorial change was made to clarify the intent of the regulation within the context of the law. In Section 816.46, "revegetation" was replaced with "timely" revegetation in accordance with Section 816.111(b). The purpose of this change was to stimulate the operator to take swift measures in re-establishing the vegetative cover.

§ 816.46 Sedimentation ponds.

§ 816.46(a) General requirements. The Office has decided to require sedimentation ponds in conjunction with other sediment control measures as "best technology currently available" to prevent the extent possible additional contributions of suspended solids to streamflow or runoff outside the permit area and to achieve and maintain applicable effluent limitations.

Sedimentation ponds are structures, including basins, dams or excavated depressions, which slow down water runoff to allow sediment to settle out. To effectively settle particles, sedimentation ponds must provide sufficient storage volume for both sediment and detainted water. In addition to providing adequate storage volume, ponds must retain water for a sufficient time to allow sediment to settle out.

It is well established that sedimentation ponds used with other sediment control measures are "state-of-the-art" for controlling sediment movement from surface coal mining operations. The Environmental Protection Agency (EPA) has undertaken a number of studies to determine the best methods for controlling sediment laden flow. EPA studies have concluded that sedimentation ponds are the key to controlling sedimentation. According to EPA, such ponds are "the most effective structures for trapping sediment." The conventional method for controlling sediment that reaches the periphery of the mining operations is through the construction of a sediment pond to intercept the surface runoff before it leaves the mining site. Erosion and Sediment Control—Surface Mining in the Eastern United States, at 65 (1976).

Additional EPA studies indicate sedimentation ponds may be considered as the best opportunity to intercept surface runoff before the water leaves the mine area. Hill, Sedimentation Ponds—A Critical Review, at 2 (Oct. 1976). According to one of the leading commentators in the field, sediment ponds should be located as close to the sediment source as possible and before drainageways reach the main stream. Grim and Hill, Environmental Protection in Surface Mining of Coal, EPA-870/2-74-093; at 103 (Oct. 1974).

Also, several states, including West Virginia, Pennsylvania, Kentucky and Montana now require sediment ponds to control sediment from mining operations. Hill, at 13 (1977).

The mechanics of sediment laden flow are complex. The major factors governing the efficiency of a sediment pond are the geometry of the basin, the inflow hydrograph, the inflow sediment graph, the outlet design, the flow pattern within the basin, the characteristics of the sediment and the settling behavior of the suspended sediment particles, detention time, and, where applicable, control devices within the basin which minimize short-circuiting, turbulence, and resuspension. Ward, Sedimentation of Sediment Detention Basins at 32 (1977). The final sedimentation pond design criteria are supported by Sections 102, 201(c), 501(b), 503 (a) and (b), 515(b)(10), 515(b)(24) and 816 of the Act. See also Surface Mining Regulation Litigation, 456 F. Supp. 1301 (D.D.C. 1978).

The Office has considered alternatives analyzed in the regulatory analysis. The rationale for selecting the final regulations in lieu of the alternatives is found in the context of this preamble discussion, the disposition of submitted comments related to the final regulations and the preamble to the proposed regulations for the permanent program.

The final design criteria for sedimentation ponds contain the following key requirements. Sedimentation ponds may be used individually or in series. Especially in mountainous areas, several small ponds may be more desirable than a single large pond because of topographic constraints. Several small ponds may also improve overall detention times. Moreover, one small pond can be used to remove the bulk of the large particles thus reducing the need to clean out a larger polishing pond. Hill, at 14 (1977); Erosion and Sediment Control at 54 (1976).

Sedimentation ponds must be constructed prior to any disturbance of the area to be drained into the pond and as near as possible to the area to be disturbed. Grim and Hill at 103 (1974). Generally, such structures should be located out of perennial streams to facilitate the clearing, removal and abandonment of the pond. Further, locating ponds out of perennial streams avoids potential that flooding will wash away the pond. However, under design conditions, ponds may be constructed in perennial streams without harm to public safety or the environment. Therefore, the final regulations authorize the regulatory authority to approve construction of ponds in perennial streams on a site specific basis to take into account topographic factors. Hill at 11 (1976); Erosion and Sediment Control at 54 (1976).

In general, various subsections of the regulations dealing with sedimentation ponds require the operator to demonstrate how elected options will meet design criteria. Several commenters desired clarification as to how this could be accomplished. The operators have the burden of providing adequate assurance or proof that the methods proposed are detailed and safe. Such proof can be presented for approval by the regulatory authority in many different forms, and is not specified in any specific format. Except as specified in the regulations, such forms may generally include but are not limited to the following:

a. Maps, graphs, or charts.
b. Valid reports of similar work performed by others.
c. Testimony by recognized professionals.
d. Actual laboratory experiments, and controlled field plot demonstrations.

The operator has the option of electing the most advantageous method. Final approval is still vested in the regulatory authority.

The following general comments were received on Section 816.46(a).

Commenters requested insertion of words in this section to point out the exemption from the requirement to
construct ponds in order to track Section 816.42. Such insertions as “if necessary,” “as required” were suggested. This issue has been previously addressed in the context of whether sediment ponds are “best technology currently available.” Operators will find that sedimentation ponds can be used to their advantage to reduce sediment and achieve effluent limitations. The insertion of the suggested wording might expand the narrow exemption contained in Section 816.42. To avoid any possibility that the exemption would be expanded by this language addition, the Office decided to reject the comment.

Commenters requested clarification of the terminology “disturbance of the disturbed area” as used in the proposed regulations. Disturbance is a progressive process which can be considered as a deviation from a baseline condition. The wording has been clarified to reflect the requirement to construct a pond prior to any disturbance of the existing pre-mining condition.

Commenters suggested allowing construction of sedimentation ponds in intermittent and perennial streams. Because of the physical, topographic, or geographical constraints in stream mining areas, the valley floor is often the only possible location for a sediment pond. Since the valleys are steep and quite narrow, dams must be high and must be continuous across the entire valley in order to secure the necessary storage.

There are two other alternatives. One would be to use an area to one side of the stream for the pond. This will not be physically possible in most cases, and if pursued, might cause serious additional disturbance to the environment. Kathuria at 4 (1976).

The other alternative would be to declare the area unsuitable for sedimentation ponds in intermittent and perennial streams. This method, if pursued, might cause serious additional disturbance to the environment. Kathuria at 4 (1976). Each case needs to be judged on its own. The Office recognizes that mining and other forms of construction are presently undertaken in very small perennial streams. Many Soil Conservation Service (SCS) structures are also located in perennial streams. Accordingly, OSM believes these cases require thorough examination. Therefore, the regulations have been modified to permit construction of sedimentation ponds in perennial streams only with approval by the regulatory authority.

One commenter suggested that a new Section should be added for controlling sedimentation from mining on steep slopes and that the new Section should focus on performance standards with no reference to design criteria. The commenter contends that 0.1 acre-foot for each acre of disturbed area within the upstream drainage area is sufficient to control runoff and sedimentation. Also, the commenter suggests the design standards would appear to eliminate bench ponds.

The commenter did not submit any data or information on soil types, contours and mine plans and drainage of their sediment ponds to substantiate the comments. Based on this suggestion alone without the submission of data, the Office has no reason to believe that performance standards of the Act will be achieved and maintained.

Commenters said sediment ponds could cause degradation and scouring of some stream channels especially in areas prone to arroyo formation. The Office has decided that such downstream erosion can be mitigated. As discussed previously, sediment ponds are necessary to achieve and maintain water quality standards of the Act during surface coal mining and reclamation operations. To avoid downstream erosion or scouring, operators are free to divert streams around surface coal mining activities in accordance with Section 816.44. Moreover, downstream scouring and mixing can be mitigated by locating the sediment pond out of perennial streams thus assuring that natural sediment loads remain in the stream. In addition, downstream adverse effects can be mitigated by the use of energy dissipators, riprap channels and other devices as required by Section 816.45.

§ 816.46(b) Sediment storage volume.

The final regulations establish two methods for computing required sediment storage volume. First, the operator may utilize the Universal Soil Loss Equation (USLE), gully erosion rates and appropriate sediment delivery ratios to compute sediment yield. This method allows the operator maximum flexibility to account for site specific variations in sediment yield. The preamble to the proposed rules 43 Fed. Reg. 41747 (Sept. 18, 1976) supporting the selection of the USLE is incorporated herein by reference.

Under the second method, operators may utilize a general rule for computing sediment yield from the disturbed area. The operator may assume a sediment yield of 0.1 acre-foot for each acre of disturbed area. The regulatory authority is authorized to require greater sediment storage volume if necessary. A lesser sediment storage volume to .035 acre-foot for each acre of disturbed area may be authorized if the operator demonstrates that sediment removed by other sediment control measures is equal to the reduction in the pond sediment storage volume.

In particular, vegetation standards require, as a minimum, vegetative cover capable of stabilizing the soil surface for erosion. Site-specific investigations in the western coal fields have shown that such stabilization may not occur within the first year or two after mining. Gulles formed on revegetated surfaces will often increase sediment yield. Moreover, internal drainage to graded, topsoil and seeded areas is possible. Hardaway and Irwin, Trip Report at 3. 113 (1976). See also Dollhopt et al. 71-73 (1977). This type of extensive erosion after mining requires that sediment
The use of gully erosion rates and sediment delivery ratio factors was questioned by some commenters. The Office has retained these requirements. The USLE considers only soil loss by sheet erosion. Where gullies are active, the eroded material must be accounted for in determining the sediment delivery ratio. The SCS Technical Release No. 32 is one reference which gives procedures for determining the rate of gully development.

Sediment delivery ratio is defined as $D = Y/A$ where $Y$ is the sediment yield from a watershed and $A$ is the gross erosion occurring on the watershed. Gross erosion is the sum of a sheet and rill erosion, gully erosion, and stream erosion. On active and reclaimed surface mines, sheet and rill erosion area can be estimated using the method of A. Haan and Barfield at 221 (1978). The sediment delivery ratio is necessary to account for eroded material which is deposited prior to entering the pond. Haan at 5 (1978); McKenzie at 4 (1977).

One commenter questioned whether the regulatory authority should establish methods for determining sediment storage volume. The Office agrees that this is not the proper role of a regulatory authority. Accordingly, the regulation has been changed by substituting the word "approved" for "established." With this concept, the operator will submit his methods for review and approval by the regulatory authority.

Commenters requested that reference and justification for using the USLE should be discussed. They stated that accumulated sediment volume in storage ponds was excessive. This volume was composed of storage for the runoff generation, sediment detention and constructed sediment detention structures containing adequate storage volume. The adverse effects of mining on stream water quality can be essentially eliminated. (Haan and Barfield at 5.1 (1978).)

Commenters questioned the selection of sediment storage volume equal to 0.1 acre-foot for each acre of disturbed area. This is the nationwide minimum sediment storage volume for sedimentation ponds. Simpson, Westmoreland Resources, comments on the Interim Final Rules, page 1, March 15, 1978. According to respondents, methods using gully erosion rates and sediment delivery ratios, either singly or in combination, which estimate sediment volume are not commonly used for surface mining.

Section 186,46(b)(1) authorizes the use of the USLE, gully erosion rates, and the sediment delivery ratio converted to sediment volume using the sediment density, or other empirical methods derived from regional sediment pond studies to determine the sediment storage volume. Haan and Barfield (1978), ch. 5, discuss soil erosion and sediment yield similarities between surface mining and agricultural land. The similarities are helpful since agricultural erosion has been studied for many years resulting in the development of procedures for its prediction and control. Soil erosion results when soil is exposed to the erosive powers of rainfall and flowing water. It is not possible to conduct massive earth moving operations necessary for strip mining without exposing soil to these erosive forces. It is possible to use the USLE to plan the surface coal mining and reclamation operations. The sediment production can be reduced. Through the use of properly designed and constructed sediment detention structures containing adequate storage volume the adverse effects of mining on stream water quality can be essentially eliminated. (Haan and Barfield at 5.1 (1978).)
ria in design of sedimentation ponds, particularly where necessary to meet the effluent limitations. They cite "Physicochemical Processes" by Walter J. Weber, Jr., to support this proposition. This discusses overflow rate, detention period, terminal particles velocity and effective tank depth. This reference discusses "the removal of discrete particles by ideal settling," "by" where inflow, outflow, surface area, and volume are constant values in a steady state process.

The Office agrees that surface area is an important consideration in the design of a sediment pond to achieve and maintain water quality standards. Surface area should be adequate to provide both the required storage capacity and the sediment removal capability to achieve and maintain water quality standards. Kathuria at 87 (1976). The Office believes, however, that established criteria for sediment storage volume and detention time will result in adequate pond surface area to meet water quality standards. Determination by this method is based upon the preamble discussion supporting Section 816.46(b) and (c) which is incorporated herein by reference.

§ 816.46(c) Detention time.

This section of the final regulations requires sediment ponds to be designed, constructed and maintained to detain, sediment laden water for a period of time sufficient to allow the water to come to rest and clarify the discharge from the pond meets water quality standards of the Act. The average time design inflow is detained in the pond is the theoretical detention time. Haan at 6.6 (1976). This measure of flow through velocity is an essential design criterion for sediment ponds. Haan at 6.6 (1976); Hill at 11 (1976); Kathuria at 8, 56 (1976); Ward at 23 (1978); Janiak, Purification of Waters from Lignite Mines, at 59 (1975); USEPA Erosion and Sediment Control, Vol. 2, 51-79 (1976).

The final regulations establish a 24-hour theoretical detention time for the initial design detention time for sediment ponds. The regulatory authority is authorized to lower the theoretical detention time upon adequate demonstrations by the person who conducts the surface mining activity. In no event may the regulatory authority lower theoretical detention time from 24 hours without a demonstration that water quality standards including effluent limitations will be achieved and maintained. The regulatory authority may require the pond design to include a theoretical detention time above 24 hours to meet water quality standards and other effluent limitations. The regulatory scheme recognizes that to achieve the water quality standards of the Act, the operator must consider site-specific conditions such as soil type, particle size, particle specific gravity, slope, moisture content, and other conditions. In addition, the final regulations recognize the importance of pond inflow and outflow design, and pond shape in determining necessary detention time. The preamble to the proposed rule as clarified in the response to comments on this section is incorporated herein by reference. 43 Fed. Reg. 41748, Sept. 18, 1978.

The following comments were received on Section 816.46(c).

Most industry commenters suggested that the use of sedimentation ponds alone will not achieve EPA effluent limitations. Although some industry commenters concede that sediment ponds are the best technology currently available, some commenters add that even the use of such technology will not achieve EPA effluent limitations. Commenters submitted no independent field data to show that properly designed sediment ponds would not achieve effluent limitations. Rather, commenters challenged the database, methodology, recommendations and conclusions of the Kathuria study cited in the preamble to the proposed rules, 43 Fed. Reg. 41748, Sept. 18, 1978.

In particular, regarding the initial design criteria of a 24-hour theoretical detention time for the water inflow entering the pond from a 10-year 24-hour precipitation event, commenters suggested that this detention time would not necessarily result in a 94 percent removal efficiency which may be necessary to achieve effluent limitations. Commenters added that when particles in the inflow are less than 20 microns, a sediment pond built to OSM criteria will not settle out particles during high rainfall events. Commenters suggested that pond efficiency was more a function of surface area and inflow sediment concentration and velocity. According to commenters, chemical treatment will probably be a requirement rather than option to meet effluent limitations. Environmental group commenters said sediment ponds were the best technology currently available, but greater detention times and surface area would probably be required to meet effluent limitations.

Sedimentation ponds are the heart of the regulatory scheme. As discussed previously, sedimentation ponds are the key to controlling sediment. Nonetheless, as industry commenters point out, sedimentation ponds alone may in some cases be insufficient to achieve standards and acceptable effluent limitations. Therefore, the Office has required the use of additional sediment control measures if necessary to achieve effluent limitations.

In addition to sediment ponds, operators must use, as necessary, mounds, dikes, riprap, check dams, vegetative sediment filters, dugout ponds, and other measures that reduce overland flow velocity, reduce runoff volume, or trap sediment to meet effluent limitations. The effectiveness of such sediment control measures is well documented. Grim and Hill at 101-115 (1974), Erosion and Sediment Control 59-72 (1976).

Moreover, disturbing the smallest practicable area at any one time during the mining operation through progressive backfilling and grading, timely revegetation, retaining sediment within disturbed areas, and diverting runoff using protected channels or pipes through disturbed areas will effectively reduce sediment laden flow to sediment ponds thereby decreasing pond maintenance and increasing overall efficiency of sediment control measures. Grim and Hill at 101-115 (1974), Erosion and Sediment Control 59-72 (1976).

As commenters have repeatedly said, such sediment control measures will effectively reduce sediment laden flow from surface coal mining and reclamation operations. West Virginia Surface Mining and Reclamation Association, Comments on Interim Rules, Section 715.17(e) at 6 (1977), West Virginia Department of Natural Resources, Comments on Interim Rules, Section 715.17(e) 1 of 2 (1977).

The final design criteria for sedimentation ponds, in conjunction with other sediment control, are intended to achieve the water quality standards of the Act. The sediment pond design criteria requiring inflow detention time are critical to effective performance of sediment ponds. Under the final regulations, a 24-hour theoretical detention time for runoff entering the pond from a 10-year 24-hour event is established as the threshold criteria for sediment ponds.

The regulatory authority may require additional detention time if necessary to achieve effluent limitations. Similarly, the regulatory authority may approve a lower detention time to 10 hours, when the person who conducts the surface mining activity can demonstrate that the process will achieve and maintain effluent limitations and is harmless to fish, wildlife and related environmental values.

The detention time requirements are based upon the following technical literature and comments. In 1976, EPA commissioned a study of nine selected sediment ponds in the States of Pennsylvania, West Virginia and Kentucky. Kathuria, Effectiveness of Surface Mine Sedimentation Ponds (1976).
The conclusions and recommendations of this study demonstrate the need for and timelines of the final design criteria for sediment ponds. According to the study, construction of ponds in accordance with approved plans and specifications and poor subsequent maintenance of the ponds were the two major factors contributing to their poor performance. Moreover, the investigation showed that sediment pond inflow and disposal are extremely important for the proper functioning of sediment ponds. Kathuria at 3 (1976). Thus, the final regulation for sediment ponds is essential to assure that sediment ponds are properly designed, constructed and maintained to achieve the water quality goals of the Act.

The study identified three ponds which achieved EPA effluent limitations during both baseline (non-storm) and storm conditions. Kathuria at 47, 48 (1976). Based upon these and other collected data which show that removal efficiency is a function of detention time, the study recommended that sediment ponds be designed and constructed with a minimum of a 10-hour actual detention time. Kathuria at 8, 56 (1976).

Studies of actual pond detention time versus theoretical detention time have shown actual detention time to be 30 to 70 percent of the theoretically designed detention time with most ponds falling into the lower category. Hill at 11 (1976). Assuming ponds are approximately 50 percent efficient, to achieve the theoretical detention time, operators should consider locating ponds out of perennial streamlines and utilize measures to control the inflow rate to sediment ponds. For example, Kathuria found that Pond 1 which met effluent limitations had the benefit of initial settling of inflow in a pit area. The surge effect from a rainfall event was reduced by controlled pumping of influent to the pond. Pond 6 also had a portion of the inflow pumped from the mining pit into the sediment pond area. Kathuria at 22, 31-34 (1976). Other measures can also be applied to reduce the surge effect of a rainfall event. Erosion and Sediment Control 59-72 (1976), Grimm and Hill 101-115 (1974), Hill at 14 (1976).

With the proper design construction and maintenance of sediment control measures including sediment ponds, the Office believes that water quality standards of the Act are met. To the extent that particle size distribution precludes attainment of water quality standards even with application of these sediment control measures, the operator must use flocculants to meet water quality standards. Hill at 6 (1976).

The Office emphasizes that Congress was well aware that best technology for sediment control could necessarily include the use of flocculants. In discussing best technology currently available, the House Committee on In-
Thus, Congress intended that operators use flocculants if necessary to achieve and maintain water quality standards.

Congress' belief that flocculants are available to effectively control sediment in size ranges not buttressed by testimony on flocculants received during public hearing on the proposed rules. During hearings in Charleston, West Virginia, a vendor of such chemical agents testified to their effectiveness in facilitating the capture of submicron size sediment. Public Hearing 450-459 (Oct. 26, 1978). Therefore, the Office has included flocculants as best technology currently available if necessary to achieve and maintain water quality standards.

Commenters suggested that the term detention time be more precisely defined in the regulations. Theoretical detention time is determined by a flood routing procedure for the design event. Haan, at 2.91, 4, 8, and 4.17, 6.6 (1978). The routing procedure balances the design release rate and the available storage (settling storage). The balance achieved assures that water will be released rapidly enough to prevent overtopping the dam, and that it will be released slowly enough to allow proper settling for the design event. Soil Conservation Service National Engineering Handbook Chapter 15 and 17 (1971). As the release rate is decreased, the amount of storage is increased and the outflow hydrograph is lengthened (because the settling storage is released over a greater length of time). The net effect of a smaller release rate is greater distance between the centroids of the inflow and outflow hydrographs, thus, giving a larger theoretical detention time. The determination of the centroids of the outflow hydrograph is an analytical procedure discussed in Haan and Barfield, at 6.6 (1978).

Commenters questioned the selection of a 10-year 24-hour precipitation event as the design criterion for a sediment pond. The selection of a 10-year 24-hour precipitation event as the design criterion for sediment ponds is based upon Section 403(b)(1) of the Act which requires the Office to assure that additional contributions of stream flow do not exceed applicable Federal law. Under the Clean Water Act, EPA effluent limitations are applicable to control mining operations, 40 CFR Section 434. According to EPA regulations, treatment facilities to meet such effluent limitations should be constructed to include the volume which would result from a 10-year 24-hour precipitation event. See also Grim at 241 (1974). To assure a uniform regulatory scheme and enable the regulatory authority to measure compliance with both EPA effluent limitations and OSM standards, the Office has decided that sediment ponds should be designed to control a 10-year 24-hour precipitation event. This should also reduce the regulatory burden on the operator by eliminating confusion between EPA regulations and OSM regulations.

Commenters questioned the requirement that chemical treatment processes be designed by a professional engineer. Commenters specifically questioned the ability of even a few professional engineers to properly design chemical treatment processes. They also noted that EPA does not require that a professional engineer design treatment processes. This Office also determined that designing processes for chemical treatment of water will require special expertise. Accordingly, the Office removed the restriction, thus making it unnecessary to use the services of any qualified persons.

Commenters questioned whether qualified operators approved by the regulatory authority should operate chemical treatment processes. Commenters said that approval by the regulatory authority was not necessary. Other commenters were concerned about apparent conflict with recent UMW wage contract agreements. Other commenters said OSM was without statutory authority to require certification of waste-water treatment operators.

The Office has decided to delete the requirement for a qualified person approved by the regulatory authority to operate a treatment process. This additional flexibility should avoid any conflicts with UMW wage contract agreements. It is emphasized, however, that operators have the burden of achieving and maintaining effluent limitations. The operator is therefore responsible for selecting a qualified person to operate a chemical treatment process and to maintain all requirements. A few commenters suggested removal of “chemical” in reference to treatment processes. Commenters said that inclusion of “chemical” in the regulations would decrease development of alternative methods, because the term “chemical” excluded such methods which were mechanical, or electrical.

The Office has retained this terminology. Alternative sediment control measures are permitted under Section 816.45 and 816.46. Chemical treatment which may include flocculants is an option chosen by the operator if approved by the regulatory authority. Chemicals used as flocculants include both organic and inorganic compounds that effectively cause the coalescing of individual particles and their resulting increased rate of settling.

§ 816.46(d) Dewatering.

This Section of the final regulations requires a non-clogging dewatering device (which can be a principal spillway) to achieve and maintain the required theoretical detention time. The dewatering device and the principal spillway are required to prevent runoff resulting from a 10-year 24-hour precipitation event without use of the emergency spillway. If the design flow passes through the emergency spillway, there is no practical way to detain it. Thus, the detention time would be inadequate. For this reason, flow from the emergency spillway is restricted to precipitation events exceeding the 10-year 24-hour event. Erosion and Sediment Control—Surface Mining in the Eastern United States, Vol. 2 at 56-58 (1976); Hill at 17 (1976); Haan, at 6.1-6.27 (1978).

The sediment pond dewatering device may be designed in a number of ways. One method is to place the outlet of the principal spillway (usually a pipe spillway) at the elevation of the required sediment storage. A second method would be to place the inlet of the principal spillway at an elevation above the required sediment storage elevation. If this latter alternative is selected, sediment cleanout would not be necessary when sediment accumulates to 60 percent of the required sediment volume. However, the reduction in settling storage must not reduce the actual detention time below the theoretical detention time.

§ 816.46(e) Short-circuiting.

This section of the final regulations requires each person who conducts surface mining activities to design, construct and maintain sedimentation ponds to prevent short-circuiting to the extent possible. Short-circuiting is defined as a process which transports sediment through a pond in less than the detention time required for sediment to settle out. Short-circuiting can be caused by improper pond construction, high velocity jet action of incoming water, wave action and inlet and outlet design. Hill at 10 (1970); Kathuria at 84 (1976).

Methods of preventing short-circuiting include baffles, partitioning the pond into chambers, maintaining a length to width ratio of five to one, constructing an energy dissipator at the pond entrance, modifying the inflow, or adding two or more basins in series. Erosion and Sediment Control—Surface Mining in the Eastern United States, at 68 (1976). See also Ward, at 57 (1977); Janiak, at 59 (1975); Kathuria at 58 (1976).

Commenters said it is impossible to prevent short-circuiting. Therefore the regulations should require only that operators "minimize" short-circuiting.
To accommodate this concern while at the same time assure an enforceable standard, the Office has modified the language of the regulation to require that operators prevent short-circuiting to the extent possible. Thus, the burden is on the operator to show that all available methods have been utilized to prevent short-circuiting.

§ 816.46(d) Effluent limitations.

This section of the final regulations provides that the design, construction and maintenance of sedimentation ponds or other control measures will not relieve the person from compliance with applicable effluent limitations contained in 30 CFR 816.42. The additional design flexibility provided to operators is thus coupled with the responsibility to achieve and maintain water quality standards. This minimum requirement is mandated by Section 515(b)(10)(B)(L) of the Act which provides that in no event may this Office authorize the discharge of suspended solids in excess of requirements set by applicable state or Federal law. See also 121 Cong. Rec. 6291 (1975).

Commentators suggested that operators should be relieved from compliance with effluent limitations if the design criteria for sedimentation ponds were met. Many of the same commentators said there should be minimal or no design criteria for sedimentation ponds.

As stated previously the Office is without authority to relieve operators from compliance with effluent limitations contained in 30 CFR 816.42. The additional design flexibility provided to operators is thus coupled with the responsibility to achieve and maintain water quality standards. This minimum requirement is mandated by Section 515(b)(10)(B)(L) of the Act. Further, as a result of extensive industry comment, considerable flexibility has been added to the final regulations. For example, pond detention times and sediment pond volume may be lowered upon proper demonstration. In addition, no surface area requirements are included in the design criteria. These modifications have been made because industry has said it should have the flexibility to use alternative means to meet effluent limitations. With this additional flexibility, operators and their engineers will need a guiding limitation to properly design, construct and maintain sediment ponds. Moreover, the Office must be assured that the measures approved by the regulatory authority are effectively controlling the discharge of suspended solids. The effluent limitations provide this essential standard to measure the effectiveness of the sediment control system.

§ 816.46(g) and (i) Principal and emergency spillway.

The final regulations require the design, construction and maintenance of principal and emergency spillways to safely pass a 25-year, 24-hour precipitation event or larger event specified by the regulatory authority. As provided in Section 816.46(d), the principal spillway must divert the sediment pond at a rate to achieve and maintain the required detention time during a 10-year, 24-hour precipitation event. To assure that the emergency spillway is used only for precipitation events exceeding a 10-year, 24-hour event, the final regulations prohibit any discharge through the emergency spillway during the passage of runoff resulting from such an event and lesser events. The minimum capacity of the emergency spillway should be that required to pass the runoff from a 25-year, 24-hour event less any reduction due to flow in the principal spillway. Erosion and Sediment Control, Vol. 2, 50-69 (1976); Haan, 6.25-6.27 (1976); SCUS, Pond 578-513 (1977).

Some commentators questioned whether the precipitation events specified in the spillway grades and velocities. These commentators said that the regulatory authority should assume responsibility in case of failure. In consideration of these comments, the final regulations permit the operator to select spillway grades and velocities with final approval resting with the regulatory authority. The purpose of the grade and velocity requirements is to provide protection against downstream scouring by released water. This modification recognizes that the operator has the responsibility to design a safe sediment control system and bears liability in the event of failure.

Commenters questioned whether only events greater than the 10-year, 24-hour magnitude were permitted to pass over the emergency spillway. Some commentators interpreted the proposed regulation to require the "lessor precipitation event" to pass through the emergency spillway. The intent at the final regulation is to provide for the detention of any and all events less than or equal to the 10-year, 24-hour precipitation event for a 25-year, 24-hour time period. For example, the emergency spillway may not be located at an elevation where the 5-year, 24-hour precipitation event might be discharged through the spillway. Such action would short-circuit the detention time for the runoff volume of the 10-year, 24-hour precipitation event. Grim at 241 (1974); Erosion and Sediment Control as 65 (1976); Haan at 242 (1977).

§ 816.46(h) Sediment removal.

This section of the final regulations provides for the timely maintenance of sediment ponds. A properly designed sediment pond poorly maintained will not achieve water quality standards. Kathuria at 3, 47, 48 (1976). To assure that the sediment pond contains adequate unoccupied sediment volume, sediment must be removed from sediment ponds when the volume of sediment accumulates to 60 percent of the design sediment storage volume. The regulatory authority is authorized to allow sediment removal when the permanent sediment storage is decreased to 40 percent of the total sediment storage volume if additional sediment storage volume is provided above that required for the design sediment storage and theoretical detention time is maintained.

These requirements are necessary to assure that the pond has adequate sediment storage as a reserve for future precipitation events inasmuch as runoff events are not entirely predictable. Additionally, the remaining water volume (40 percent of required sediment volume) reduce the velocity of inflows and allows for resuspension of previously settled sediment. When resuspension occurs, the concentration of suspended solids contained in the inflow to the pond. Erosion and Sediment Control—Surface Mining, the Eastern United States Vol. 2 at 75 (1976); Hill at 11, 13, 14 (1976); Kathuria, Effectiveness of Sediment Ponds, EPA-600/2-76-17 at 3 (1976); Haan at 6.1-6.27 (1978).

Commenters questioned sediment removal requirements. Some commenters want to utilize 100 percent of the storage volume for sediment prior to cleanout while others suggested 70, 80 or another percentage without technical justification.

The Office has decided to retain the sediment removal requirements. Timely removal and disposal of accumulated sediment is extremely important for the proper functioning of a sedimentation pond. This maintenance is too often overlooked. Kathuria at 3, 25, 28, 31 (1976). Actual experience show that some sediment ponds fill up with sediment after only one moderate storm. Grim at 106 (1974).

A number of studies have recommended criteria for timely removal of sediment from ponds. One commentator said ponds should be cleaned when the storage capacity is reduced to 40 to 50 percent of design capacity. Hill at 11 (1976). Another commentator recommends that ponds should require maintenance when 60 percent full. Grim at 106 See also Erosion and Sediment Control, Vol. 2 at 75 (1976). Based upon these studies and to assure effective maintenance of sedimentation ponds, the Office has decided to require removal when sediment accumulation reaches 60 percent.

Commenters requested guidance on the proper disposal of sediment removed from ponds. Normally, sediment is fine-grained material which has a high water content, and is difficult to handle. After
being removed from the pond, sediments are usually placed in a sump or buried during spoil replacement. § 816.46(f) Freeboard.

This section of the final regulations requires a one-foot freeboard above the water surface in the pond with the emergency spillway flowing at design depth. The purpose of freeboard is the protection of the embankment against overtopping created by wave action. U.S.D.A. Technical Release No. 69, "Earth Dams and Reservoirs," published (1976). Erosion and Sediment Control, Vol. 2 at 65 (1976); SCS (No.) Pond 378-2 (1977). Commenters did not provide any information on other methods to prevent overtopping created by wave action. Therefore, the comment was rejected.

§ 816.46(k) Embankment settlement.

This section of the final regulations requires the construction height of the dam to be increased a minimum of five percent over the design height to allow for settlement. The regulatory authority may authorize an exemption from this requirement if it has been demonstrated that the material used and the design will ensure against settlement. Erosion and Sediment Control at 69 (1976); SCS (No.) Pond 378-2 (1977). Commenters suggested deletion of the freeboard requirements. They said freeboard requirements are specified by MSHA for large ponds, and should not be included in these regulations. Commenters did not provide any information on other methods to prevent overtopping created by wave action. Therefore, the comment was rejected.

§ 816.46(m) Embankment side slopes.

To assure embankment stability, this section of the final regulations requires the combined upstream and downstream side slopes of the settlement embankment to be not less than 1v: 1.5h with neither steeper than 1v:2h. SCS (No.) Pond 378-2 (1977).

Commenters suggested deletion of side slope criteria as specified 816.46(m). They suggest that an overall safety factor should control side slopes. The side slope criteria-also specifies that embankment stability analysis may allow slopes steeper than 1v:2h, the procedure requires an intensive geologic investigation and testing. The side slope criteria specified for small ponds is standard for most soil and has been proven adequate. The Office considers this alternative design a sounder approach, as many designers do not have the facilities to perform complex investigations. This side slope criteria also provides additional protection against erosion due to impacting rain and runoff. Moreover, the slope is not so steep as to impede good surface stabilization by vegetation.

§ 816.46(n) Embankment foundation.

This Section of the final regulations requires the embankment foundation to be cleared of all organic matter with surfaces sloped to no steeper than 1v:2h and the entire embankment surface scarified. SCS (No.) Pond 378-1, 7 (1977); Erosion and Sediment Control, Vol. 2 at 69 (1976). Commenters suggested deletion of the third criteria between the foundation and the embankment materials, because such requirements will result in occupation of excessive areas by the foundation. The Office has retained this section of the regulations. The basic concept for this specification is to ensure an adequate seal between the excavated slope of the foundation and the embankment materials, both on the bottom and the side slopes. Steeper slope criteria could result in additional shear at this important junction. The requirement is retained to ensure the creation of an adequate base and safe surface of these two materials. SCS (No.) Pond 378-2 (1977).

§ 816.46(o) and (p) Fill material.

These Sections of the final regulations require fill material to be free of sod, large roots, and other large vegetative matter, and frozen soil, and in no case may coal processing waste be used. The placing and spreading of fill material must be started at the lowest point of the foundation. The fill must not be brought up in horizontal layers of such thickness as is required to facilitate compaction and meet the design requirements of the regulation. SCS (No.) Pond 378-7 (1977); Erosion and Sediment Control, Vol. 2 at 69 (1976). Commenters requested regulations to use coal processing wastes as a fill material in embankment construction. The commenters said coal processing waste could serve as a supplement to embankment materials in areas where soil and rock material were limited. The use of the waste would also allow a desirable use for these products. Coal processing waste may not be used to construct embankments. Several problems are involved in using coal processing wastes. See the preamble discussion under coal waste embankments. (Section 816.81-88) and disposal of excess spoil (Section 816.71-70). Due to the potential of this material containing the required compaction, thin lift thickness is usually required. Other problems are the potential for spontaneous combustion resulting from the inflammable nature of the waste and the potential for acid and toxic forming material within the waste. For these reasons, coal processing waste was not included in the list of approved construction materials. See also McKenzie, at 3, 4 (1978). Commenters said authorizing the regulatory authority to specify lift thickness and compaction requirements was beyond the scope of the Act.

Section 515(b)(10)(B)(ii) of the Act provides that sedimentation ponds must be constructed as designed and approved in the reclamation plan. This provision of the Act is intended to assure that the regulatory authority has the authority to require the design of sediment ponds to meet the requirements of the Act. Moreover, Section 510(a) authorizes the regulatory authority to grant, require modifications of or deny plans to construct sediment ponds. The Office therefore believes the Act authorizes the regulatory authority to specify lift thickness and compaction requirements for sediment ponds. Such measures are essential for proper control and stability. SCS (No.) Pond 378-7 (1977).

§ 816.46(q) Embankments greater than 20 feet in height.

This section of the final regulations establishes more stringent design standards if the pond embankment is more than 20 feet in height or has a storage volume of 20 acre-feet or more. Under either of these conditions, the combination of principal and emergency
spillways must safely discharge the runoff from a 100-year, 24 hour precipitation event or larger event as specified by the regulatory authority.

The embankment must also be designed with a static safety factor of at least 1.5 or higher safety factor as determined by the regulatory authority. Further, appropriate barriers must be provided to control seepage along conduits that extend through the embankment. Finally, the criteria of the Mine Safety and Health Administration as published in 30 CFR 77.216 must be met. SCS (No.) Pond 378-2-3 (1976); Erosion and Sediment Control, Vol. 2 at 59-69 (1976); SCS Technical Release No. 60, at 5.1 and 5.4. See also preamble discussion to Section 816.42 incorporated herein by reference.

Commenters questioned the need for additional design criteria for large dams.

The general design criteria for principal and emergency spillways, and embankments are drawn from technical literature which distinguishes between large and small sediment ponds. SCS (No.) Pond 378 (1977); Grim at 239 (1974).

To prevent more extensive damage to public health and safety and the environment resulting from a failure of a dam capable of releasing a large volume of water, the Office has decided to impose additional safety requirements for such structures.

§ 816.46(r) Engineering.

This Section of the final regulations requires each pond to be designed and inspected during construction under the supervision of and certified after construction by a registered engineer. This requirement is mandated by Section 1516(b)(10) of the Act to assure the proper design and construction of ponds.

One commenter requested that the pond might be inspected and certified by a qualified person, other than a professional engineer. Another commenter suggested that the regulations include a list of individual items to be inspected and certified. Such areas would include concept, design, construction activities, and inspection certification.

Sedimentation ponds are the key sediment control structures required in the final regulations. In the past many sedimentation ponds have been poorly designed and constructed. Sometimes ponds were adequately designed but not constructed in accordance with approved plans. This has caused severe erosion and downstream damage, as well as failure to meet water quality standards. Kathuria at 3, 47, 48 (1976).

Congress was well aware of the importance of the proper design and construction of sediment ponds. To assure that water quality standards were met by surface coal mining and reclamation operations, Congress explicitly required sediment ponds to be certified by a qualified engineer. Implementing this congressional directive, the Office has required that each sedimentation pond must be designed and inspected during construction under the supervision of a registered engineer. The operator must have proof of such engineering supervision.

Further, after construction is completed, a registered engineer must certify the sediment pond as conforming to the approved design requirements.

§ 816.46(s) Stabilization of embankment.

This Section of the final regulations requires the entire embankment including surrounding areas disturbed by construction to be stabilized with a final vegetative cover. Erosion and Sediment Control, Vol. 2 at 71 (1976); SCS (No.) Pond 378-8 (1977).

After removal of the sediment pond, the portions to be regraded and revegetated are specified in accordance with Sections 816.100, 816.105 and 816.111-816.117 unless the pond is approved for postmining land use. In this event, the pond must comply with the requirements for permanent impoundments in Section 816.49 and 816.56.

Commenters suggested modifications to 816.46(s) concerning stabilization of the embankment. One commenter suggested that graded be replaced with "stabilized." The Office found this suggestion acceptable because it permits the operator to employ methods other than grading alone. This intent was previously mentioned in the preamble to 816.45(b).

The final vegetation should be used initially, until the permanent vegetation can be established. Permanent vegetation for sedimentation ponds should include the sod-forming grasses and should exclude woody plants.

§ 816.46(l) Inspections.

This Section of the final regulations requires all ponds to be examined for structural weakness, erosion and other hazardous conditions in accordance with 30 CFR 77.216-3. With approval of the regulatory authority, dams not meeting the criteria of 30 CFR 77.216-3 must be examined at least four times per year.

Commenters were opposed to weekly inspections for all ponds including those not meeting the size or other criteria in accordance with MSHA requirements. SCS (No.) Pond 378-8. According to commenters the small size and brief duration of these impoundments make weekly examinations for structural weakness, erosion, and other hazardous conditions unnecessary.

The Office has decided to modify this Section to allow for inspections on a less frequent basis. Since the ponds are small and have been designed and constructed according to Section 816.46, weekly inspection and subsequent reporting required under MSHA for large impoundments might have no significant value.

§ 816.46(u) Removal of sedimentation ponds.

This Section of the final regulations provides that no pond may be removed until the disturbed area has been restored and the vegetative requirements of Section 816.111-816.117 are met. Additionally, the drainage entering the pond must meet applicable State and Federal water quality requirements for receiving streams.

Commenters questioned when ponds might be removed. Some commenters read the proposed regulations to prohibit sediment pond removal until such time as pond infilled met effluent limitations. As discussed more fully in the preamble to Section 816.46, which is incorporated herein by reference, sediment ponds may be removed after revegetation requirements have been met, and after pond infill meets applicable State and Federal water quality requirements for receiving streams.

One commenter said bonds should be retained as protection against operator abandonment of a sedimentation pond.

The Office believes there is sufficient control within the regulation for the regulatory authority to approve any changes or amendments pertaining to long term control.

Another commenter requested that the landowner should have a role in determining the postmining use of the sedimentation pond. The Office interprets this comment to apply to cases where the landowner is not the operator. Such decisions would have to be mutually agreed upon by the two parties and in accordance with approved postmining land uses.

§ 816.47 Hydrologic balance: Discharge structures.

(1) Authority for this Section is found in Sections 102; 201; 501, 503; 504; 515(b)(2), (3), (4), (10), (17), (18), (21), (23) and (24) of the Act.

(2) The requirements of Section 816.47 are intended to minimize erosion from mining operations by requiring control of water runoff which have high velocities and can scour unprotected channels of receiving streams and cause uncontrolled erosion. Scouring can destroy the aquatic, biotic communities of the receiving stream in the immediate discharge area as a result of physical factors, such as trauma, displacement and de-
constricts of habit, and it can adversely affect water quality and ecology for large distances downstream as a result of excessive suspended material. (See the discussion in the Final EIS at Part II-B) Most biological effects of suspended materials are also physical in character, including asphyxiation by the mechanical blockage of respiration, inhibition of photosynthesis by the obstruction of sunlight, and the irritant action of toxic substances which render the affected organisms more readily susceptible to infections. Hynes, H.B.N., 1970, pp. 443-450; and Wilber, C.G., 1968, p. 261. The regulations identify devices generally applicable for dissipating water energy and preventing scour. Flexibility is provided for use of any acceptable method or combination of methods that will preclude channel deepening or enlargement. Some commenters suggested that the reference to surge ponds be omitted as a means to control discharges from sedimentation ponds. Some of these commenters also suggested that the phrase "where necessary" be moved to follow immediately after the word "controlled." The commenters considered surge ponds to be generally associated with large reservoirs and suggested that discharge control might not be necessary in all cases. Alternatives considered for developing the final rules were: (1) to leave rules as proposed, (2) delete the reference to "surge ponds", (3) move the words "where necessary", or, (4) incorporate both of the suggestions in (3) and (4). The second alternative was adopted and the reference to surge ponds was deleted since they are just another form of an energy dissipator, and therefore, already included in the listed discharge controls. In addition, a comma was added before the phrase "where necessary" to clarify that the intent of the regulations is not to require discharge control in all cases but to limit the need for the specific measures and devices to instances where they are necessary.

(4) OSM has further clarified the scope of this provision from proposed Section 816.47 by removing the words "permanent and temporary impoundments, coal processing waste dams and embankments" after the word "ponds." This change is based on provisions of the proposed rules which provided that all these structures be designed and operated in a manner which minimized erosion, adverse affects on fish and wildlife and disturbance of the hydrologic balance (see for example, Sections 816.41(c), 816.49, 816.81-816.83(c), and 816.97). The addition of specific mention in Section 816.47 of impoundments and waste dams emphasizes that discharge measures are appropriate means to help achieve the goals of other regulations specifically applicable to these structures.

§ 816.48 Hydrologic balance: Acid-forming and toxic-forming spoil.

Authority for this Section is found in Sections 102; 201; 501(b); 503; 508(c)(13); and 515(b)(2)-(5), (9)-(11), (14), (16), (17), (19) and (21)-(24) of the Act. Section 816.48 identifies measures for avoiding acid or other toxic-forming spoil that might result in degradation of the water quality and ecology of receiving streams (Kinney, 1964; Warner, 1973; Turner, 1956; Striffler, 1973). Biological effects may be acute or chronic in nature, depending upon the type and concentration of toxic pollutants contained in the drainage, the biological species exposed to the pollutants, and the time of exposure.

The commenters felt that the 30-day period in Section 816.48 are broad in character and cover the practical options known for avoiding acid or other toxic mine drainage. These are supported by the technical literature and State regulations that predate the Act:

Sec. 816.48

Alabama: Act 1260, Sec. 4(1), 1971; Regulations of June, 1974, Secs. 6(c), 7.


Louisiana: LRS, Title 30, Secs. 901, 914 'no date); Regulations of Jan. 1978, Rule 10(b-c), 10(f-lab,c).

Maryland: AGM, Article 64a, 1967; Regulations of Oct. 1973, Rule 08.06.07.

Montana: RCM, Title 50, Chapter 10, 1947; Regulations of (no date), Rule 26-210(10)-S10310, 1(c-b).

Ohio: ORC, Chapter 1514, Secs. 1513.01-1514.02 (no date); Regulations of Sept. 1977, Rule 151013-11-05.


Texas: RCST, Article 5920-10 (no date); Regulations of Feb. 1976, Rule 051.07.03.251(c).

Virginia: CV, Chapter 17, Title 45.1, 1989; Regulations of July 1972, Chapter II, Sec. 4, C(1,2). West Virginia: CWV, Article 6, Chapter 20, 1971; Regulations of March 1972, Rule 6D.01(c).

1. Several commenters questioned the provision of Section 816.48(c) which requires that acid- and toxic-forming spoil be placed on impermeable material. The alternative suggested would be to change the last sentence of Section 816.48(c) by deleting "on impermeable material" and substituting "in such a manner as to be." These commenters felt that the primary concerns in handling spoil are water quality, air quality and safety. Further, that material properly compacted as required will be protected from erosion and contact with surface water and will not further oxidize or otherwise deteriorate. Thus, they felt that placement on impermeable material is unnecessary.

The Office did not accept these suggestions. Compaction alone may not be sufficient to prevent acid or toxic waters from slowly seeping through the spoil, making contact with surface or ground water. It is necessary to prevent contamination of these waters, and thus the use of impermeable material is imperative to prevent seepage. (Gasper, 1976, p. 2; Gasper, 1978, pp. 2-4.)

2. A commenter questioned Sections 816.48(a) and (c) as to the appropriateness of relying upon treatment of acid- or toxic-forming spoil as an acceptable alternative to spoil burial because of doubts concerning whether the reliability of permanent spoil treatment, under average site conditions, has been sufficiently proven. The Office's review of this matter indicates that the commenter's doubts, based on the basis of work on this subject to date, may have some validity. However, use of treatment methodologies is believed to represent a potentially reliable alternative in certain situations for destroying the toxicity of spoils. The critical fact which is believed to resolve the issue is that, in Section 515(b)(14) of the Act, Congress clearly permitted either spoil treatment or burial as acceptable disposal methods for preventing water-quality contamination. Furthermore, an absolute ban on use of spoil treatment would preclude development of acceptable treatment methodologies.

Therefore, the Office decided not to exclude the provision allowing for treatment of spoil as an alternative to burial. Of course, the regulatory authority will allow for use of treatment with the operator who can demonstrate that the particular treatment methodology involved will preclude water pollution. (See Sections 102 and 515(b)(22) of the Act.) Use of treatment methods which have no demonstrated history under field conditions relevant to the particular site should not be allowed as an alternative to burial except when the requirements for approval of an experimental practice under Section 705.13 of the final rules are fulfilled.

3. Several commenters questioned the 30-day limitation for completion of burial or treatment of acid- or toxic-forming spoil, suggesting both longer and shorter periods. Some commenters felt that the 30-day period may not be feasible in all instances nor adequate for environmental protection. In addition it may increase costs and still may not allow enough
time to adequately assess the potential problem. However, a total disregard of the requirement or allowing a much longer time for treatment or burial does not meet the requirements of the Act to minimize the potential formation of water pollutants.

Laboratory testing conducted under both buffered and unbuffered conditions and designed to relate the acid-producing potential of a rock to its sulfur content, have shown that significant acid production begins within 24 hours of exposure of the rock to water. After 24 hours, the production rate of acidity tends to decrease, but not 20 to 30 days, increases again (Caruccio, 1968, pp. 125-126). The Office believes that the 30-day limitation for covering potentially toxic drainage. However some flexibility is necessary to allow temporary storage, or burial of material, might result in reduction of disturbance to the hydrologic balance. However, such a requirement would be unduly restrictive and costly and may cause other areas to be disturbed and thus prevent mining of some areas efficiently.

A requirement for immediate treatment or burial of material, might result in reduction of disturbance to the hydrologic balance. However, such a requirement would be unduly restrictive and costly and may cause other areas to be disturbed and thus prevent mining of some areas efficiently.

The Office chose to make no changes to the 30-day time requirement, as the provision was deemed necessary to ensure against acid or toxic drainage. However some flexibility is necessary to allow temporary storage, or burial of material, might result in reduction of disturbance to the hydrologic balance. However, such a requirement would be unduly restrictive and costly and may cause other areas to be disturbed and thus prevent mining of some areas efficiently.

4. Several other commenters questioned the reasonableness of requiring spoil burial and treatment only on the basis of the regulatory authority decision as to its potential acidity or toxicity. The suggested alternative would require that the regulatory authority determine the spoil to be, in fact, acid or toxic before burial or treatment. This alternative was not accepted because it would authorize the regulatory authority to allow acid and toxic releases from spoil, thereby undermining the intent of Congress to preclude water pollution from occurring at all.

816.49 Hydrologic balance Permanent and temporary impoundments.

1. The authority for Section 816.49 for the final rules is found in the Act in Sections 102, 201, 501, 502, 504, 816(b)(2), (24), (26), (11), (15), (19), (21), and (24).

2. The technical literature used in developing the performance standards for permanent and temporary impoundments includes that listed under "Hydrologic balance," Sections 816.41-816.57, and that listed under "Coal processing waste dams." Sections 816.91-816.93, in addition to other works cited below within the preamble.

3. The requirements contained in Section 816.49 set minimum standards for permanent and temporary impoundments. Soil Conservation Service (SCS) documents are incorporated by reference and contain the general design criteria for temporary impoundments and all coal processing waste dams and impoundments. These design criteria were selected because these standards are widely used and accepted. The SCS had "built" 1.7 million ponds as of September 30, 1977, and is presently assisting in the design and construction of about 3,000 ponds per year. In addition SCS has constructed over 8,000 dams under PL 83-566 and PL 504 programs. SCS standards have proven to be workable and are not so restrictive economically as to prohibit construction of small impoundments.

Because the final regulations require that coal processing waste dams and impoundments be designed in compliance with this Section, the requirements included in Sections 816.92a), 816.91a), 816.91b), 816.91c), and 816.91d) of the proposed rules are now contained in Sections 816.49a), 816.49f), 816.49g), 816.49h), and 816.49i), respectively. These requirements are the general requirements that are applicable to all dams and impoundments and are an integral part of the complete scheme suggested by the SCS standards. This Section should be specified as a Federal Standard 780.25, which contains related permit application requirements, and the reader is referred to the preamble discussion for that Section for elaboration of additional issues relevant to Section 816.49.

4. Paragraph (a) of Section 816.49 contains the specific SCS design criteria that are to be used to design permanent impoundments and itemizes certain conditions that must be met before the impoundments will be permitted.

5. Paragraph (b) refers to the design requirements for sedimentation ponds as the criteria for all other temporary impoundments.

6. Paragraph (c) contains requirements that must be met before excavation that will impound water shall be allowed during or after the mining operations.

7. Paragraphs (d) and (e) provide for slope protection, sediment control, and vegetation of all unplanted areas to be accomplished contemporaneously with construction, in line with standard operational procedures for permanent structures under construction.


6. Paragraph (i) adopts inspection requirements by reference to 30 CFR 77.216-3. See responses to comments contained in Paragraphs (12)(1), (m), and (n) below for more detailed discussion of inspection requirements. An inspection program is necessary to discern any changes which could indicate problems developing with structures. (ASCE, 1974, p. 5; USMESA, 1975, 9.7-9.11. Sherard, et al., 1963, pp. 553-555; W. Va. Dept. of Nat. Resources, no date.) See also Comptroller General of the U.S. (acting), 1977.

9. Paragraph (g) requires maintenance of dams, which is essential to assure their continued stability and proper performance in accordance with the engineering and environmental standards. (Canada DEMR, 1977, p. 93; USBR, 1973, p. 521. See also ASCE 1973; Sherard, et al., 1963; USMESA, 1975; W. Va. Dept. of Nat. Resources, no date.)

10. Paragraph (h) contains requirements for initial certification of construction and an annual certification thereafter. This requirement is in compliance with current MSHA requirements. (Canada DEMR, 1977, pp. 93-95; USBR, 1973, pp. 521-523; U.S. Dept. of the Interior, Federal Co., p. 780.25, which contains related permit application requirements, and the reader is referred to the preamble discussion for that Section for elaboration of additional issues relevant to Section 816.49.

11. Paragraph (i) contains procedures that must be followed in modifying structures that have been constructed.

12. Response to specific comments on the proposed rules and regulations are:

a. One commenter recommended that Section 816.49(a)(1), which requires that discharges from impoundments must not degrade the quality of receiving waters below the water quality standards under applicable State and Federal laws, be eliminated because this duplicates requirements under the Clean Water Act and State regulations. This recommendation was not accepted and this subsection is retained in the final rules in the same form it was proposed. The Office must, under the Act, insure that water quality standards are met. Retaining
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This subsection gives the regulatory authority the right to review plans and inspect the mining operations for conformance to water quality standards. The Office believes that emphasis of soil conservation practices and the use of buffer strips near streams may be desirable when different agencies are regulating toward a common goal, such as improving water quality and protecting environmental values.

Another commenter suggested that Sections 100.49(a)(1), (2), (3) and (4) contain some general requirements that are impossible with which to comply and that specific terms such as "adequate safety", "adjacent", and "sufficient storage" should be more clearly defined. The terms used are common usage and these four subsections as adopted have not been significantly changed from the version proposed. These four paragraphs contain general requirements that are not incorporated and addressed before permanent impoundments will be approved on the mining plan area. The Office believes the intent of the language is sufficiently clear to operators, regulators and the public to meet the obligations and perform their intended functions under the Act. If further definitions are needed for a specific State, they can be included in the State program for that State.

Another commenter recommended that Section 816.49(a)(2) be expanded to state that the design high-water level in impoundments must be below the level of any tile drainage system in the vicinity, and that the impoundments may not affect seasonal variations in water tables in underground agriculture soils. This recommendation was not incorporated in Section 816.49(a)(2) because the Office felt the adverse effects with which the commenter was concerned were adequately covered by other provisions relating to the protection of the hydrologic balance, including Sections 816.41, 816.49(a)(4), 816.51, and 816.54 of these final rules.

Another comment stated that the Soil Conservation Service's practice Standard 378 is not the same for each State and that Technical Release No. 60 is too detailed to be used. This commenter recommended that minimum design requirements be developed and included in the final rules rather than incorporating by reference the SCS design criteria. In developing the final rules three alternatives were considered:

(i) Incorporate by reference the current State SCS standard rather than the National 578 Standard for "Fonds";

(ii) Develop design criteria and include the criteria in the final rules and regulations rather than incorporating by reference SCS design criteria.

The final rules and regulations were developed using an alternative by incorporating by reference Technical Release No. 60 and the National 378 Standard as contained in the proposed rules. The design criteria were incorporated by reference because these standards are widely used and accepted.

The alternative to refer to the current State SCS 378 Standard rather than the National 376 Standard was rejected because the design criteria required for smaller embankments and impoundments as contained in the National 378 Standard are adequate for national application. Requiring adherence to separate SCS 378 Standards in this context would give rise to potential problems in applying different standards and would present logistical problems in distributing and maintaining the current standards while not providing the advance notice the current criteria require that is not contained in the National 378 Standard. In addition, since each State Standard is at least as stringent as the National 378 Standard, a State could adopt the State Standard for its regulatory program as an alternative standard approved as part of the State program under Subchapter C of these final rules. (See Section 731.13—the "State window.")

The alternative to develop specific design criteria and include them in the final rules and regulations was rejected because this would add considerable volume to the regulations with no appreciable benefit, since the SCS design criteria have proven to be adequate and acceptable design criteria for the size and type of dams and embankments anticipated in operations covered by these final rules.

A few commenters recommended that design criteria be developed for different classes of dams and embankments which would allow smaller, lower hazard structures to be designed to comply with less rigid design criteria. The final rules and regulations, which contain the incorporation by reference of SCS design criteria, provide for different design criteria for different classes of structures, which is appropriate, giving consideration to the risks involved.

One commenter stated that the Soil Conservation Service does not publish changes to their design criteria in the Federal Register and that this could be a potential problem in incorporating by reference the SCS design criteria. SCS has agreed to inform the Office of any revisions issued to the design criteria referenced in Section 816.49(a)(5) and the Office intends to publish in the Federal Register the title and date of those revisions to the referenced design criteria which are to become standards under this Section.

Another commenter recommended that impediments should be prohibited on steep slopes. This recommendation was not accepted because the design requirements contained in this Section are considered adequate to evaluate the acceptability of impoundments on steep slopes. In some cases, however, it will be impossible to design an impoundment on a steep slope and meet the design requirements in the referenced SCS design standards contained in Section 816.49(c) of this Section. In such circumstances, no impoundment will be permitted.

Another commenter questioned whether fish and wildlife structures were allowed under the criteria contained in this Section. This statement contained in the SCS design criteria, which are incorporated by reference in this Section, includes multiple uses, one of which is fish and wildlife. One commenter recommended that impoundments be allowed to be retained in final cut areas of area stripping operations. This recommendation was accepted and Section 816.49(c) was added to the final rules to contain the specific requirements that must be met in order to retain excavations that will impound water during or after the mining operation. These excavated slopes shall be stable and not pose a safety hazard and shall meet the basic requirements of the Act concerning the elimination of highwalls.

One comment was accepted which recommended that "structures" be changed to "measures" in Section 816.49(d) (proposed Section 816.92(c)) because there are other effective ways to control sediment at a construction site besides structures. Structures will be required in many instances, under Section 816.42, which applies to these impoundments.

One comment, recommending that a requirement to establish vegetation on permanent and temporary impoundments be included in Section 816.49, was also accepted. Section 816.49(e) was added to the final rules. Vegetative and revegetative requirements were contained in proposed Sections 816.106 and 816.111-816.117. Adding the cross reference to SCS Sections in the final rules does not impose any additional requirements, but only assures that the requirements are not overlooked.

Another commenter suggested editorial changes to proposed 816.91(a); i.e., change reference of 30 CFR 77.310-3 and Mine Safety and Health Review Commission to 30 CFR 77.216-3 and Mine Safety and Health Administration respectively. These references
have been corrected since the original citation was a typographical error which was not misleading, since the reason for the cross reference was clear, and since the substance of the material was set forth elsewhere in the proposed rules and preamble to the proposed rules. The entire paragraph was moved to 816.49(f) in the final rules.

(2) These controls are to be instituted, first, with respect to backfilling operations under Section 816.50(a). Implementation of Section 816.50(a) will require certification of the compliance of Sections 816.43 and 161.100-161.105, which also regulate backfilling. In particular, the provisions of Sections 816.43 and 161.103, related to handling of acid-forming and toxic-forming backfill, are critical to the success of efforts to protect ground water. As proposed, Section 816.50(a) would have regulated backfilling to protect the ground water system "offsite," a term that was nowhere expressly defined and, therefore, subject to ambiguous interpretation. To guard against that possibility, the final version of 816.50(a) provides for protection against adverse effects of backfilling on ground water systems outside the permit area, with the latter term being specifically defined at 30 CFR 701.5. It should be noted, however, that this does not mean that ground water systems within a permit area may be allowed to be polluted by surface mining activities. Rather 816.50(a) requires that, as a minimum, protection be afforded to ground water outside the permit area, which will ordinarily also require protection of ground water inside the permit area so as to preclude the drainage of pollutants to adjacent areas.

(3) The second means by which this section will protect ground water is to require careful regulation of mining-related earth excavation and other disturbances to land under Section 816.50(b). Important complements to this provision are Sections 816.13-816.15, 816.53 and 816.55.

§816.51 Hydrologic balance: Protection of ground water recharge capacity.

(1) The impacts of surface mining activities on ground water may vary considerably, depending on the scope and extent of aquifers involved, water infiltration rate, the porosity and permeability of the excavated overburden, the compaction of the backfill in disturbed areas, whether mining operations are conducted above or below the water table, and the extent of ground water use in the recharge area.

(2) Section 816.51 is adopted to protect the recharge capacity of aquifers in areas affected by surface mining activities.

Uncontrolled mining and reclamation practices can result in significant degradation of ground water systems. All water levels and flow in ground water levels and flow from springs, and changes in water-bearing characteristics within any aquifer recharge area.

Recharge capacity is defined in Section 701.5 and conceptually is the ability of the soil and rock materials to receive water, store it for a variable period of time and slowly release it, usually to lower elevation streams, water bodies or in response to runoff, and to transport the movement of surface water (precipitation and surface flow) to the recharge zone is controlled primarily by the infiltration characteristics of the surface soil (Chow, V. T. 1964. Handbook of applied hydrology, McGraw-Hill, Chapters 12 and 13). When mining disturbs the surface soil, it changes the infiltration characteristics, primarily ambient soil moisture, structure, and porosity. If the infiltration is reduced by compaction in backfilling, the soil pores are clogged from fine sediment, the rate of infiltration is reduced and thus recharge is reduced. Water levels and
spring flows then will be adversely affected. The opposite can occur, if the waterbearing characteristics, such as porosity and transmission, are improved. Thus, careful consideration in mining and reclamation must be given, for example, to proper location of ponds, backfilling techniques and distributions in local recharge areas to ground water.

(3) Legal authority for this Section is found in Sections 102, 201(c), 501(b), 503, 504, 507(c), 508(a), 515(b), and 517 of the Act.

(4) The primary protection afforded recharge capacity under the Act is provided for in Section 515(b)(10)(D) of the Act, requiring the postmining restoration of the approximate pre-mining recharge capacity. As proposed, however, Section 816.51 contained an ambiguity, for although the main text of the Section required restoration to “approximate” pre-mining levels; Section 816.51(c) would have required restoration to a recharge capacity “at least equal” to that prior to mining. Many commenters argued that Section 816.51(c) be revised to more closely follow the language of Section 515(b)(10)(D) of the Act. To resolve the ambiguity in the proposed rule and in response to those comments, Section 816.51(c) was changed in the final rule to require “a rate of recharge that approximates the pre-mining recharge rate.”

(5) One commenter claimed that the restoration of recharge is impossible on certain “scoria deposit” lands in the West. To the extent, however, that the Act requires restoration (e.g. to approximate pre-mining levels) as noted in above discussion, this comment could not be accepted as a basis of change to the regulations.

(6) Several commenters suggested that the regulatory authority be afforded discretion under Section 816.51 to waive the requirement of restoration to approximate pre-mining recharge capacity on a case-by-case basis. These commenters, however, provided no data to support such a waiver, nor did they suggest specific criteria by which waivers could be assessed to avoid inconsistency in administration of the Section. Further, adoption of such a broad waiver provision would be tantamount to a general variance clause, which was not contemplated as available in implementation of Section 515(b)(10)(D) of the Act, for there is no indication in either the language of that Section or the legislative history that Congress desired that broad exemptions be afforded to the requirement of restoration of recharge capacity. Moreover, since restoration is required to “approximate” pre-mining levels, the regulatory authority is afforded sufficient discretion to account for local physical characteristics in administration of Section 816.51 without the need for a waiver clause. As a result, the Office declined to accept these comments.

(7) One commenter suggested that the term “mining recharge capacity” in Section 816.51(c) be specifically defined. Such a definition was believed unnecessary because the meaning of “capacity,” as used in the context of “recharge capacity,” implied the rate or the ability to receive, store and transmit water.

§816.52 Hydrologic balance: Surface and ground water monitoring.

A. Section 816.52 is adopted to require compliance with applicable surface-mining activities to conduct surface and ground water monitoring, under the authority of Sections 102, 201, 503, 504, 506, 507, 508, 510, 515, and 517 of the Act. Because mining and reclamation must be given, mining recharge capacity. As proposed, however, Section 816.51(c) would have required restoration to a recharge capacity “at least equal” to that prior to mining. Many commenters argued that Section 816.51(c) be revised to more closely follow the language of Section 515(b)(10)(D) of the Act. To resolve the ambiguity in the proposed rule and in response to those comments, Section 816.51(c) was changed in the final rule to require “a rate of recharge that approximates the pre-mining recharge rate.”

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(7) One commenter suggested that the term “mining recharge capacity” in Section 816.51(c) be specifically defined. Such a definition was believed unnecessary because the meaning of “capacity,” as used in the context of “recharge capacity,” implied the rate or the ability to receive, store and transmit water.
Two commenters proposed revisions to Section 816.52(a)(3), to indicate that the additional hydrologic tests which may be required in this Section, be conducted after reclamation. This was rejected as redundant. The existing wording allows for additional tests to be required either during or after mining and reclamation.

(7) Four commenters suggested removing Sections 816.52(a)(3) by deleting the words “specified and.” This commenters felt that any additional hydrologic tests required by the regulatory authority should be planned by the operator, rather than specified by the operator. This alternative was rejected, since the regulatory authority may need to specify specific tests to be conducted, or it could specify that the operator develop a plan for additional testing which would have to meet regulatory authority approval. Moreover, this wording puts the burden on the regulatory authority to specify additional testing, if it decides that either the initial plan was inadequate or that the overall work load which may result from the requirement of this Section and other parts of the regulations. The Office feels that there presently are enough qualified people to meet this predicted demand, and any such demand will be filled quickly.

(8) One commenter expressed concern as to whether or not there are enough qualified technical personnel available to meet the potential work load which may result from the requirements of this Section and other parts of the regulations. The Office feels that there presently are enough qualified people to meet this predicted demand, and any such demand will be filled quickly.

(9) One commenter proposed that the requirement for determining post mining recharge capacity be deleted, due to the expense and difficulty of those tests. This comment was rejected, however, since Section 515(c)(10)(D) of the Act requires restoration of the recharge capacity of mined areas to the approximate pre-mining condition. It is noted, however, that as interpreted in Section 816.51, the restoration requirement applies to the overall mine area, not necessarily to fills or coal processing waste and refuse disposal sites. Thus, highly detailed monitoring, as apparently assumed by the commenter, may not ordinarily be required.

C. (1) Section 816.52(b) establishes minimum requirements for surface water monitoring. Under Section 816.52(b)(1), the regulatory authority is to specify the nature of data, frequency of collection, and reporting requirements, subject to the standards of Section 816.52(b)(1)(i)- (iii). The provision of this information for the regulatory authority, if requested, in a report, Reston, VA (Chapter 3 on Sediment, Chapter 5 on Chemical and Physical Quality of Water, and Chapter 7 on Basin Characteristics) was completed in 1974, and seven other chapters are currently in progress. A summary containing this information will be published by the end of 1979.

(4) Several commenters felt that Section 816.52(b) should not be modified so that it required only monitoring under NPDES permitting. These commenters cited Missouri and a few other States where non-point source discharge monitoring is required under NPDES permits. The Office rejected this alternative, since its national regulation of non-point source discharges from coal mines does not occur under the NPDES permit program administered under the Clean Water Act, 33 U.S.C. Section 1341-1368. The regulations of Missouri and a few other State’s laws. The requirements for NPDES permits under the Clean Water Act merely specify, as a matter of nationwide Federal law, apply to the requirement for monitoring of the quantity and quality of water which may result from activities in areas with little available treatment capacity. As to whether or not there are enough qualified technical personnel available to meet the potential work load which may result from the requirements of this Section and other parts of the regulations. The Office feels that there presently are enough qualified people to meet this predicted demand, and any such demand will be filled quickly.

(2) Surface water monitoring requirements should be tailored to the characteristics of the mining and associated treatment facilities. Wastewaters with highly variable concentrations and quantities of potential contaminants must be sampled more frequently than discharges which have relatively constant or low rates of contaminant input. If adequately designed, operated, and maintained, settling ponds and automatic neutralization facilities (for acid or toxic mine drainage) will assure that the treated effluent will be relatively constant, subject to seasonal and daily natural variation in levels of contaminants, therefore requiring a minimum of monitoring to document compliance with the permit limitations.

(3) Federal comments were received proposing that further minimum criteria be delineated for the collection of hydrologic information. These criteria were not developed, because of the impossibility of accounting in national regulations the instantaneous fluctuations which would have to be considered, including the proximity and utility of historic data, knowledge about the characteristics of a site, and the availability and applicability of hydrologic models that might be used to evaluate information.


U.S. Geological Survey, 1979. "National Handbook of Recommended Methods for Water Data Acquisition" Office of Water Data Coordination, Reston, VA (Chapter 3 on Sediment, Chapter 5 on Chemical and Physical Quality of Water, and Chapter 7 on Basin Characteristics were completed in 1974, and seven other chapters are currently in progress. A summary containing this information will be published by the end of 1979.

(3) One commenter felt that the regulations appeared to limit monitoring to point sources and to ignore surface water sampling devices. This is not true; Section 816.52 merely requires that sampling be adequate to meet approval of the regulatory authority and does not necessarily exclude manual sampling.

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(6) One commenter felt that the requirement of Section 816.52(b)(1)(i) with regard to water quantity monitoring should be deleted as it was too burdensome. The Office rejected this proposal, since information collected on the quantity of water is expressly required by Sections 507(b)(11), 508(a)(13)(c) and 517(b)(2) of the Act. Further, Sections 510(b)(3) and 515(b)(10) require that the regulatory authority ensure that operations are conducted to "prevent material damage to the hydrologic balance." "Hydrologic balance" is defined to include water quantity (see Sec. 70l.5 of the regulations).

(7) Three commenters felt that when the analyses for water quality constituents (parameters) are found to be at insignificant concentrations, then those analyses be discontinued, and suggested that this be specified in 816.5(b)(2) to allow a decrease in the monitoring of constituents that consistently meet the effluent limitations. The Office rejected this proposal as redundant. The language of the final rule is sufficiently flexible for the regulatory authority to revise the monitoring program to fit such situations.

(8) Several commenters suggested several alternatives of limits for monitoring requirements in Sections 816.52(b) and 817.52(b). These alternatives suggested that water quality measurement requirements be deleted, require a demonstration that the infiltration capacity has been restored, and specify the limits on the amount of change that will be allowed to the streamflow regime. These alternatives were rejected, because Section 610(b)(10) of the Act requires that the disturbance to the prevailing hydrologic balance (quantity and quality) be minimized and Section 517(b)(12)(A) of the Act specifically requires surface water monitoring where mining activities potentially affect surface or ground water and previous users of the surface lands on which these wells are located. Use of wells already created during mining operations is preferable to construction of new and additional wells by the operator. The Office has adopted Section 816.52(b) to have monitoring requirements on a case-by-case basis.

(9) Three commenters felt that the frequency of monitoring reports specified in proposed Sections 816.52(b)(1)(ii) and 816.52(b)(1)(iv) and in the corollary subsections of Section 817.52 were not consistent. The Office agreed, and revised the final rules, by combining the Sections into a single Paragraph for Sections 816.52(b)(1)(ii) and 817.52(b)(1)(iii). (10) Two commenters suggested that Sections 816.52(b)(ii)-(iii) and 817.52(b)(ii)-(iii) be modified to more closely align these Sections with EPA reporting requirements under the NPDES system. The Office concurred with the commenters and has appropriately changed these subsections to specify reporting of violations within five days, reporting of violations by a second statement of analytical results, and a general quarterly reporting period.

(11) Under 816.52(b)(2), monitoring is required to continue throughout the reclamation period. This Section was revised from the proposed rule, to accommodate proposed Section 816.42(a) in response to comments. Those comments objected to the provision of Section 816.42(a), as proposed, which could have been read as requiring continuous, automated monitoring in Sections 816.52(b)(2) and 817.52(b)(2). As explained in more detail in the preamble to Section 816.42(a), this was not the Office's intention. Section 816.42(a), as adopted, specifies that such drainage meet applicable stream water quality standards, not Section 816.42(a)'s effluent limits.

Section 816.52(b)(2) has been modified, first, to provide that monitoring data collected by the operator may be used for determining bond releases under Section 816.4(b)(a), but leaves to the regulatory authority discretion as to whether other data, collected by State or Federal agencies, should be used instead, recognizing that stream sampling is a different problem than monitoring of discharges only. In addition, Section 816.52(b)(2) has been revised to delete the phrase "for determining when the requirements of this Section are met," as Section 816.42(a), not Section 816.52(b), establishes the relevant substantive bond release criteria in the final rules. (12) In 43 FR 41751, September 18, 1978, a previous comment suggested that all operations be required to conduct continuous suspended solids/sediment monitoring in the first, second, and third streams downstream from discharges from the areas disturbed by a particular operation. Upon further consideration of this alternative, the Office has concluded that, if effluent guidelines are met, if the hydrologic balance is restored on the mine plan area, and all reclamation completed, the Office will not be required to expect that adverse changes will be found in downstream sediments at great distances from the mine site. The alternative suggestion has, therefore, been rejected as a general requirement for all mining operations.

(13) Two commenters believed that the word "monitoring" in Sections 816.52(b)(3) and 817.52(b)(3) referred to continuous, automated monitoring devices. The intent is that the monitoring requirements are determined by the regulatory authority on a case-by-case basis. The need for continuous automated monitoring, therefore, need not be required in all cases.

§ 816.53 Hydrologic balance: Transfer of wells.

(1) Under Sections 512(a) and 515(b)(10) of the Act, the use of drill or bore holes as water wells is to be closely regulated in both coal exploration and surface mining activities to prevent ground water pollution, as is explained in the preamble to Section 816.13-816.15 and portions of the final EIS corresponding to these Sections. On the other hand, these wells also can be used, subject to careful regulatory controls, as sources of water for domestic and public consumption by occupants of the surface lands on which these wells are located. Use of wells already created during mining operations is preferable to construction of new and additional wells by the surface occupant, both because of the additional expense involved and the danger that a new well will shift ground water drainage patterns in a way unforeseen during the operator's careful process of formulating and implementing a reclamation plan to protect ground water resources (Sec. 30 CFR 777.21).

To allow for the continued use of water wells used in coal exploration and surface mining activities, the Office has adopted Section 816.53 in the final rules, under authority of Sections 102, 201(c), 501(b), 814, 503, 507(b), 508(a), 510(b)(3), 512(a), 515(b), and 517 of the Act. Section 816.53 will provide for satisfactory accommodation between first, second, and third streams downstream from discharges from the areas disturbed by a particular operation. Upon further consideration of this alternative, the Office has concluded that, if effluent guidelines are met, if ground water drainage patterns are restored on the mine plan area, and all reclamation completed, the surface occupant need not be required to expect that adverse changes will be found in downstream sediments at great distances from the mine site. The alternative suggestion has, therefore, been rejected as a general requirement for all mining operations.
face owner or lessee thereof as water wells. Approval of a well transfer must be supported by a written transfer request. Under Section 816.53(b) primary responsibility for any liability for damages, eventual plugging, or compliance with 816.53 passes to the surface owner upon approval of the transfer. Under Section 816.53(c) the permittee remains secondarily liable for those obligations until release of the applicable performance bond. As long as the operator is still conducting restoration in a permit area, it will be relatively easy for the operator to conduct necessary repairs or closing operations to a well. If a transferee does not maintain the well, the transferee's cost should not be excessive to return to full/first obligations under Sections 816.53(c) and 817.53(c).

The Office also considered, but rejected, an alternative limiting the transferee's secondary liability to 12 months after the transfer, because this is a relatively short period in which to determine whether the surface owner has satisfactorily administered a transferred well. Tying the elimination of secondary liability to bond release provides the regulatory authority with a sufficient length of time in which to determine, accounting for seasonal variations, that the surface owner can satisfactorily manage the well.

(3) The Office recognizes that standards for the construction of potable water supply wells generally require construction practices which assure protection from surface pollution. Since wells intended for potable supply uses are usually subject to regulation by local public health agencies, it is expected that the regulatory authority may require certification from the local government agency, before the well is approved for potable supply use. Stock and irrigation uses, however, when well yields are sufficient for these purposes, usually do not require local agency inspection and approval.

(4) As proposed, Sections 816.53 and 817.53 contain no provision for cutting off the transferor/operator's secondary liability for assuring compliance with the requirements of the Act. Several commenters objected to this, indicating that perpetual liability would be so onerous as to preclude the transfer of good wells. In response to these comments, the Office considered three substantial alternatives.

First, it was considered whether to exempt the transferor/operator from any secondary liability. This alternative was rejected, however, because under Section 515(b)(10)(A)(iii) of the Act, the transferor/operator is charged with responsibility for protection of the hydrologic balance, in the first instance, both during and after mining operations. Thus, it is believed that Congress intended that the industry assume ultimate responsibility for assuring that wells used in coal mining do not result in ground water pollution. Moreover, it is the industry which will have both the resources and expertise to ensure that wells are satisfactorily abandoned, if no longer needed, or if their use is leading to adverse effects on ground water.

On the other hand, the Office recognizes that Congress also expected that the operator's obligation to protect ground water was not one of absolute perpetuity, inasmuch as performance bonds are releasable under Section 519 of the Act at a relatively finite point. Therefore, the Office also considered and adopted an alternative whereby the transferor/operator's secondary liability for the well terminates upon approved release of applicable performance bond. As long as the operator is still conducting restoration in a permit area, it will be relatively easy for the operator to conduct necessary repairs or closing operations to a well. If a transferee does not maintain the well, the transferee's cost should not be excessive to return to full/first obligations under Sections 816.53(c) and 817.53(c).

(2) A commenter questioned whether the operator, in consultation with the owner of interest, should be provided with the option of either replacing water affected by contamination or compensating the owner of interest for that loss. It was asserted that this would be a less expensive method than physically supplying replacement water. If ruined waters are not replaced, owners of interest may never find potable water sources for the replacement on their own. Moreover, Sections 513(a)(13) and 717 of the Act require that replacement, not compensation, be provided.

(3) Two commenters questioned who should have the burden of proof in administration of Sections 816.54. Although the regulation does not explicitly establish this, the Office believes no additional language needs to be added to this Section. Under the normal rules of agency law, the initial burden of production and proof will rest with the party asserting that a water supply source has been affected by interruption, whether a proceeding to enforce Section 816.54 is initiated by the Office or the regulatory authority under Subchapter II or by a citizen under Section 520 of the Act or other relevant provisions of law.

(4) One commenter felt that the Section should be changed to provide that the operator would not have to replace the landowner's water supply, if the landowner indicated replacement was not wanted. The Office rejected this proposal, as Section 717(b) of the Act clarifies that replacement is required in all instances. Moreover, allowing present owners to waive the benefits of 816.54 would not provide adequate protection for present lessees or for future owners of the property involved.

§816.55 Hydrologic balance: Discharge of water into an underground mine.

(1) Section 816.55 provides for protection of the mining areas' hydrologic balance by restricting the diversion of discharge of water from surface or underground mines and the discharge of waste water, including coal processing waste, into other underground mine voids. Use of underground mines for wastewater disposal has the potential of degrading ground water aquifers and stream flow, (USEPA, 1976(a), pp. 90-93, Spaulding and Opden, 1963, p. 171. However, such subsidence control by filling mine voids through sedimentation of suspended solids. Consequently, the regulations would allow the practice, pro-

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vided that all necessary precautions are taken to assure the protection of the area's water resources and comply with the approval of the Mine Safety and Health Administration (MSHA). It should be noted that the regulatory authority's approval of such a practice would be based on environmental protection and related criteria as required in Sections 102, 201, 515(b)(10), 515(b)(12), and 702 of the Act, and not economically.

The Office considered an outright ban on all discharges into underground mining works. However, this would preclude the environmentally beneficial measures authorized under this Section. Legal authority for this Section is Sections 102, 201, 501, 503, 504, 506, 507, 510, 511, 516, 517, and 702 of the Act.

(2) Two commenters pointed out that a safety hazard might be involved in discharging water into underground voids. Accordingly, Paragraph 816.55(e) has been deleted, requiring MSHA approval prior to allowing discharges under 816.55. Other editorial corrections were made to improve clarity or correct obvious inaccuracies. The requirement was reworded to allow all discharges into underground mines. Section 816.55(a) was reworded to apply to surface mining activities, which is the Part, of course, to which 816 applies. Section 816.55(b)(7), as proposed, was moved to 816.55(c). Compliance with effluent limitations on the ultimate discharge from the underground mine workings was specified, to assure that these discharges do not circumvent the requirements of 816.42(a)/817.42(a).

(3) Several commenters objected that proposed 816.55(b) did not allow for the discharge from the surface into underground workings to be exempted from the pH limitations of 816.42(a) although an exemption was allowed from the total suspended solids limitation. The commenters pointed out that this would preclude the use of mine workings for storage of acid wastes and/or as an intermediate conveyance facility to a mine drainage treatment plant, requiring unnecessary pre-treatment prior to the discharge into underground workings. Accordingly, the final rule was modified to allow for an exemption as proposed by the commenters. It should be clearly understood that any discharge from the underground workings must meet all relevant effluent limits of 816.42(a) through 816.55(c).

(4) Two commenters felt that 816.55(b) should be deleted because they felt that all discharges would ever meet the effluent limitations and thus there was no reason for not discharging it directly. The Office rejected these comments, because whether or not such waters will ever meet the effluent limitations is conjecture. The subsection is designed to protect the hydrologic balance, but also to provide flexibility for the regulatory authority to grant variances for pH and total suspended solids.

§ 816.56 Hydrologic balance: Postmining rehabilitation of sedimentation ponds, diversions, impoundments, and treatment facilities.

(1) Authority for this Section is found in Sections 102, 201, 502, 504, and 515 of the Act. The requirements of Section 816.56 are intended to control the renovation of permanent structures prior to abandoning the permit area. Renovation shall be required to restore all permanent structures to criteria specified in the detailed design plan for each structure approved by the regulatory authority.

(2) Four commenters suggested that the design requirements of all permanent structures allowed to remain, to criteria specified in the permit, rather than to require renovation to the design as was provided in the version of this Section proposed September 18, 1978. Four other commenters suggested modification of the renovation requirements to requirements appropriate for the approved land use. All suggested that restoration to the original design would unnecessarily require removing silt accumulations from all impoundments regardless of the postmining use. Alternatives considered for developing the final rules were (1) to leave rules as proposed, which requires that all structures be restored to the original design, (2) change the renovation requirements to those approved by the regulatory authority in the detailed design plan, and (3) change the renovation requirements to criteria appropriate for the postmining land use.

The final rules were developed using the second alternative, which requires that permanent structures shall be renovated to criteria specified in the approved detailed design plan for the structure. This will give the flexibility needed to renovate the structure to suit postmining land use and will assure that the regulatory authority reviews and approves all renovation plans. The first alternative was rejected because OSM believes that it is too restrictive and that the regulatory authority should be allowed some flexibility in determining how structures should be renovated on a site-specific basis. The third alternative is incomplete, and was not accepted because the Office believes that, although appropriate for post-mining land use, one standard to be met, other standards also should be brought into consideration, as appropriate, in the detailed design plan.

§ 816.57 Hydrologic balance: Stream buffer zones.

(1) Authority for this Section is Sections 102, 201, 501, 503, 504, 506, 507, 508, 510, 515, and 517 of the Act. In particular, this Section is promulgated to implement Sections 815(b)(10) and 515(b)(24) of the Act. Buffer zones are required to protect streams from the adverse effects of sedimentation and from gross disturbance of stream channels, as explained in further detail in the Final Environmental Impact Statement (p. BIII-59).

(2) The general rule of Section 816.57 recognizes that buffer zones are an effective method to be used, in conjunction with sedimentation ponds and other techniques, to prevent sedimentation of streams by runoff from disturbed surface areas (Tennessee Valley Authority, 1971, pp. 229-234; Grims and Hill, 1974, pp. 102 and Appendix D, p. 255; Hardaway and Kinbali, 1976, pp. 27-29; Weigle, 1965, p. 314; and USEPA, 1976b, Erosion and Sediment Control, Vol. 1, pp. 7, 14, 19, 30, 61-62). It also recognizes that small streams may have a biologic community of considerable complexity worthy of protection under section 815(b)(24) of the Act, even if the streams are not perennial (Hynes, 1970, pp. 398-403).

However, since even the most ephemeral streams may have benthic biota, the Office believes that some reasonable level of biological community should exist in streams before they deserve direct protection. The rule under Section 816.57(a) for determining "biological community," seeks to do this by eliminating from consideration most of the very small forms of stream biota which have brief, ephemeral lifespans, unless they are joined in the biota by longer lived, larger forms of life which characterize the more permanent streams (Hynes, 1970).

(3) Section 816.57 protects stream channels, but recognizes that the regulatory authority may allow surface mining activities to be conducted within 100 feet of a perennial stream or a stream with a biological community adopted to flowing water for all or part of their lifecycle. Thus, if operations can be conducted within 100 feet of a stream in an environmentally acceptable manner, they may be approved. This concept does permit the use of erosion and drainage control measures near the channel, if approved by the regulatory authority. The 100-foot limit is based on typical distances that should be maintained to protect the stream channel from sedimentation. The 100-foot standard provides a simple rule for enforcement purposes, but the Office recognizes that site-specific variations should be
made available when the regulatory authority has an objective basis for either increasing or decreasing the width of the buffer zone. Under Section 816.57, an operator cannot mine through a stream covered by Section 816.44 (intermittent and perennial streams), unless it has been diverted around the area of disturbance in accordance with that Section.

(4)(a) Several commenters questioned Sections 816.57(a) and 816.75(c) as to which water bodies require buffer zones. A commenter pointed out that even ephemeral streams and dry washes are significant sources of water and sediment to larger streams within the watershed, and thus are in need of protection by buffer zones to preserve aquatic habitat downstream. Although this is true, the Act contemplates mining and associated activities to directly disturb minor stream channels, when it allows for sedimentation ponds (Section 515(b)(10)(B) of the Act). For the same reason, it does not require buffer zones. A specific inflexible width is arbitrary, would not fit local situations, and could take significant coal reserves out of production without adding any better protection to the stream. The Office chose to make no changes to the regulation, as the 100-foot zone is a valuable general rule and a valuable biological community that fits within the less likely it is to directly disturb minor stream channels. The Office thus has to draw a reasonable line.

Surface mining is impossible without destruction of a number of minor natural drainages, including some ephemeral streams as defined in section 701.5. The Office, therefore, believes it is permissible to surface mine coal so long as a reasonable level of environmental protection is afforded.

(b) Several other commenters felt only perennial streams should require buffer zones. This would reduce operator cost and increase coal production from deposits underlying nonperennial streams. The Office believes that this alternative is illegal; however, because there are significant fish and wildlife resources in streams other than perennial streams that need protection under section 515(b)(24) of the Act. The Office rejected these alternatives and chose not to change the section, except to delete the term "macroinvertebrate biological community" and redefine and clarify the intent of "biological community." (See following discussion.)

The regulation by use of the term "biological community," seeks to protect biologically significant streams, from direct disturbance, except in accordance with section 816.44. The more constant intermittent streams will usually have a biological community, but as streams become increasingly intermittent due to their climatic, geologic, and geographic location, the less likely it will be that they have a biotic community that fits within the definition of sections 816.57(c) and 816.57(c). The regulatory authority and the permittee can agree at the application stage where buffer zones need to be established, based on the fish and wildlife data required under section 779.20.

Perennial streams will almost always have a significant biota unless it has been eliminated by pollution. Use of this regulation will aid the restoration of fish and wildlife resources in an area. Section 515(b)(24) of the Act requires protection of all fish, wildlife, and related environmental values, using the best technology currently available. It would be illegal to protect only those streams with threatened or endangered species.

(8) Another commenter felt that section 816.75(c)(12) should apply only to water quality and not quantity. The Office rejected this alternative because Section 515(b)(10) of the Act. Also, changes in water quantity can have marked effects on water quality and availability of aquatic habitat, thereby adversely affecting fish and related environmental values of aquatic environments as prohibited by section 515(b)(24) of the Act. (See Hynes, 1970, chapters 3, 11, 21.)

(9) Several commenters asked that the section be deleted entirely, as being redundant relative to various other sections of the regulations. These comments have some merit and changes have been made in sections 816.44 and 816.57 to clarify the regulatory scheme.

However, the Office rejects the position that there is no need for a separate section dealing specifically with stream buffer zones. Streams are the crucial conduits of sediment pollution from mine areas, and a given stream section either has a significant biota or else eventually flows into a downstream area which has a significant and valuable biological community that is significant for human use. Because of the significance of streams as features on the mine landscape, the Office believes that rules on how streams are to be treated and protected should be spelled out. Section 816.57 establishes the kinds of streams that have the level of biological significance that triggers direct protective measures. Section 816.44 prescribes how stream channels and stream water must be handled when diversions are justified. Other sections of the regulations dealing with sedimentation ponds (section 816.49), impoundments (section 816.49), revegetation of ponds and treatment facilities (section 816.55), and reclamation (Sections 816.111-114) are to be read in conjunction with the provisions of this section. The Office believes that the conflicts have been resolved.

(10) Several commenters made suggestions on the definitions of perennial, intermittent, and ephemeral streams which relate to sections 816.57 and 816.57. The reader is directed to section 701.5 and the preamble for a discussion of those definitions and a resolution of the comments.

(11) The definition for "macroinvertebrate biological community" was deleted because several additional comments were made on this definition when it was constructed, its concept. The Office redefined the term as "biological community." The concept is still retained, as discussed below, but is clarified by...
The definition of macroinvertebrate biological community was proposed by the Office of Federal Water Pollution Control and was applied to buffer zones (Sections 816.57 and 817.57) and stream-channel diversions (Sections 816.44 and 817.44). Hydrologic discharge characteristics are the main criteria on which the definition of macroinvertebrate biological communities (MBC) would be applied. If streams in wetter regions, a MBC would be applied, and if streams in drier regions, none would be applied. These discharge characteristics do not directly relate to the ecological complexity of stream communities. (Hynes, 1970, chapters 3, 11, and 21; Gary, McAtee, and Wolf, 1974, pp. 233, 366, and 527.)

Therefore, the buffer zone sections as proposed, used the macroinvertebrate biological community (MBC) definition to call for a special performance standard near streams that are either perennial or which have a MBC.

These biological significant streams may be diverted only under special circumstances by cross-reference to Section 816.44 and Sections 816.57 and 817.57. Section 816.44 applies certain engineering criteria to the diversion of streams characterized as "intermittent" using hydrological considerations.

Several commenters assumed that the MBC definition would cause the buffer zone sections (Sections 816.57 and 817.57) to apply to all ephemeral streams or "pools of stagnant water." These comments misunderstood the definition, which was specifically drafted to refer to true stream community organisms that need flowing-water conditions to complete their life cycles. These organisms are severely limiting in that they must be arthropods (insects, crayfish, and their kin) or mollusks (snails, clams, and their kin), and that they must be larger than 2 mm long while living in the stream. These criteria eliminate worms and invertebrate species of tiny arthropods and other small fauna which inhabit all streambeds, from the wettest to the driest. (See Hynes, 1970, Chapter 21.) Even streams with summer pools containing fish that migrate upstream in the spring would not be included, unless a MBC also exists. For the more constant intermittent streams in wetter regions, a MBC will usually exist, but a MBC will very seldom exist in a truly ephemeral stream as defined in Section 701.5. In arid regions, many intermittent streams draining large areas will have no MBC (Hynes, 1970) and will thus be exempt from the buffer-zone regulations, although the stream-channel diversion regulations will still apply.

The intent of the Office that the use of the MBC indicator approach will better determine the streams worthy of special protection under the buffer-zone concept. It will necessitate a stream-fauna survey before a permit is granted, in those cases where it is unclear to the regulatory authority from available information on discharge ranges, maps, and from other sources whether the stream segments within or bordering on the mine-plan area have a MBC. Such surveys are very simple, and the regulatory authority should have the expertise to make a preliminary determination based on the stream organisms found.

(3) A third alternative, requiring a separate stream-fauna survey before a permit is issued, was also considered but not adopted. Public comment on the utility of requiring this information in permit applications, for use by the regulatory authority according to a fixed formula for determining economic feasibility of recovery, was overwhelmingly against such a requirement. The Office agrees with the commenters that such requirements are impractical and incapable of uniform administration.

(4) One commenter suggested that the recovery of small coal be made mandatory. The Office feels that the recovery of small coal is mandatory, while it might not have been during the initial period of mining. Accordingly, the Office does not prohibit the spoiling of small coal seams in the course of economic recovery of major coal seams, so long as the value of the remaining small coal economically feasible is achieved.

(5) Several commenters suggested prohibiting the redisturbing of previously mined land for a period of 50 years as a means of insuring maximum recovery. OSM has rejected this suggestion, because this concept would foreclose, for 30 years, the introduction of new mining technology which could make mining of the remaining coal economically viable, while it might not have been during the initial period of mining.

(6) The reader's attention is directed to a report of the Office of Recovery of Coal, which contains an outline of proposed regulations for determining recoverable reserves under a Federal lease, published by the U.S. Geological Survey July 10, 1976, (43 FR 19631). The Office understands the final version of these rules is soon to be published.

(7) Under the regulations published today, the regulatory authority would monitor the mining operations to assure that the operator is proceeding in compliance with the permit and with the determination of recoverable coal. Variations in recoverability may be necessary, where dictated by quality of coal resources, by health and safety considerations, by the geometry of the mine workings, and other factors.

(8) The language relating to environmental quality was added in re-

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§ 816.59 Coal recovery.

This Section addresses two persistent problems of coal mining: (1) The loss of coal resources when mining operations are not properly planned; (2) the permanent environmental degradation when land is reclaimed for mining to recover the remaining coal. The regulatory authority should have the expertise to make a preliminary determination based on the stream organisms found.

(1) The Office considered but did not include specific language requiring the recovery of all coal economically feasible to be recovered from a site, because such a requirement would be too imprecise to enforce effectively and uniformly. The regulation as promulgated would be satisfactory, however, if it demonstrated by the permittee to the regulatory authority that all coal which is economically feasible to recover will be recovered.

(2) The Office also considered requiring fixed percentages of recovery. The most commonly considered fixed percentages were 85, 90, and 95. These alternatives were not included for three reasons. First, it is difficult to define precisely the amount of coal existing at a site prior to mining, because of variable thickness of seams and partings, variable quality of the coal, and variations in depth of overburden. Second, health and safety considerations may preclude attainment of fixed percentages of recovery. Third, constant variation in thickness of seams, quality of coal, depth of overburden, and mining conditions during mining recovery, and detailed ongoing exploration programs which may be beyond the capability of the regulatory authority to undertake or oversee. All commenters on the fixed percentage of the proposed regulations voiced concern, although some, in Germany, pointed out that the requirement would be inappropriate because the amount of coal that can be mined economically varies widely from place to place. The reader is referred to the Office's Regulatory Analysis for a discussion of the costs of these alternatives, which the Office considered in reaching its decision.

(3) A third alternative, requiring a specified recovery percentage of recoverable reserves, would be inexpensive to enforce because it would be based on a ratio of economic feasibility. The Office feels that coal recovery depends on the quality and thickness of a seam as these characteristics relate to economic recovery. Accordingly, the Office does not prohibit the spoiling of small coal seams in the course of economic recovery of major coal seams, so long as the value of the remaining small coal economically feasible is achieved.

(5) A commenter suggested prohibiting the redisturbing of previously mined land for a period of 50 years as a means of insuring maximum recovery. OSM has rejected this suggestion, because this concept would foreclose, for 30 years, the introduction of new mining technology which could make mining of the remaining coal economically feasible, while it might not have been during the initial period of mining.

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(7) Under the regulations published today, the regulatory authority would monitor the mining operations to assure that the operator is proceeding in compliance with the permit and with the determination of recoverable coal. Variations in recoverability may be necessary, where dictated by quality of coal resources, by health and safety considerations, by the geometry of the mine workings, and other factors.

(8) The language relating to environmental quality was added in re-

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spouse to comments, with which the Office agreed, pointing out that the requirement for maximization of recovery should not be viewed as superseding other performance standards, but should be viewed as a requirement of equal importance to others in Part 816. The additional language places the regulation in perspective.

§§ 816.61-.816.68 Use of explosives.

Introduction

These sections establish performance standards regulating the amounts, methods of use, timing, and monitoring of blasting in the course of conducting surface mining activities. The statutory authority for and general basis and purpose of these sections were explained in the preamble to the proposed regulations, 43 FR 41753-41758 (Sept. 18, 1978).

The fundamental purpose for these sections is to establish regulatory controls on the use of explosives and blasting agents used in surface mining activities, because of the great potential for damage to public health and safety and water resources that improper blasting can cause. Congress was well aware of these dangers when it enacted the Act, as was explained through a review of relevant portions of the legislative history in the preamble to the proposed regulations. To protect against these dangers, Congress required the establishment of rigorous regulatory controls, particularly under Section 815(b)(15) of the Act.

1. Regarding Congress' perception of the dangers that may occur from blasting in surface mining activities, some commenters criticized what they felt to be the Office's reliance on a report presented in 1977 to the House Subcommittee on Energy and the Environment by the Center for Science in the Public Interest (CSPI). This report's conclusions were briefly discussed in the preamble to the proposed rules.

These commenters felt that the Office should not utilize the CSPI report because of asserted inaccurate assumptions about the extent of blasting effects made by the authors of the report. The Office has carefully reviewed these comments and the report and has concluded that, while the report's quantitative estimates of annual damages from surface mining blasting are indeed open to debate, changes in the regulations are not needed on that basis. The CSPI report was described in the preamble to the proposed rules as material illustrating the basis for Congress' general concern with the adverse potential for blasting, because it contained reports of firsthand observations of the effects of blasting in surface mining activities. Those observations, rather than quantitative predictions in the report, were used by the Office. Those observations were not challenged by commenters. As a result, the Office notes that the CSPI study is entitled to some weight to generally illustrate that significant problems can occur, if blasting is not properly controlled.

Materials considered by the Office in developing these regulations include:

10. Laadegard-Pederson and Dally, 1975, A Review of Factors Affecting Damage in Blasting, National Science Foundation.
11. Maryland Geological Survey, Bureau of Mines, 1973, Blasting restrictions (08.06.05.09) and Regulations governing blasting (08.06.05), in Bituminous coal strip mines and auger regulations, Maryland Department of Natural Resources Rules and Regulations, p. 23.

15. Pennsylvania Department of Environmental Resources, Rules and Regulations, Title 25, Pennsylvania Code, Ch. 911.

3. Several of the materials were criticized by one commenter as being inappropriate for use by the Office as the basis for some or all of Sections 816.61-816.68. In part, this comment was based on the presentation in the preamble to the proposed rules (43 FR 41753), that the Office "used" the cited materials to "develop" Sections 816.61-816.68, thereby indicating that
the Office was relying upon each source listed in the Preamble as justification for the proposed rules. In fact, the Office considered all of these sources, but found justification for the proposed rules in only some of them. Those that were believed to justify the regulations were discussed in portions of the preamble to the proposed rules related to particular sections of the regulation.

For the final rules, the Office has listed above all materials considered. That literature which provides the actual basis for particular sections of the regulations questioned by commenters is cited in succeeding portions of this preamble. The Office has also specifically considered the criticisms of the commenter who questioned the applicability of several articles listed in the preamble to the proposed rules—

(a) The Medears study was consulted frequently by the Office in the preparation process, as is indicated by frequent citations in the final preamble. While the Office did not, as explained below, feel that the structural response technique proposed by Medears is adequately developed for the purpose of adoption in these regulations (as an alternative to the peak particle velocity ground vibration limitation) the report does contain a considerable amount of useful information in other areas.

(b) The Siskind paper, "Structure Vibrations from Blast Produced Noise," points out that significant structure vibrations can be produced by airblast alone and that an airblast criteria based on damage should be considered. The specific data in the paper were not used as a basis for the final regulations. The noise decibel limits of Section 816.65 were derived, instead, from a special study done for the Bureau of Mines and from comments of a State agency.

(c) The Siskind and Stachura paper, "Recording System for Blast Noise Measurements and Instrumentation," contained a good deal of background information on existing techniques, some typical airblast levels measured on various instruments, and general recommendations. Although TPR 78 was used as a basis for the 128 dB standard in the interim regulations (see 50 CFR 115.19), the final standard was based on the special Bureau of Mines study. TPR 78 did, however, provide much of the rationale for parts of the airblast regulation, as indicated by frequent citations in the final preamble.

(d) The Ashley and Parkes reference was not relied upon in developing the vibration standard. Although not a study involving original research, it does present reasoned opinion, based on experience of the authors, that the one-inch-per-second peak-particle-velocity standard is reasonable. This paper is an example of one which was considered, but which did not weigh heavily on the writing of any particular section of the regulations.

(e) Bulletin 656, "Structural Vibrations and their Effects on Structures," was frequently used in the writing of the regulations. The data on propagation of blast vibrations was especially useful. The scaled distance formula requirement of Section 816.65 was also developed from that publication. Bulletin 656 stated that the two-inch-per-second criterion will keep the probability of damage below five percent. However, as explained further below, because of the inadequacy of a two-inch standard and information in several other technical reports (references 5, 6, 8, 12, and 13) the one-inch-per-second criterion was adopted in the final rules. The Office agrees with the statement in the one-inch limitation of 50 will protect against vibration of two-inches-per-second. The same graphs used for that conclusion support the use of a scaled distance of 60 to protect against vibrations of one-inch-per-second.

(f) RI 8168, by Siskind, Stachura, and Radcliffe, gave an insight on the correlation between structure vibrations induced by ground vibrations and airblast. No recommendation is to be made as to the damage levels from blasting was made. This publication merely gives background information on the technology and was not specifically used in writing the regulations.

(g) The Atlas Powder Company brochure, "Blasting Vibration and Airblast," contained no data other than that contained in Bureau of Mines Bulletin 656 and TPR 78. It did, however, show that a major powder company considers Bureau of Mines publications as authoritative sources. Since the Bureau work contributed heavily to the regulations, it was important to know that industry has confidence in Bureau work. This is clearly shown by Atlas' preparation of a users' pamphlet based primarily on Bureau work.

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The Barnes study, "The Effects of Strip Mine Blasting on Residential Structures . . ." has been criticized by many commenters who feel that an alternative to traditional delay detonators exist for reducing peak particle velocities and to indicate that the industry can meet the one-inch-per-second standard. The use of these materials with respect to delay detonation is to be an improvement that may be available for some operators who want to blast at very close distances to structures, i.e., within 300 to 1,000 feet.

(k) The University of Maryland, "An Investigation into Delay Blasting," describes inaccuracies in firing times of commercial electric blasting caps which have been known for a long time. The commenter stated that these inaccuracies cast doubt as to the ability of operators to meet the one-inch-per-second velocity limitation, by using a scaled distance equation based on eight-millisecond delay intervals. However, the scaled distance studies described in Bulletin 656, upon which the Office's scaled distance formula in the final rules is based, were empirical studies employing standard commercial detonators which would have the inaccurate firing times described by the commenter. Thus, these empirical studies accommodate and account for the inaccuracies described by the comments.

The University of Maryland publication itself was used only to justify Sections 816.65(o) and 817.65(p) in the proposed regulations, which required regulatory authority permission to use combination surface-in-hole delay systems. In response to heavy comment objecting to this requirement, with which the Office concurs, it has been deleted. Thus, the University of Maryland study was not used to directly support any of the final rules.

§ 816.61 Use of explosives: General requirements.

I. A few commenters proposed that over 50 safety-related items be included in Sections 816.61 and 816.63 as operating standards. These suggested additions would cover the transportation, storage, and use of explosives. A
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study of these comments indicated that these items should not be included in the final rule. Examination of the suggestions showed that they apply mostly to the safety of workers; commenters did not indicate how the inclusion of these provisions would increase the safety of the public. All but one of the proposed additions to the rules were either already adequately covered by the Office's rules or were covered by regulations of the U.S. Mine Safety and Health Administration (MSHA) or the Federal Alcohol, Tobacco, & Firearms (ATF).

Because MSHA has primary responsibility for the safety of workers and ATF has primary responsibility for the storage of explosives to protect the public, inclusion of these provisions in the regulations would be an unnecessary duplication. The exception is the lack of a provision to regulate the use of two-way radios in the vicinity of MSHA inspectors. The management of MSHA referred the Office to the use of two-way radios has never been known to cause an accident and that estimated costs of requiring those throughout the industry would be $4,000,000, a cost that would appear not to be justified.

II. To avoid redundancy by Federal agencies in inspection and enforcement, and to stay within the authority of the Act, deletions were made from Sections 816.61-816.68. The proposed regulation required compliance with all applicable local, State and Federal laws and regulations and the requirements of Sections 816.61-816.68 in the storage, handling, preparation, and use of explosives. The section was changed to require compliance with all applicable State and Federal laws in the use of explosives. As compliance with all of the regulations is independent of local, State, or Federal laws and regulations, as required by the Act, deletions to Sections 816.61-816.68 was deleted.

The Act in section 515(b)(15) requires the Office to "ensure that explosives are used only in accordance with existing State and Federal law and the regulations promulgated by the regulatory authority..." The Act does not mention local law. In many cases it will not be necessary for inspection personnel of the Office to determine all the laws which may be applicable in the numerous municipalities and counties within their assigned geographical areas, because those governmental bodies will enforce those provisions directly. Therefore, reference to local laws and regulations has been deleted.

Further, the Act mandates that the Office "ensure that explosives are used only in accordance with State and Federal laws and regulations." Traditionally, the "use" of explosives has been differentiated in practice: there are no specific regulations applying to the use of explosives in manufacture, transportation, or in the storage of explosives. See 30 CFR 55.6-1, 55.6-40, 55.6-90, 77.1300, 77.1301, 77.1302, 77.1303. Inspection by personnel of the Office to ensure compliance with all Federal and State laws pertinent to manufacture, transportation, and storage of explosives is not required of the Office by the Act under Section 515(b)(15). These aspects are presently sufficiently regulated by other Federal and State agencies, such as ATF, MSHA, and the U.S. Department of Transportation. Therefore, the reference that appeared in the proposed regulations pertaining to the storage, handling, and preparation of explosives has been deleted.

III. Section 816.61(b).

A. Several individuals and groups objected to the use of "the equivalent of five pounds of TNT" in the proposed rules as being confusing, since no minimum level for this limit was too low, or the regulation was ambiguous. Based on the comments received, the following alternatives were considered and alternatives (2) and (5) were adopted.

(1) Retain the specification "the equivalent of five pounds of TNT" as written in the proposed permanent regulations.

(2) Substitute in Section 816.61(b) the phrase "five pounds of explosive or blasting agent."

(3) Increase the weight to "250 pounds of explosive or blasting agent."

(4) Define the term "explosives" in the regulations.

(5) Do not further define the term "explosives."

B. A few commenters felt that the specification in the proposed rule of "the equivalent of five pounds of TNT" was ambiguous and confusing. Commenters suggested that a minimum level for application of these regulations, and not industrial blasting. One of these commenters suggested that the Office define explosives. Another comment asked for clarification at to whether OSM means five-pounds-per-blast or five-pounds-per-delay, and recommended specification of five-pounds-per-blast. Another commenter suggested that the minimum weight be increased to 250 pounds, and that a provision be made for exempting unscheduled detonations in case of misfire, wet holes, or other instances.

The comments on the ambiguity of the "TNT" specification are correct, so the Office has replaced the phrase "the equivalent of five pounds of TNT" by "five pounds of explosives or blasting agents." A similar change was also made in Section 816.64(c) of the final regulations. "Explosives or blasting agents" will be used throughout the product used for industrial blasting. Since both "explosives" and "blasting agents" are widely accepted terms for many specific types of detonable material, and the definitions of detonable material are known to those engaged in surface mining activities, no specific definition in the regulations is necessary. Of course, State regulatory authorities may adopt specific definitions, if those defining the terms of detonable materials used for blasting in surface mining activities in the particular State.

C. As proposed, Section 816.61(b) clearly stated that the rules apply to "blasting operations," but did not apply to "explosives and blasting agents" used in a particular blast will be aggregated to determine if these regulations apply. The Office clearly does not mean that the regulations should be applicable on the basis of five pounds or more.

The recommendation to increase the minimum charge specifications to 250 pounds was not accepted. First, this comment merely asserts, without providing supporting data, that blasting using up to 250 pounds of explosive is considered unnecessary, and that the regulations should be changed to "blasting operations" has been changed to "blasting operations." Therefore, all "explosives and blasting agents" used in a particular blast will be aggregated to determine if these regulations apply. The Office clearly does not mean that the regulations should be applicable on the basis of five pounds or more.

D. Finally, the Office has also decided not to adopt a special exception from the blasting schedule warning requirements for misfires and for other reasons that lead to explosives falling to fully detonate. Such an exception is unnecessary, if the need for additional blasting to replace misfires and wet holes is accounted for and described with particularity in the original blasting schedule. For example, if the schedule describes that blasting will occur at 2-3 p.m. on X date, then reblasting at 3 p.m. for misfires occurring at 2 p.m. will have been properly described. However, reblasting occurring at times or under conditions not specified...
in the blasting schedule would not be allowed, because then the public will not have received the adequate warning required by Section 515(b)(15) of the Act.

IV. Section 816.61(c). Several commenters questioned the specification in the proposed rules of persons requiring certification and personal characteristics of persons handling explosives. As a result, the Office revised Section 816.61(c) to eliminate reference to personnel characteristics of persons handling explosives and to retain only the requirements that blasting operations be conducted by certified blasters.

Adequate requirements for certification of blasters will be provided in detail in 30 CFR Part 850. Therefore, it is redundant to specify other requirements for certification of blasters in Section 816.61(c). It is sufficient in this section to provide that all blasting operations be conducted by certified blasters. Several commenters stated that is unreasonable to certify all persons using explosives. These comments will be considered in the revision of proposed 30 CFR 850.

Section 816.62 Use of Explosives: Pre-blast survey.

Section 816.62(a). (A) Numerous comments were received relative to when, where, how, and by whom the preblast survey should be conducted. A review of the comments resulted in consideration of the alternatives listed below. Alternatives three and four were adopted by the Office.

1. Retain the section as it appeared in the proposed regulations.
2. Set a definite time limit for submission to the regulatory authority of the preblast survey report, when completed.
3. Amend the proposed regulation to require "prompt" responses to the request for the survey and submissions of the report to the requestor and the regulatory authority.
4. Amend the proposed regulation to add provision for a supplemental pre-blast survey, if there have been renovations or additions to a surveyed structure after the original preblast survey.
5. Amend the section to extend the area of preblast survey beyond one-half mile of the permit area.
6. Amend the section to require that the preblast survey state the causes of existing preblasting structural damage.
7. Amend the section to require that requests for preblast surveys be made in writing.
8. Amend the section to require that the blast schedule providing notice of the right to a survey be mailed to all residents within one mile of the permit area and include a map showing the permit area.

B. Analysis of Comments and Alternatives.

Alternatives 2 and 3. Numerous comments were received relative to setting a time limit on completion of the preblast survey and submission of the report. The Office rejected the alternative of setting a specific time limit, in days, for the initiation of a preblast survey report and, instead, adopted the alternative of requiring both "prompt" responses to the request for surveys and "prompt" submission of survey reports to the regulatory authority. This alternative will further the purposes and requirements of the Act to ensure that preblast surveys be completed in a reasonable time prior to blasting, at the same time leaving flexibility to the regulatory authority to administer preblast survey requirements to fit local needs and workloads.

Alternative 4. A few commenters recommended that provisions should be made for a supplemental preblast survey, when renovations or additions have been made to a structure after an initial preblast survey has been made. The Office accepted this recommendation. The Act, Section 515(b)(15)(E), mandates that, if requested, a preblast survey be conducted of any structures within one-half mile of the permit area. Additions to a structure after the survey become portions of the "structure" that have not been surveyed and, therefore, should be covered in a supplemental survey. Renovations of a structure can substantially change its features, so that a preblast survey conducted prior to the renovation will no longer be representative of the structure for the purposes of analyzing the effects of blasting on the structure.

Alternative 5. Several comments were received relative to extending the area for preblast surveys beyond one-half mile of the permit area. The Office considers the one-half mile zone required by the Act as adequate for most blast surveys. A distance of 2.640 (2,940 feet) is based on the scaled distance formula presented in 30 CFR 816.65(m)-(l), more than 1,900 pounds of explosives can be detonated within any eight-millisecond time period, without the maximum peak-particle velocity of the ground vibration exceeding one inch per second. Similarly, at a distance of 0.6 mile (3,168 feet), over 7,000 pounds of explosives can be detonated without exceeding the peak-particle velocity exceeding one inch per second.

Therefore, at distances greater than one-half mile, a mining operator should not experience difficulty in detecting blasting operations at the quantities as allowed by the scaled distance formula. Furthermore, Gustafson, p. 221 (Ref. 8), states that when ground vibration control is to be supplemented with preblast surveys, the preblast inspection is usually within one-half mile of a blast site. The Office did not, therefore, extend the area of preblast surveys. However, under Sections 503, 504, and 505 of the Act and 30 CFR 701.3(c), 720, and 728, the regulatory authority may extend the area beyond one-half mile from the permit area, if local situations require.

Alternative 6. Several commenters recommended specifying that the preblast survey include analyses of the causes of existing preblast structural damage, while another commenter recommended that persons who conduct surveys make no comments either during the survey or within the survey report, concerning possible causes of any damage noted during the survey. The Office did not adopt either of these recommendations. The final regulations neither absolutely preclude nor require such information in the survey report.

In some cases the permittee may choose to have the causes of existing structural damage determined in a preblast survey. However, such determinations need not be made in all cases, because it would require detailed engineering analyses incompatible with the general purpose of the survey, which is to quickly document that damage exists and to compare that record as blasting proceeds.

The Office did not adopt the recommendation to prohibit the surveyor from making comments during the survey. This would be contrary to an objective of the preblast survey as stated in the preamble to the proposed regulations, to increase communication between the mining entity and the public about blasting operations. Further, the surveyor or persons may be able to provide opinions or information which could be of value to the requestor, by explaining the cause of existing damage present at the time of the survey.

Alternative 7. A commenter recommended that requests for a preblast survey be made in writing and that the person making the request state the specific conditions of the structure to be surveyed. The Office did not adopt this recommendation, because the stated purpose of the recommendation, which was to limit the number of requests for the preblast survey, was contrary to the purposes of Section 515(b)(15)(E) of the Act. The provision broadly provides for surveys and for the surveyor, rather than the requestor, to evaluate existing conditions of structures. Moreover, requiring requests for surveys from all persons with limited writing abilities in invoking the protection of the Act.
Finally, a preblast survey is not an investigatory or adjudicatory proceeding, requiring the written allegations be made to trigger the initiation of regulatory procedures. "Alternative 8. A commenter recommended that the blast schedule be mailed to all residents within one mile and that a map showing the permit area be included with the schedule. The Office did not adopt these recommendations, because a precise description of the permit area is already required to be published in local newspapers under 30 CFR 786.11, and residents beyond a distance of one-half mile from the permit area can reasonably be expected to have adequate notice of the blasting schedule by its publication in the local newspaper.

II. Section 816.62(b) Survey Personnel. A. Numerous comments were received relative to the personnel specifications in the proposed rules for conducting preblast surveys. A review of the comments resulted in consideration of the alternatives listed below. The Office adopted alternative 5.

1. Retain the section as it appeared in the proposed regulations.

2. Amend the regulation to give property owners and residents within one-half mile of the permit area the right to agree to the persons conducting the preblast surveys and/or the right to have their own candidates perform the surveys.

3. Establish specific approval criteria for preblast surveyors and have the regulatory authority approve all those permitted to perform such surveys.

4. Establish only one criterion: preblast surveyors must not be employed by operator.

5. Delete requirement for regulatory authority's approval of persons conducting preblast surveys.

B. Analyses of Comments and Alternatives

Alternative 2. The Office did not adopt this recommendation as it would make it too difficult to conduct prompt surveys, contrary to the purposes of the Act. Also, it is in the permittee's interest to have a thorough survey performed when requested, as it will serve as a baseline of damage existing at the time of the survey. Furthermore, the public can retain its own consultants, if necessary, for conducting surveys.

Alternatives 3, 4, and 5. Several comments were received recommending against allowing the use of personnel employed by the mining industry to conduct preblast surveys, while several other commenters asserted that use of industry personnel should be allowed.

As stated in the preamble to the proposed regulations, one of the objectives of this section is to encourage communication between the mining entity and the public about blasting operations including discussions about how operations are conducted and how they may be modified, if necessary, to prevent damage. Use of personnel employed by the mining operators to conduct preblast surveys facilitate this objective.

The second objective of the preblast survey is to provide for the establishment of a preblasting record of the existing conditions of structures. The survey will provide a baseline record against which the effects of the mining-related blasting can be assessed. As it is to the operator's advantage to obtain a thorough preblast survey, it is not necessary to burden the regulatory authority and the industry with the requirement of approval of specific personnel conducting preblast surveys, because the operator is likely to use competent persons to conduct the survey. In addition, requiring prior approval of specific survey personnel would necessitate the establishment of time-consuming, job-related approval criteria, a scheme beyond the scope of this rulemaking.

The requirement in the proposed regulations for regulatory approval of personnel conducting the surveys was, therefore, deleted.

III. Preblast Survey Methodology. A. Recommendations as to the specific details of the conduct of preblast survey required by the rules were made by several commenters. Based upon a review of the comments, the alternatives listed below were considered. The Office adopted alternative 1. The Office may also prepare guidance manuals concerning the content of the preblast survey, if future experience indicates a need.

1. Retain the subject section as published in the proposed regulations.

2. Require that the subject of structural fatigue, due to blasting, be included as part of the preblast survey report.

3. Require that information be provided in the report on a specific minimum list of items.

4. Require that a photographic record, with copies of the photographs, be provided to the regulatory authority and to the survey requestor.

B. Analyses of Comments and Alternatives

Alternative 2. A commenter recommended that the subject of structural fatigue due to blasting be a required item to be considered in each preblast survey. The Office did not adopt this comment as the survey report, including the preblast survey, will provide the regulatory authority with the structural condition of the structure so that any defect is noted by the regulatory authority.

Alternative 3. A comment was made that information be required on specific items such as cracks in foundations, water leaks, mortar cracks, loosened gutter nails, and columns out of location. The Office did not adopt this recommendation, as it is in the self-interest of the mining operator that the preblast survey accurately reflect the condition of the structure at the time of the survey.

Alternative 4. Another commenter recommended that a photographic record of the structure be required as part of the survey report. The Office did not adopt this recommendation, because photography is not the only method of establishing the condition of structures. Verbal, textual descriptions are an acceptable alternative.
As the requestor was reviewing a report concerning the effects from blasting and also because, the Office determined that the public would not be sufficiently protected by the right to file complaints under the inspection and enforcement provisions of Sections 517 and 521 of the Act and Subchapter L, because that process is intended to provide a remedy for problems that have already resulted, whereas the purpose of complaints on a preblasting survey is to prevent adverse effects prior to their occurrence.

Alternative 3. The Office did not adopt recommendations by commenters that the requester of the survey must approve the survey report or include comments therein, before the survey report is submitted to the regulatory authority. Requiring approval of the report prior to its submittal to the regulatory authority would result in considerable delay of the permit application. Furthermore, it appears to the Office that approval of the report by the requester might not serve a meaningful purpose, where the requester was reviewing a report containing detailed technical information difficult for lay persons to understand.

As an alternative, the Office has decided that the right of the requester to comment on the report as provided for in alternative two will provide adequate protection, because the requester will have had an opportunity to independently consult with appropriately qualified persons, if necessary, prior to filing objections.

Alternative 4. The Office did not adopt the recommendation of a few commenters that, within a specified time period, the regulatory authority shall in all cases approve, disapprove, or modify any recommendations regarding the survey contained in the survey report. It is the responsibility of the permittee, in the first instance, to conduct operations to avoid damaging property. Therefore, it is the permittee's primary responsibility to either implement or reject the recommendations. Requiring regulatory authority approval in all cases of recommendations in preblast survey reports would also be inconsistent with the purpose of the survey, which is to expediently provide a baseline reservoir of data on existing damages to structures.

Of course, there are instances where this consideration may be outweighed by the need for a regulatory authority to carefully scrutinize proposed blasting operations prior to blasting, such as where restrictions of Section 816.65(k) or where the peak-particle velocity would be expected to exceed 0.01 inch per second, to protect sensitive structures under Section 816.65(i). In those instances, scrutiny of the preblast survey report, together with other relevant data, is needed because of the high probability of adverse effects from blasting and also because, ordinarily, examination of those matters will not have occurred during the permit application review process, as is explained in the preamble to 30 CFR Section 780.13.

§816.64 Use of Explosives: Public notice of blasting

816.64(a)(1). Blasting Schedule Publication

A. Several commenters objected to the provisions in the proposed regulations requiring the mining operation to publish its blasting schedule in a local newspaper at least 10 days, but not more than 20 days, prior to blasting. A review of the comments resulted in consideration of the alternatives listed below. Alternative 1 was adopted by the Office.

1. Retain Section 816.64(a)(1) as proposed.

2. Allow publication of the blasting schedule at the same time that notification of the filing of the permit application is published.

3. Do not require public notification of the blasting schedule and delete Section 816.64(a)(1).

4. Delete the requirement for publishing the blasting schedule in a newspaper, but retain the requirement for notification by mail.

5. Require notification of the blasting schedule only in "heavily populated areas."

B. Analyses of Comments and Alternatives.

Alternative 2. One commenter stated that the permittee should be allowed to publish the blasting schedule at the same time as the notice of the filing of the permit application is published in a newspaper of general circulation in the locality. Further, persons traveling through an area near blasting need to be aware of the times when detonations of the blasts are actually conducted.

Alternative 4. Another commenter agreed with the notification of the blasting schedule by mail, but objected to the requirement of publishing the notice in the newspaper. Section 816.65(a)(1) of the final rules allows for deviations from the schedule published in the newspaper, under carefully prescribed circumstances, to avoid a safety hazard to workers. Finally, Section 816.64(a)(1) does not require notice by mail. In any case did occur that a blast was not ready to be detonated at the time originally anticipated, it could be detonated during the next scheduled detonation period.

Moreover, Section 816.65(a) of the final rules allows for deviations from the schedule published in the newspaper, under carefully prescribed circumstances, to avoid a safety hazard to workers. Finally, Section 816.64(a)(1) does not require notice by mail.

Alternative 5. One commenter agreed with requiring public notice of the blasting schedule in heavily populated areas, but objected this was impractical in remote areas. The Office decided not to modify the regulation.

Notification in remote areas will require considerably less effort to conform with the Act, due to the probability of fewer residents within one-half mile of the blasting site who require notification by mail. In any event, the Act requires notification without regard to the density of population in the areas involved.

§816.64(a)(2)

A. Many comments were received on details of the mailing of the blasting schedule and notification of the permit holder to request a preblast survey to owners and residents within one-half mile of the
A review of the comments resulted in consideration of the alternatives listed below. Alternatives 3 and 4 were adopted by the Office.

2. Change “permit area” to “blasting site.”

3. Restrict the meaning of “permit area”.

4. Add a provision to Section 816.64(c), eliminating the requirement for preblast survey information in change notices.

B. Analyses of Comments and Alternatives.

Alternatives 2 and 3. Several commenters pointed out that Section 515(b)(15)(a) of the Act provides that residents within a half mile of the “blasting site” will be notified by mail of the proposed blasting schedule. However, Section 515(b)(15)(b) of the Act provides that preblast surveys are unnecessary, unless the structures or facilities studied have changed. Section 816.64(c) was revised in the final rules to eliminate requiring information relative to preblast surveys to be included in blasting schedules, when notices previously mailed to the owner or resident have already supplied that information.

Other Comments. A commenter recommended that the regulations be amended to prohibit the blasting schedule be submitted to the regulatory authority. This comment was not adopted, however, because the schedule will have to be retained by the permittee and made available for inspection in order to keep the public informed.

Another commenter felt that special notification conditions are necessary in Alaska. Section 708(d) of the Act and 30 CFR 731.13, 738.22(a), 741, allow for the regulations to be modified to fit the special conditions of Alaska. Such modifications are not, however, within the scope of the instant rulemaking.

Section 816.64(a)(3).

A. Several comments were received concerning the provision of the proposed regulations that required renotification by the permittee of its blasting schedule every three months. A review of the comments resulted in consideration of the 3 alternatives listed below. Alternative 3 was adopted.

1. Delete the requirement for renotification.

2. Retain the provision as proposed.

3. Retain the requirement for renotification, but lengthen the time period beyond three months.

B. (1) Several commenters recommended deleting this subsection in its entirety, arguing that the Act does not explicitly require renotification of blasting schedules. These commenters alleged that renotification is an unnecessary cost, with one commenter citing $1,800 as a median cost to prepare, copy, publish, and distribute the schedule. Another commenter recommended that the section be changed to provide for an original notification covering the expected life of the mining operation, and to republish and redistribute the schedule only in the event that life of the operation is extended beyond that noted in the original schedule. Section 515(b) of the Act requires the regulatory authority to promulgate regulations that will include provisions:

... to provide adequate advance written notice to local governments and residents who might be affected by the operation of such explosive, by publication of the planned blasting schedule in a newspaper of general circulation in the locality and by mailing a copy of the proposed blasting schedule to every resident living within one-half mile of the proposed blasting site... prior to blasting. (emphasis added)

There will be persons who will begin to travel or work in or move into the area around permitted operations only after the original notification of the blasting schedule. Therefore, renotification of some frequency is needed so that those persons are given the “adequate advance written notice” required by the Act. Further, as the comments on the proposed blasting plan portions of the permit regulations (30 CFR 760.13) showed, highly detailed predictions of blasting operations cannot be ordinarily be given several years in advance of conducting those operations. Thus, renotification of blasting schedules will be needed on, at least, approximately annual frequencies as detailed information on blasting becomes available to the permittee.

Renotification of the blasting schedule at least every 12 months can reasonably be expected to keep the population adequately notified and aware of the blasting schedule and sufficiently reduce the expense that would have been needed to comply with the proposed regulations. By lengthening the maximum time period from three to 12 months, smaller mining operations, where necessary blasting can ordinarily be completed within 12 months, will be spared the expense of renotification of the blasting schedule, unless changes in operations are made during the 12-month period.

Section 816.64(b)(1)(f)

A. Numerous comments were received relative to the provisions of the proposed regulations limiting blasting to periods not exceeding an aggregate of four hours in any one day. A review of the comments resulted in consideration of the 4 alternatives listed below. Alternative 1 was adopted by the Office.

1. Retain “aggregate of four hours” as published in the proposed regulations;

2. Change to “aggregate of eight hours”;

3. Change to “between Sunrise and Sunset.”
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4. Delete the last sentence of the section, i.e., allow blasting throughout the day, without limitation on the length of the time periods.

B. Numerous commenters objected to the aggregate of four hours as proposed in the regulations, primarily on the theory that blasting would be rushed to meet a certain specific time period, causing mistakes in detonation which would be dangerous. These commenters, however, were based on misinterpretation of the regulations, which require only that "...such periods shall not exceed an aggregate of four hours in one day." (emphasis added) This would allow for blasting at more than one time period in one day, so long as the aggregate of total blasting time does not exceed the maximum of four hours. Thus, there should be no necessity for operations to "rush" to blast at one particular hour, as personnel engaged in blasting can detonate the round during any one of the scheduled periods in the daily aggregate of four hours.

Furthermore, as is explained in Section 816.65(b), blasting may be delayed and conducted at a previously unscheduled time under carefully prescribed conditions, if specified unavoidable hazardous conditions arise, in order to avoid safety hazards to workers.

(2) Many commenters stated that the four-hour limitation would unduly inhibit operations and was not authorized by the Act; several commenters objected that they could not sufficiently predict when blasting would be conducted. Some commenters also stated that the limitation would increase costs, but provided no supporting data. As previously discussed, however, the regulation allows for multiple blasting periods, aggregating to a daily total of four hours, giving a great deal of flexibility to an operator to fashion its own blasting schedule. Because the regulations only specify that detonation must be within the time frame, the operator can do all preparation for blasting during other times. In fact, several commenters stated that if it was clear that several different times aggregating to four hours was permitted, then the four-hour limitation would be acceptable.

Regardless of possible inhibition of operation and costs associated with these limitations, the Office must establish some time limitations on blasting under the Act. Section 815(b)(15)(a) of the Act requires that the person conducting surface mining activities "...provide adequate advance written notice to local governments and residents of the planned blasting schedule." Thus, some limitation on the frequency of blasting must be imposed, to ensure that predictions are made by the operator for the purpose of including in the schedule "adequate advance written notice." Secondly, Section 815(b)(15)(c) of the Act requires that blasting be limited with respect to the "time and frequency of blasts." Therefore, the limitation on the total duration in which blasting may occur in any one daylight period is appropriate to implement this Section of the Act.

Given that the Act requires establishing limitations on the timing of blasting, the industry must develop the capability of planning its operation so as to be able to predict in advance, to a certain extent, the times in which blasting will occur. As noted above, some commenters indicated that this can be done under the "four-hour aggregate" system, which is what the Office requires.

(3) Comments that suggested limited blasting only to eight hours per day or "suspended blasting until the requirements of the Act. These limitations would not provide a schedule with sufficiently specific advance warning to inhabitants of areas around the minesite, persons traveling through these areas, or governments so as to allow those persons and governments to regulate their daily activities around normal work or business hours when blasting would take place.

V. Section 816.66(c).

Additions were made to this Section from the proposed regulations, due to comments received and discussed under the preamble to Sections 816.64(a)(2) and 816.64(b)(2)(II).

§816.65 Use of explosives: Surface blasting requirements.

Section 816.65(a).

(A) A few commenters objected to allowing the regulatory authority to specify time periods for allowable blasting that are more restrictive than sunrise to sunset, while others recommended further restrictions on blasting between 5 p.m. to sunset. Some commenters objected to prohibiting blasting at night, alleging that it may be dangerous to hold undetonated charges overnight. Other commenters proposed that the regulatory authority be allowed to grant exemptions for night blasting on a site-specific basis in remote areas; additional comments cited the special conditions in Alaska as an example where restrictions on night blasting are unreasonable. One commenter assumed a conflict between this section and MSRA's proposed blasting regulations. A review of these comments resulted in the Office's consideration of five major alternatives; alternatives 4 and 5 were adopted.

1. Retain the Section as proposed;

2. Allow blasting at night in "remote areas;"

3. Modify the Section to add further restrictions on blasting between 6:00 p.m. and sunset;

4. Modify Section 816.65(a) to be more specific as to the reasons the regulatory authority may use to specify more restrictive time periods on an ad hoc basis;

5. Modify Section 816.65(a), by adding provision to allow for blasting at night on loaded charges that cannot be either detonated by sunset or delayed until sunrise of the following day for safety reasons. (This alternative included attaching conditions to the use of night blasting, to ensure that the public is still adequately warned and protected as required by the Act.)

(B) Alternatives 3 and 4. A few commenters objected to allowing the regulatory authority to prohibit or otherwise regulate blasting in time periods in addition to the sunset-to-sunrise restriction. These comments objected to the vagueness of the discretionary authority which would have been granted the regulatory authority under the proposed rule. The Office agreed that more specificity is desirable. Accordingly, the regulations have been modified to clarify the conditions under which the regulatory authority has the power to further modify hours for blasting.

The regulatory authority will only be empowered under Paragraph (a) to impose more restrictive blasting time periods for the specific purpose of protecting the public from adverse noise. In some cases, protection against noise may warrant special precautions, particularly because it can be much more severe under certain conditions (Ref. 25, p. 404 and Ref. 21, p. 15). The public is adequately protected from other effects of blasting, such as ground vibrations and flyrock, by Sections 816.65(c) and (f). A few commenters recommended that blasting should be further restricted, than in the proposed regulations, between 5:00 p.m. and sunset, because of noise caused by blasting that would occur during those hours when people relax at the end of the day. The Office did not accept this recommendation as it would be redundant. The regulatory authority may specify more restrictive time periods to protect from adverse noise under Section 816.65(a)(1).

(C) Alternative 5. Several commenters noted that it may be dangerous to hold explosive charges overnight which were loaded with the intention of being detonated during the day, but through equipment failure or sudden adverse weather occurrences could not be detonated until after sunset. These comments asserted that, in the next day, the explosives could...
react to detonation by blowing out and throwing rocks over the area, due to moisture accumulation in the charge holes, or could result in incomplete or no detonation at all. The threat of such conditions caused safety problems to the workers, such as in diggings out undetonated explosives. Some of these comments recommended modifying the regulations to allow for blasting at night to prevent these safety problems.

Although not fully explained by the comments, throwing of rocks could possibly result from leaving undetonated charges held overnight. Due to the deteriorating effect of moisture in the blast hole on some types of explosives or blasting agents, some of the charged blast holes in a blast may not have the power necessary to fragment the surrounding rock as originally planned. Under these circumstances, it is probable that some charged holes would lose their potential power to a greater degree than others, due to having been in the ground for a greater number of hours or being subjected to more moisture. Where charges that contain a greater degree of moisture accumulation when adopted in final form.

This is probable that some charged holes would lose their potential power to a greater degree than others, due to having been in the ground for a greater number of hours or being subjected to more moisture. Where charges that contain a greater degree of moisture accumulation when adopted in final form.

The Act requires that blasting be allowed to create exemptions for more powerful charges that could be caused by the failure of some weakened charges to move the rock burden in a lateral direction as planned, with the more powerful charges only moving rock in a vertical direction.

As a result, the Office decided that a change in the regulation should be made to allow blasting at night, when it is necessary to prevent creating a hazardous condition, while maintaining controls about blasting at those times of day for the benefit of workers.

The Office notes that, while MSHA currently does not prohibit all surface blasting at night, a proposed revision to MSHA's regulations (33 CFR 477.1308(j)) would create such a blanket prohibition. The Office will, however, ensure that its regulations are closely coordinated with MSHA's final rule and expects that, given the safety problems discussed above, MSHA will appropriately modify its proposed regulation when adopted in final form.

(D) Alternative 2. One commenter proposed that the regulatory authority be allowed to create exemptions for blasting at night, on a site-specific basis, for surface mines in "remote areas." This comment was rejected. The Act requires that blasting be appropriately restricted as to times with regard to the density of population in surrounding areas. Indeed, the Act requires protection of even a few persons (i.e., "the public") in areas located near to the permit area. Further, the term "remote area" concept would be very difficult to enforce, because it would require extensive field investigations to determine the density of population in areas surrounding mines, in very difficult terrain, thereby utilizing enormous regulatory authority resources for the benefit of very few mine operations.

(E) A commenter from Alaska objected to the restriction nighttime blasting due to portions of that State having up to 3½ months of completely daylight time and winters where daylight is only 2-3 hours a day in areas where coal is actively produced. This was a result of the shape of this national rule-making and should be addressed, if valid, through appropriate special provisions for Alaska under Section 508 of the Act and 30 CFR 791.13, 735.22(a)(1), and/or 741, depending upon whether the State of Alaska seeks to implement its own State program.

(III) Section 816.65(b).

A) MSHA commented that this section, as proposed, was unclear in two ways. First, the use of the term "emergency blasting" was to be allowed only in "emergency conditions approved by the regulatory authority." The section did not specify what or why these situations would be approved by MSHA to the regulatory authority and left the implication that operators would have to contact the regulatory authority, after an emergency arose, to obtain permission to blast at un-scheduled times.

The Office agreed with this comment and has reordered the Section to read, "previously approved by the regulatory authority in the mining plan." Though 30 CFR 780.13(f) requires that applicants for permits list such information, it does not permit approval, by the regulatory authority, persons who are responsible for meeting the requirements of Section 816.65(b) could have misinterpreted the methods and time of regulatory approval as the section was previously worded.

MSHA's second concern was that the word "emergency," along with the listing of "rain, lightning, other atmospheric conditions," was not consistent with MSHA's regulations. MSHA considers rain and lightning to be expected and recurring hazardous events, not emergencies. MSHA labels such events as "hazardous situations," along with emergencies (totally unexpected events which are also hazardous, e.g., fires). The Office agreed to substitute MSHA's term, "hazardous," for emergency, which makes terminology of the two agencies consistent and describes all situations which threaten operator or public safety. The Office has further limited approval of unscheduled blasting to these times of unavoidable hazardous situations, preventing the creation of situations which could be created by the operator to justify deviation from the blasting schedule for convenience and not safety's sake.

Adoption of these changes in Section 816.65(b) also required changing the word "emergency" to unavoidable hazardous in Sections 816.64(b)(2)(c), 816.65(a)(2)(d), and 816.65(b)(2)(d), and adding it at Section 780.13(d), to maintain consistency of terminology throughout affected portions of the regulations.

(B) (1) Several other comments received on proposed Section 816.65(b) suggested that additional requirements be added that the blasting schedule be eliminated, and asserted possible conflicts with MSHA regulations. Analysis of these comments led to consideration of three alternatives: alternative 1 was adopted.

1. Remove Section 816.65(b), only as per MSHA's comments.

2. Require a report to be submitted to the regulatory authority, within 10 days of any emergency blast.

3. Explain the definition of emergency concept in this section.

(2) Alternative 2. One commenter recommended that the emergency conditions and reasons for deviating from the blasting schedule be documented and reported to the regulatory authority with the report, whether the State of Alaska seeks to implement its own State program.

That range is distinguishable, however, from the narrow type of circumstances when blasting at night would be authorized in Section 816.65(a). In the latter situation, reports should be filed with the regulatory authority much less frequently, and the regulatory authority needs to more closely scrutinize night blasting because of its high potential for causing adverse noise effects. The decision on Section 816.65(b), of course, will not preclude individual States from requiring the filing of such reports, if their needs require it.

(3) Alternative 3. Another commenter suggests that the conditions
justifying deviation from the schedule be expanded to specifically include "events beyond the operator's control." The Office feels that this is adequately provided for by substituting the adjectives unavoidable and hazardous conditions under situations which warrant unscheduled blasting.  

(4) Other Comments. One commenter's objection, that the schedule, stating it is impractical to establish, was rejected. The Act in Section 816(b)(15)(A) requires a blasting schedule. 

Another commenter suggested that there are some differences between Section 816.65(b) and MSHA's regulations, 30 CFR 77.1305(c)) and proposed Section 77.1305(g). MSHA's existing and proposed regulations call for suspension of operations and withdrawal to a safe location of all persons upon the approach of an electrical storm. The Office does not believe that these create a conflict with Section 816.65(b), as the withdrawal would constitute justification for deviation from the proposed schedule, if the operator's permit had provided for such conditions under Section 730.13(c). If delay because of storm conditions had not been approved by the regulatory authority in the permit, the operator would have to wait for the next scheduled time period to conduct blasting operations. In no event does Section 816.65(b) allow for blasting during an electrical storm.

III. Section 816.65(c).  

(A) A number of commenters object-ed to the requirement that warning and all-clear signals be given which are audible at a distance of one-half mile from the blast site. One commenter felt that this provision is already covered by MSHA regulations, that particular items should be deleted, that additional sections should be added covering specific provisions on safety in the storage and use of explosives, that the signals should be audible "under normal weather conditions," that some wording was unnecessary, and that the section was inappropriate for the State of Alaska. 

The Office's review of these comments led to the consideration of four major alternatives and the adoption of alternative 1:  

(1) Do not revise this Section from the proposed rule;  
(2) Reduce the audible limit to one-quarter mile or less;  
(3) Delete the requirement for periodic notification and posting of signs;  
(4) Specify the signal source and signal character.  

(B) **Alternative 2.** Several commenters recommended that the audible distance requirement for signals be reduced to one-quarter mile or less. 

Some of these commenters asserted that, to meet the requirement that the signal be audible for a distance of one-half mile, the noise level of the signal would be greater than allowed by MSHA. Although the particular regulations may not be the same in all the commenters, 30 CFR 70.510(b)(3) of MSHA's regulations lists a table of permissible noise exposure levels as follows: 

```
<table>
<thead>
<tr>
<th>Duration (per day)</th>
<th>Noise level (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 hours</td>
<td>90</td>
</tr>
<tr>
<td>6 hours</td>
<td>92</td>
</tr>
<tr>
<td>5 hours</td>
<td>95</td>
</tr>
<tr>
<td>4 hours</td>
<td>97</td>
</tr>
<tr>
<td>3 hours</td>
<td>100</td>
</tr>
<tr>
<td>2 hours</td>
<td>105</td>
</tr>
<tr>
<td>1 hour</td>
<td>107</td>
</tr>
<tr>
<td>½ hour or less</td>
<td>110</td>
</tr>
</tbody>
</table>
```

(Figure 1) 

These do not substantiate the commenters' assertion that the requirement for warning signals audible to one-half mile from the blast would require a source that would exceed acceptable noise levels set under MSHA's regulations. 

The noise levels from the individual devices would be considerably less than for a single device used to notify the entire one-half mile area. The Office's regulations do not specify that a single signal device has to be audible for one-half mile. Rather, it requires that signals that are audible within a range of one-half mile shall be given. Second, as provided in MSHA's Section 77.1305, a noise level of 115 dBA is an allowable level for up to 15 minutes per day. Adequate warning signals under the Office's regulations can be conducted to aggregate less than one minute per day, particularly considering that blasting may only be conducted within a total aggregate of four one-hour periods. Thus, warning and all-clear signals may be divided into eight segments of one minute each, far less than the 15-minute limit imposed by MSHA's regulations. 

Third, calculations made by the Office and contained in its administrative record indicate that a warning signal sounded at 115 dBA (MSHA's maximum in Table 1) or less can be audible at a distance of one-half mile. 

(C) **Coverage by MSHA.** Several commenters stated that the provisions of this Section are already adequately addressed under MSHA's regulations. MSHA has only one proposed signal warning regulation (30 USC 77.1308h), and it merely provides that "ample warning shall be given . . . ." However, Section 815(b)(15)(A) of the Act requires that daily notice be given to residents/occupiers in the area that are within one-half mile of the blast site. Therefore, the Office decided not to alter the regulation, because the provisions of this section will fulfill the Act's requirement for daily notification of the public, in a manner that is satisfactory, appears to be most practical, and does not duplicate MSHA's proposed general requirements. 

(D) **Alternative 4.** A few commenters recommended that additional provisions be added to Section 816.65(b), to specify rules on handling explosives, and that this paragraph be modified to specify the actual signal type and the signal source. The material that was recommended to be inserted is covered in MSHA's rules, 30 CFR Part 77. Addition of those rules would be more duplication of MSHA, as opposed to the requirement that the signals be given and at what distances they must be audible, and would not provide any greater protection to the public or environment. If conditions in particular States require specific signals or signaling devices, these can be adopted in that State's regulations. 

(D) **Alternative 3.** Several commenters recommended deletion of the provisions for periodic notification or communication of the meaning of signals and maintenance signs. Commenters felt that miners and visitors are warned and instructed when entering the property. That, in itself, would not, however, provide warning instructions for residents within one-half mile, if they are not employees of the mine. Therefore, the comments were not accepted. 

(E) **Other comments.** (1) One commenter recommended that the section should be changed to "audible, under normal weather conditions, within a range of one-half mile." The Office did not feel that this modification would improve the regulations, as the phrase "normal weather conditions" would be subject to highly variable, and the statute requires adequate warnings without regard to the type of weather conditions. Indeed, severe weather is the time when warnings are most necessary, because of the increased danger of airblast and reduced visibility for persons traveling near the permit area. 

(2) A commenter stated that the phrase, "through appropriate instructions," should be deleted as unnecessary additional wording. This wording specifies how the information shall be communicated and the Office, therefore, decided it should be retained to ensure that the Act is fully implemented. 

(3) Another commenter alleged that there are significant differences between most mining to be covered by
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this Section and conditions of mining in the State of Alaska. This comment was believed to be outside the scope of this national rule-making and can be more appropriately resolved when a particular permanent regulatory program is approved for Alaska under Subchapter C and D.

(4) Several commenters alleged that the blasting schedule provision is redundant, because it is already required prior to a blast under Section 816.65(c) would be sufficient. Audible warnings alone, however, are not sufficient. The Act specifically requires publishing of blasting schedules in advance. Furthermore, audible warnings will not provide adequate advance notice either to persons inside buildings in the area around the mine site (and thus cut off from the signals), or to persons who travel through the blast area between the signal and the blast.

(5) Several comments cited Gustafson (page 256, ref. 8) on the effects of atmospheric conditions on the propagation of pressure waves. Even the type of weather, for example cloudy or almost clear, should be taken into consideration when estimating the propagation of pressure waves. However, the multiple time frames allowed by the “four-hour aggregate” rule of Section 816.65(b)(2)(ii) and the emergency blasting provisions of Section 816.65(a) and (b) provide a degree of flexibility to assure that for eliminating the four-hour time aggregate. Gustafson correctly points out that—

"... wind direction, wind velocity, air temperature, and air pressure have a very great effect on the propagation of pressure waves. Even the type of weather, for example cloudy or almost clear, should be taken into consideration when estimating the propagation of pressure waves."

Although several commenters supported the proposed version of this section, other comments suggested that either it be deleted, or the wording changed to agree with relevant MSHA regulations. Several commenters recommended deletion on the grounds that the guarding of charged holes is already covered by MSHA and that an additional rule covering the same item is merely duplicative. MSHA does, in fact, cover the protection of charged holes under 30 CFR 77.1303(g), which provides: "Areas in which charged holes are awaiting firing shall be guarded or barricaded and posted or flagged against unauthorized entry." The Office believes that the MSHA rule is adequate, so that the Office's proposed rule was redundant. MSHA's regulation will apply to surface coal mining operations throughout the active phase of mining. Blasting is not ordinarily conducted at other times in the surface mining of coal, and the flagging/guarding of holes is related solely to worker protection, not those outside the mine site.

Section 816.65(f)—Airblast Standards

(A) Numerous comments were received on a variety of aspects of the airblasting standard, including recommendations for both higher and lower permissible noise levels, changes in frequency specifications in Hertz (Hz.), and exemption of certain structures from protection by the standard. Review of the comments received in the consideration of the following alternatives. Alternatives 10, 11 and 12 have been adopted.

1. Retain the rules as proposed;
2. Increase the permissible airblast level;
The airblast noise level standards of 30 CFR, Parts 70 and 71, protect only mine workers from hearing loss caused by continuous noise, such as that emitted by trucks, shovels, cars, shatterers, and crushers. However, impulsive noise, such as airblast resulting from the detonation of explosives, is not similarly regulated by MSHA. Because impulsive airblast can cause property damage (Ref. 21, pp 2, 3, 15; Ref. 22), the Office has adopted standards to prevent damage to structures and to protect the public from noise resulting from airblast.

Introduction—MSHA health standards in 30 CFR, Parts 70 and 71, protect only mine workers from hearing loss caused by continuous noise, such as that emitted by trucks, shovels, cars, shatterers, and crushers. However, impulsive noise, such as airblast resulting from the detonation of explosives, is not similarly regulated by MSHA. Because impulsive airblast can cause property damage (Ref. 21, pp 2, 3, 15; Ref. 22), the Office has adopted standards to prevent damage to structures and to protect the public from noise resulting from airblast.

Alternatives 2, 3, and 5. Reference 21 was written in 1974 and was based on 26 quarry analyses of the results of a great deal of previous work by other researchers. This reference recommended a 136 dB linear peak value (equivalent to the 130 peak measured at six Hz or lower peak response) as a minimum allowable level for airblast, based on damage probabilities. This data was further supported by more recent work.

The airblast noise level standards of the regulations are based largely on a special study conducted by the Bureau of Mines (Ref. 22). The time histories of hundreds of cases of ground vibration, airblast, and structural response to ground vibration and airblast were plotted and analyzed. Using the observed structural response to ground vibration and airblast and observed damage to the structures, an appropriate airblast/ground vibration equivalence, consistent with the latest data on structure response, damage, and tolerable levels was derived.

(3) Decrease the permissible airblast noise level standards;
(4) Permit a percentage of the blasts to exceed the noise level standards;
(5) Delete the airblast noise level standards entirely;
(6) Change the Hz (± 3dB) in the table in Section 816.65(e)(1) to Hz (± 3dB);
(7) Delete the C-weighted noise level standards;
(8) Replace the numerical airblast noise level standards with a stemming requirement;
(9) Use only one frequency specification, instead of multiple specifications;
(10) Delete the reference to the permit area in Section 816.65(e)(1) and allow a waiver from persons leasing structures from the operators;
(11) Add a provision enabling the regulatory authority to require monitoring of blasts;
(12) In Section 816.65(e)(3) change the using limit of frequency from 500Hz to 200Hz and specify “Type 1” sound level meters for C-slow measurements.

II. Analysis of Comments and Alternatives

A. Introduction—MSHA health standards in 30 CFR, Parts 70 and 71, protect only mine workers from hearing loss caused by continuous noise, such as that emitted by trucks, shovels, cars, shatterers, and crushers. However, impulsive noise, such as airblast resulting from the detonation of explosives is not similarly regulated by MSHA. Because impulsive airblast can cause property damage (Ref. 21, pp 2, 3, 15; Ref. 22), the Office has adopted standards to prevent damage to structures and to protect the public from noise resulting from airblast.

A second independent technique was used to analyze the airblast response data, involving displacement produced strain which is related to cracking in interior walls (Ref. 23, p. 4). This data is related to the Bureau of Mines study, the latest state-of-the-art in understanding coal mine blasting airblast on structures and methods of measurement of that airblast. To increase reliability, two independent approaches were used to derive the values specified by Ref. 22, p. 4 for the recommendation.

(1) The first analysis involved determination of the structural response associated with a one-inch-per-second ground vibration. Plots were made of the previously described data organized into four classes: one-story homes, two-story homes, corner responses (structural), and mid-wall responses (non-structural).

(2) A second independent technique was used to analyze the airblast response data, involving displacement produced strain which is related to cracking in interior walls (Ref. 23, p. 4). This data is related to the Bureau of Mines study, the latest state-of-the-art in understanding coal mine blasting airblast on structures and methods of measurement of that airblast. To increase reliability, two independent approaches were used to derive the values specified by Ref. 22, p. 4 for the recommendation.

(1) The first analysis involved determination of the structural response associated with a one-inch-per-second ground vibration. Plots were made of the previously described data organized into four classes: one-story homes, two-story homes, corner responses (structural), and mid-wall responses (non-structural).

The airblast response data were then similarly analyzed, except that the above four categories were examined for six types of airblast descriptors. The results of this series of comparisons correlated very closely, proving the natural frequencies of structures are within a narrow range (Ref. 12, pp. 6-7).

Based on the first method of analysis, it was decided that the amplitude of ground vibrations and corner motions of structures could be limited to levels below those causing damage, by limiting the amplitude of airblast from 135 to 137 dBL (0.1 Hz) when measured on a blast meter (Ref. 20, pp 20-23 and 21, p. 14) that measures the peak amplitude and has a flat frequency response of 0.1 to 200 Hz (135 dBL (0.1Hz)), or when the amplitude of airblast is limited to 108-112 dB when measured with a “type 1” sound-level meter that will hold the peak reading and uses the C-weighting, slow response described in ANSI Standards S1.4-1971 (dBC-slow).

(3) The use of C-slow measurements has been recommended in the Committee on Hearing Bloacoustie (CHABA) Working Group 69 report to the EFA. (Ref. 5, pp. V-1–V-5). The Office is not convinced that this method is superior to peak-linear; however, C-slow is included as an alternative, based on CHABA’s recommendation, to provide for the use of another class of monitoring instruments which will give equivalent indications of potentially damaging airblast to the other types of instruments allowed under the regulations.

(4) Some commenters suggested lower noise level standards, based on arguments that human annoyance is caused at levels of noise below the proposed standards. Some commenters dispute this, arguing that prevention of human annoyance goes beyond the requirements of the Act. The latter commenters felt that the 135 dBL (0.1 Hz or lower) specification was unreasonable, because it provides an additional safety factor (Ref. 22, pp. 5-6) to prevent human annoyance, as com-
pared with the one-inch-per-second peak-particle velocity limitation, and
should be raised to 137 decibels.
A State agency submitted comprehen­
sive testimony on the annoying ef­
teffects to humans of airblast at coal
From the proposed standard amounts
be alert the public before blasting, Sec­
nonnally unpredicted events. Be­
sion of Section-816.64 and prohibiting
123dB and 98dB, respectively. These
tions 816.64 and 816.65Ca.) already sub­
To the study, the reputation of the or­
doclause was not abused. There­
other hazardous conditions, where documented to
function of the type of burden being blasted, type
be met 100 percent of the time.

The two adverse effects from air­
was not necessary for all mine opera­
which are similar to airblast from blasting. However, sonic booms are
both ground vibrations and air­
historically, airblast from coal

The “startle effect” cited by a com­
are based on the range of airblast occur­

Furthermore, it is important to note
the decibel scale is loga­
reduction of about 55 percent in the sound pressure. (For instance, 132dB=1,639 pspl, 125dB=70 pspl.) Based
in the field of blast vibration. The
the research organization in the field of blast vibrations for over 20 years.
The researcher who conducted the study
on which the airblast standard is
recognized authority in the field of blast vibration. The
The large volume of data contributing to the study, the reputation of the or­
and the qualifications of the investigator
and the prevention of such events is not

(1) Without giving reasons, several commenters asserted that the study of
Reference 22 cannot be defended. Some commenters (again without a ra­
(supertonic) felt that the airblast standard is
inappropriately tied to the one-inch­

It should be noted that, because the decibel scale is loga­
7 decibel (db) reduction from the proposed standard amounts to a
reduction of about 55 percent in the sound pressure. (For instance, 132dB=1,639 pspl, 125dB=70 pspl.) Based
on typical airblast levels (Ref. 21, pp. 903 and Ref. 16, pp. 12 and 13), this would be a very difficult reduction to achieve
as an absolute limitation. Since Sections 816.64 and 816.65(a) already sub­
substantially alleviate the two objections
of “loss of sleep” and “startle effect,” the proposed airblast standards have not been lowered.

Some commenters stated that
the airblast standards are based
merely on preventing crack extensions in wall rock. Therefore, they
the purposes of the Act. How­
Propagations of an existing crack
a reasonable definition of damage,
and the prevention of such events is not

The commenters stated that the table stand­
ters stated that the table stand­
standard 20 percent of the time.

Historically, airblast from coal
mining has not been pervasively regu­
lized in this country. Therefore, it has
not been necessary for all mine opera­
tors to systematically design blasts to
airblast, except where specific complaints arose. Commenters’ re­
requests that the limitation be met only
50 percent of the time appear to be
based on the range of airblast occur­
ing under current practice, rather
than what the Industry is, in fact, capa­
cable of achieving. Reference 25,
pages 403 to 405, describes blast design techniques such as stemming and
proper burden which will reduce air­
blast to a level meeting the standards.
(See also Ref. 21, pp. 3 and 15). The
necessity to consider weather condi­
s in reducing the propagation of
airblast is discussed in Reference 23, p.
404; Ref. 3, p. 15, and Ref. 21, p. 15. The
Office, therefore, believes that the operator will be able to meet the
standard. If adverse weather problems
develop, such as a strong wind blowing

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In the direction of nearby structures from the blast operation or a strong temperature inversion (Ref. 25, p. 404 and Ref. 21, p. 15), it may be necessary to reschedule blasting until adverse weather conditions subside.

Further, the standard requiring compliance only 80 percent of the time could subject the public to potentially damaging airblast for 20 percent of all shots. Such a standard would not fulfill the purpose of Section 518(b)(15)(C) of the Act, which requires prevention of damage to property outside the permit area by limiting the duration and frequency of blasting. Furthermore, allowance for the standards to be violated 20 percent of the time is particularly inappropriate where, as here, the Office finds that the factors leading to exceedances are within the industry's ability to avoid the exceedances. Additionally, because blasting is a non-continuous, essentially non-regularized activity, a compliance standard allowing for 20 percent of violations of a standard would be impossible to enforce consistently through field surveillance. Such a standard would require very heavy commitment of regulatory authority resources to monitor for unpredictable periods of time in amassing and analyzing data until sufficient data were obtained to calculate a 20 percent deviation figure.

(D) Alternative 5. One commenter suggested a specification of only, rather than (±3dB) in Section 816.65(f)(1). A second commenter felt that (±3dB) allows too much tolerance. No rationale or justification was given for the change from (±3dB) to (±3dB), and the Office did not adopt the first comment. The (±3dB) defines the frequency response limit of the measuring instruments and not the accuracy of the measuring system (Ref. 21, pp. 15, Ref. 25 p. 404). It is not a tolerance allowed to the operator in meeting the standard, but rather an instrument calibration specification. The (±3dB) was determined to be a proper specification. The rule has not been changed in that regard.

(E) Alternative 7. Commenters stated that the C-weighted standard is not valid, because it is alleged not to respond to a great deal of low frequency energy associated with blasting. However, Reference 22, pp. 1-5, established the equivalence of the C-weighted standard to the other airblast damage standards, in terms of its effect on structures and use in predicting damage, thereby indicating its utility even in low frequency situations. The Committee on Hearing and Bioacoustics has supported the C-weighted measurements to the EPA (Ref. 5, pp. V-1-V-5). A state agency, in its comments on this section, also presented a proposed C-weighted specification but made no comment as to its validity. Therefore, the Office decided to retain the C-weighted standard.

(F) Alternative 8. One commenter felt that a stemming requirement should be specified, rather than an airblast limitation, and another commenter supported the Office's proposal not to include a stemming limitation. Stemming is insert material placed in the top of the blast hole above the explosive charge. Proper stemming alone controls airblast. Proper blast design (Ref. 1, pp. 373-396) and attention to weather conditions (Ref. 21, p. 15, Ref. 25 p. 404) are also important in controlling airblast. Thus, the suggestion to replace the airblast frequency limitation with a stemming requirement was rejected.

(G) Alternative 9. Some commenters felt that four different frequency specifications would be difficult to enforce and recommended that only one be selected. All of these commenters recommended their own airblast criteria, each based on a frequency response spectra, which is also the basis for the Office's standard. The Office's multiple frequency standard was selected, because a wide variety of airblast monitoring equipment is available with a wide variety of frequency response. Such a reliable comparability of the frequency standard was established in Ref. 22, pp. 1-5, the multiple standard was adopted to avoid unduly limiting the use of various types of monitoring equipment, all of which are capable of reliably detecting damaging levels of airblast. Because the four different frequency specifications amount to essentially the same level of noise control, the Office has decided to retain the four specification standards to allow for the use of a wider variety of testing equipment. The (±3dB) was determined to be a proper specification. The rule has not been changed in that regard.

(H) Alternative 10. Some commenters suggested deleting the limitation on the exemption of property owned by the permittee and exempt from the airblast standard only that property in a permit area. Another commenter suggested deleting this limitation on the assumption that the permittee's property is exempted to any other provision. The Office felt it unreasonable to require a person to protect his own property from airblast whether or not it is within the permit area. In response to the second comment, the regulation was modified to allow a person leasing a structure from the permittee to sign a waiver relieving the operator from the airblast limitation, with respect to that structure.

(I) Alternative 11. The proposed rules on airblast made no provision for requiring airblast monitoring, where violation of the standard is suspected. The ground vibration Section 816.67(c), has such a provision. To enable the regulatory authority to properly enforce the airblast provisions, wording has been added at Section 816.65(e)(4).

(J) Alternative 12. One commenter correctly stated that, since the major part of sound energy is in frequencies below 200 Hz, specifying a blast meter with at least 500 Hz is unnecessary and would eliminate the use of satisfactory instruments that are presently available. The Office agreed with this analysis and has amended the regulations to reduce the frequency response specification to 200 Hz.

(X) Other Comments. One commenter felt that the specification in the regulation for the frequency limit of the noise monitoring system should be flat or calibrated. However, the commenter did not provide evidence of a comprehensive data base suggesting that such equivalences can be routinely made on a national basis. The regulation has not been changed, as requiring a flat response assures that adequate monitoring instruments will be used. Further, use of calibrated systems on a routine basis would cause doubt as to the accuracy of data collection.

Another commenter felt that adverse weather conditions should be included by the regulatory authority to determine extenuating circumstances in any decision on penalties assessed for violation. This suggestion was not accepted. As discussed more fully above, it is the operator's responsibility to take weather conditions into account when firing a blast. The operator should not create a situation damaging to a private structure, regardless of weather conditions, because the operator can delay blasting until after weather returns to normal.

Some commenters correctly stated that three types of sound level meters are described in ANSI-S1.4-1971. As pointed out in Ref. 12, p. 22, a large amount of the energy in airblast and ground vibration is contained in frequencies below 200Hz. This is reflected...
in the different sound levels specified when using different blast meters. Because Types two and three sound level meters described in SI. 4-1971 have frequency cutoffs at 20Hz and Type one meters have a frequency response down to 10Hz, it is evident that Type two and Type three meters would not give as good an indication of the potential damage as a Type one meter. The final regulations reflect this by requiring that only Type one meters be used for the C-weighted, slow response values.

VII. Sections 816.65(f).

A. Substantial comment was received on proposed Section 816.65(c). Most of the comments requested that the 1,000-foot limitation in subsection (1) be reduced to some lower limit, on the theory that this limitation was arbitrary and had no statutory basis. Several commenters also suggested that the 500-foot limitations in subsections (2)-(3) be deleted. Several commenters felt the 1,000-foot limit was acceptable, assuming that specific waiver provisions could be written. Other commenters argued that the paragraph should be entirely deleted, because other provisions of Section 816.65 assertedly adequately protect the public, making distance limitations unnecessary. A few comments stated that the phrase “other appropriate investigations” should be deleted, and a few requested that a provision be added that the distances not be decreased if there was a probability that airblast or ground vibration would be increased. A few comments stated that, either the entire section, or the reference to dwellings should be deleted. Several commenters stated that the 1,000-foot limitation would impose unwarranted costs on the industry. A few of the comments indicated that the following alternative would be considered and that alternative 3 should be adopted.

(1) Retain Section 816.65(f), as in proposed Section 816.65(c);

(2) Change the distance limitations from 1,000'/500'/500'/ to 300'/300'/500'/, or to 3 mile /500'/500'/

(3) Add the term “seismic investigations” to Section 816.65(f)(1) and 816.65(f)(2) as unchanged and delete 816.65(f)(4),

B. Analysis of Comments and Alternatives.

(1) Legal Authority. Several commenters stated that the 1,000-foot distance limitation requiring regulatory authority approval for its waiver was arbitrary and lacked statutory authority. This argument has been rejected in the U.S. District Court for the District of Columbia in Re Surface Mining Regulation Litigation 452 F. Supp. 327, 345-346, (1978). The Court held that the Office does have authority to establish a 1,000-foot distance limit on blasting in its regulations under Section 515(b)(15) of the Act, where those regulations do not absolutely prevent mining. Rather, blasting operations may be regulated, if allowed within the specified limits, upon approval of the regulatory authority.

(2) Alternative 2. A commenter stated that no blasting should be allowed within ¾ mile of a residence under any conditions, but provided no evidence to justify this position. Therefore, the Office declined to accept it.

Several commenters recommended distance limitations for Section 816.65(f)(1) of less than 1,000 feet. Some comments suggested 500 feet, two recommended 300 feet, one recommended 800 feet, and five simply stated that 1,000 feet was too great a distance. Most of these commenters based their recommendations on the incorrect belief that the Office did not have statutory authority to set such a limit.

Several commenters stated that blasting is done safely at distances closer than 1,000 feet, and would be allowable. The fact that blasting can be done safely at distances less than 1,000 feet from a structure does not justify eliminating the 1,000-foot limitation. Because blasting can adversely impact public property and safety at distances up to 1,000 feet, if not properly controlled, there is a substantial need for close scrutiny by the regulatory authority of blasting operations within this distance.

Flyrock and noise are particular problems caused by blasting within 1,000 feet of dwellings. In Perry County, Kentucky, flyrock from surfacemine blasting several hundred feet away severely injured a four-year-old child. One of his legs was amputated and he lost his home and damaged three homes and four automobiles. (Surface Mining Control and Reclamation Act of 1977: Hearings on H.R. 2 before the Subcommittee on Energy and Mineral Development of the House Committee on Interior and Insular Affairs, 95th Congress, First Session, Part II, p. 313 (1977) (“House Hearings”). In Dante, Virginia, a 200-pound rock was thrown over 2,000 feet from the blasting site (House Hearings, Part II, p. 313). The State of Alabama, recognizing the problem of flyrock and noise, specifies a distance limitation on blasting of 800 feet, within which special precautions must be taken by covering all detonating cord to minimize airblast and posting of guards to protect against flyrock. (House Hearings, SUPRA Part I, p. 136). Cases have been revealed where blocks of rock up to one-half cubic meter have been thrown hundreds of meters. (Gustafsson, Ref. 8, p. 86).

Blasting is also a problem with respect to excess ground vibrations within 1,000 feet of dwellings. To comply with the scaled distance formula of 60 at 1,000 feet, the maximum charge weight per delay is 278 pounds, as shown in the table in Section 816.65(e). For blasting fuel oil at a specific gravity of 0.8 gm/cc, this amounts to a seven-foot charge length placed in a 12-inch diameter blasthole and a 12.5-foot charge length in a nine-inch diameter blasthole.4 Since single charges of these lengths would be unacceptable (Ref. 1 pp. 388-390) for blasting in a typical surface mine with bench heights of 50 to 100 feet, the operator would have to take alternative action such as monitoring all shots, using a modified scale-distance formula as allowed in Section 816.65(b), using multiple-delay deck charges within the blasthole, or drilling smaller diameter blastholes. To assure compliance with the one-inch-per-second peak-particle velocity limitation in such a close-in situation, it is important that the one-inch-per-second velocity contingency plans known to the regulatory authority and have them approved so that compliance can be properly monitored.

In those situations where the operator is not using scaled distances but is monitoring each blast, special precautions are also necessary, such as those described by a commenter. That comment stated that, historically, an operator’s charge weights were 400-1,000 pounds. Assuming that 1,000 pounds is a common charge, this would represent charge lengths of 25.5 feet in a 12-inch diameter blasthole and 45.4 feet in a nine-inch blasthole. These would be acceptable charge lengths under many conditions (Ref. 1, pp. 388-395). Additional precautions to meet the one-inch-per-second peak-particle velocity limit may be needed as shown by the considerable variability to be expected from use of the scaled distance formula.

Medears (Ref. 12, p. 44), has plotted predicted peak-particle ground vibration velocity against distance for a 1,000-pound charge. The curve of the plotted data passes through the one-inch-per-second peak-particle velocity line at a distance slightly greater than 600 feet. Because geological conditions can effect the propagation of ground motion, as has been indicated in Gustafsson (Ref. 8, p. 217), some scatter of data around the curve of predicted velocity is observed.

4Calculations: ANFO specific gravity (density) = 0.8 gm/cc; ANFO/CCX = 2.4; 15-lb. (Standard conversion factor) @ xh = volume of a cylinder. Therefore: 0.8 X 2.4 X .064 = 0.082 (1.5) = 278.4 lb. 0.8 X 2.4 X 0.375 (12.6) = 277.9 lb.

ANFO specific gravity (density) = 0.8 gm/cc ANFO/CCX = 2.4 (Standard Conversion Factor) = lb/cc/ft. (Standard Conversion Table) @ xh = volume of a cylinder. Therefore: 0.8 X 2.4 X 0.375 (15.4) = 1,000 lb.

1,000 lb.
Section 816.65. Such waivers do not specify how the operator intends to reduce the distance at which the regulatory authority will indicate special precautions are necessary to develop information on weather conditions and proposed blasting procedures. All of these elements, in addition to paragraphs (c) and (d), may be retained so that the health and safety of those persons is protected. Third, the Office does not expect that such removal will ordinarily be required, because the industry should be able to obtain approval of the regulatory authority through establishing that blasting within the specified distances can be done in compliance with the peak particle velocity, air blast, and flyrock performance standards.

The remainder of the commenters predict that, because of doubt as to whether a permit to mine closer than 1,000 feet would be granted, operators will encounter difficulty in obtaining financing or will have to pay higher interest rates. This difficulty should be minimized, however, because the specific focus on the blasting performance standards will ordinarily occur after permits are issued and operators are about to start. Because the 1,000-foot limitation is intended as a distance at which the regulatory authority is to ensure compliance with the provisions of the blasting performance standards, the Office does not expect the permission to mine will be difficult to obtain. It is indeed expected that approvals will be granted in many, if not most, cases. Therefore, this should not be a substantial deterrent in obtaining financing for mining operations.

(7) Blasting near deep mines. Several commenters suggested that Section 816.65(g)(3) in the proposed rules be deleted, as unnecessary in view of the provisions of Section 816.79. The Office agreed that Section 816.65(g)(3) was redundant, given Section 816.70, and has, therefore, deleted the provision.

(6) Costs. Some commenters said that the 1,000-foot distance limitation would impose unwarranted costs on the industry. A few commenters related the additional costs to the cases where land companies lease houses near mines, with provisions that the occupants must vacate within a 30-day notice. These commenters reasoned that, in these cases, the operator or land company would be forced to issue eviction notices to prevent complaints. The Office does not consider this to be a valid argument for eliminating this regulation. First, the commenters did not show that ordinarily structures and facilities within the distance limits will be owned by the operator. Thus, the distance limit is still important for those persons occupying or using structures or facilities not under the control of the operator within the distance limits.

Second, the commenters did not show that the commenters are correct (i.e., in order to comply with the blasting performance standards, persons inhabiting structures in close proximity to the permit area must be physically relocated), the regulations still should be retained so that the health and safety of those persons is protected. Third, the Office does not expect that such removal will ordinarily be required, because the industry should be able to obtain approval of the regulatory authority through establishing that blasting within the specified distances can be done in compliance with the peak particle velocity, air blast, and flyrock performance standards.

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RULES AND REGULATIONS

(8) Seismic investigations. The term seismic investigations has been added to Sections 816.65(f) and 816.65(g) in the proposed rules for clarification, since seismic investigations are an acceptable means of proving that an operator can comply with the blasting performance standards within a distance of 1,000 feet, as regards the peak-particle velocity limits of Sections 816.65(i) and 816.65(j). (See preamble to Section 816.67.)

VIII. Section 816.65(g) and 816.65(h) (in proposed rule).

A. In comments on the proposed regulations, several persons felt that flyrock restrictions are unnecessary. Some commenters felt that the restriction on casting flyrock to one-half the distance to the nearest structure illegally preempts operators' property rights. One commenter recommended a variable flyrock distance standard, based on the slope of the terrain around the blasting location. Some commenters suggested a stemming specification, rather than a flyrock restriction. Many commenters suggested the need for major revisions to this section for clarity and to eliminate redundancy. Based on comments, the following alternatives on Section 816.65(g) were considered, and alternative I adopted:
1. Rewrite the section for conciseness and clarity, eliminating the restriction on throwing rock more than half the distance to roads and railroads;
2. Delete or modify the restriction on throwing rock more than half the distance to the nearest structure;
3. Specify blast design requirements, rather than flyrock distance limits;
4. Permit extensions from the distance provisions;
5. Delete the provision entirely.

B. Analysis of comments and alternatives.

(1) Introduction. Flyrock represents a catastrophic potential for harm to the public from blasting. (House Committee Hearings—supra. Part II, p. 283.) Flyrock falling through the roofs of structures, cited in those hearings, has the potential to cause death and injury, in addition to structural damage.

(2) Alternative 1. Several commenters felt that portions of Paragraphs (1), (2), and (3) in proposed Section 816.65(h) were redundant. The Office agreed. The Section has been rewritten as one paragraph to enhance its clarity and eliminate unnecessary repetition of the phrase "no flyrock shall be cast" and the specific types of structures protected by this section.

In response to one commenter's suggestion, the reference to roads and railroads in the "one-half the distance" limitation has been deleted. If access to these areas is adequately guarded, as is to be required under Section 816.65(d), no danger from flyrock should occur.

(3) Alternatives 2 and 5. A commenter suggested that a graduated flyrock limitation based on the slope of the terrain surrounding the blast site was not accepted. A property owner needs the same degree of protection, in the form of a buffer zone, regardless of the terrain slope. Since airborne and groundborne flyrock are treated the same in this Section, the "one-half distance" requirement gives equal and adequate protection to all.

Flyrock is more difficult to predict than other blast effects. Limiting flyrock casting to within one-half the distance to the nearest occupied structures provides a necessary safety factor for people living at a mine permit perimeter. If a person lives 50 feet from the mine perimeter, and a blast is 1,000 feet from the perimeter, simply stating that the flyrock may not go past the perimeter would provide inadequate protection from both flyrock that initially lands near the perimeter and then rolls towards nearby structures, and from concussion and debris generated by landing flyrock.

Some commenters felt that it is impossible to control flyrock. This is not true. Flyrock controls, using the basic recommendations of Ref. 1, pp. 373-398, are common practices in the industry. (This reference covers, in detail, proper design for blasts.) If the burden is less than 25 times the blasthole diameter, the shot may become violent and excessive, and flyrock can occur. If the stemming distance is less than 0.7 times the burden an imbalance of forces can occur, resulting in excessive flyrock. Where midseams, voids or other zones of weakness occur, then, the blast energy will be released violently through these zones, creating concussion and flyrock. Steaming, rather than explosive, should be loaded in these zones to prevent flyrock. If a blast causes flyrock to be thrown closer than one-half the distance to a structure, the operator should be able to solve the problem, by increasing burden and stemming distances and paying close attention to zones of weakness in the area.

A comment by a vibrations consultant that uncontrolled flyrock will occasionally occur was not accepted. Using design techniques spelled out in Ref. 1, pp. 382-393, and Ref. 9, pp. 83, 86, the operator can use sufficiently conservative designs to adhere to the provisions of Section 816.65(h). When blasting near residences, it will be incumbent on the blasting to exercise close control over blast design and pay close attention to the rock structure being blasted to reduce flyrock spread.

(4) Alternative 3. Some commenters suggested that blast design specifications be substituted for flyrock limitations, based on books identifying items of preferred blast design. However, detailed specifications for blast design to limit flyrock in all cases would be an excessive burden to many operators, because of the extreme variation in rock design, construction, and geology encountered on a national basis, and the lack of substantial data to show a high degree of correlation between each variable of blast design and a specific flyrock distance limit. Given this variation and lack of existing data base, the Office feels that it is preferable to specify required results and leave the method of compliance with the public. The regulatory authority will not be expected to know the specific structural aspects of the rock to be blasted when receiving permit applications, given the final rules' version of Section 816.14. In response to comments. Because the specific sizes and distances of flyrock will not be known, in detail, the regulatory authority would not be able to routinely make the analyses necessary for approval of exceptions. Further, such an exemption would constitute a total variance from this performance standard, contrary to the limit of Office authority provided by Congress. (See In re Surface Mining Litigation, 452 F. Supp. 327, 330-333 (D.D.C. 1978).)

Other Comments.

(1) One commenter felt the rock traveling along the ground should not be considered flyrock. Since rolling rock can be as hazardous as rock falling upon persons or structures, the provision for rock traveling along the ground was retained.

(2) On the question of pre-emption of the operator's rights, the Act does not allow a person conducting mining to operate within the confines of the permit area so as to cause damage or injury to persons in nearby areas. Sections 102 and 515(b)(15), of the Act.

(3) A commenter suggested changing "area of regulated access" to "safety zone." This was not adopted, because "area of regulated access" is a more specific term as it is tied to specification of "access areas" in Section 816.65(d).

IX. Section 816.65(f) (Section 816.65(1) in the proposed rules).

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A comment was received recommending deletion of Section 816.65(i) from the regulations as unnecessary, alleging that "actual disruption and fracturing of the rock only takes place very close to a blasthole." This is certainly not true in the case of flyrock, which is documented in the legislative history, as described in the preamble to Section 816.65. An excessive standard could change the course of a small stream by creating barriers to the original flow of water in the stream and by initiation of rock slides in unstable pit slopes adjacent to streambanks. Moreover, the text of Section 816.65(i) comes directly from Section 515(b)(5)(C) of the Act, and clearly reflects the intent of Congress.

X. Section 816.65(i), (Section 816.65(i) in proposed rule) Peak-Particle Velocity Limits.

A. A large number of commenters objected to the one-inch-per-second limit for peak-particle velocity of ground motion. The majority of these comments recommended that the limit be placed at one inch per second, although others recommended levels as low as 0.2 inch per second. Other commenters indicated that the proposed rule was ambiguous as to how compliance with the peak-particle velocity standard was to be measured in the field. Some commenters recommended that this section be revised to specify the conditions under which the regulatory authority would monitor ground motion and the equipment to be used. Study of the comments received led to the consideration of the following alternatives:

1. Retain this section as proposed without change.

2. Specify that the maximum peak-particle velocity shall be as measured in any of three mutually perpendicular directions, or specify that the maximum peak-particle velocity is the maximum of resultant of three components which are measured in those mutually perpendicular directions.

3. Retain the limit of one-inch-per-second peak-particle velocity as specified in a limit of one inch per second for peak-particle velocity as a limit as low as 0.2 inches per second.

4. Eliminate any specific maximum peak-particle velocity and use an equivalent scaled distance (explosive weight/delay vs. distance to structure) only.

5. Replace the maximum peak-particle velocity standard with a "structural response" criterion; and

(b) Require the regulatory authority to monitor blasts at a mine without notifying the mine, to use certain specified monitoring equipment, and to require that the operator use trained monitoring personnel versus not providing for such requirements on monitoring.

After consideration of these alternatives, the Office decided to retain the one-inch-per-second peak-particle velocity, specifying that this limitation is to be measured in any of three mutually perpendicular directions, and to reject other alternatives.

B. Analysis of Comments and Alternatives.

1. Some of the comments received reflected confusion as to the fundamental purpose of this section. These commenters appeared to criticize the one-inch-per-second standard on the theory that the one-inch-per-second standard is an attempt to protect against not only property damages caused by blast ground vibrations, but also against causing any annoyance to people by emotional distress.

As other discussions will explain, the one-inch-per-second standard is based principally on protecting property from damage, although it should also reduce the level of human emotional distress caused by ground vibrations. Bulletin 656 (Ref. 14, p. 28), based on the Salmon nuclear event, states that an estimated 55 percent of all families will complain when exposed to ground vibrations of two-inches-per-second, and 18 percent will complain at one-inch-per-second. Although frequencies and durations for nuclear blasts are different than for conventional blasts, some similar complaint reduction should be expected in coal mining. Therefore, the standard being adopted is anticipated to reduce emotional distress somewhat, although not completely prevent it.

2. Alternative 2—One commenter approved of selecting the "resultant" form of measurement of peak-particle velocity for ground vibration. As the Office does not intend that the resultant method of measuring the minimum peak-particle velocity be required, Section 816.65(i) was modified to clarify the method of measurement.

The Office has decided that the resultant method should not be used, principally because that method has not been used in the past and analysis of the data in the literature upon which peak-particle velocity standards for mine blasting have been based. All peak-particle velocity data presented in Bureau of Mines Bulletin 656, (Ref. 14, pp. 93-102), was measured as the maximum in any of three mutually perpendicular directions. Therefore, most of the work correlating peak-particle velocity from blasting in mining with structural damage has been done with the velocity determined by measuring the greatest velocity in any of three mutually perpendicular directions, without use of the resultant method.

Investigators working on a relationship between blasting ground vibrations and structural damage continue to determine maximum recommended peak-particle velocity as that measured from any of three mutually perpendicular directions (Ref. 19, pp. 12-13). The historical data on ground vibrations and related damage is all based on measurements taken in any of three mutually perpendicular directions, as opposed to vector sum measurements. Therefore, the three-component system is the only one on which a vibration regulation can logically be based.

3. Alternative 3—the Office received a wide range of comments as to the level at which the peak-particle velocity standard should be set. Many commenters argued for a level above one-inch-per-second, most of these recommending two-inches-per-second, which was the prevailing industry standard prior to promulgation of the Office interim regulation in December, 1977. Some commenters urged that the standard be set below one-inch-per-second, arguing that structural damage and/or emotional distress cannot be eliminated unless peak-particle velocity is reduced to a level as low as 0.2 inch per second.

(a) Some commenters suggested that the two-inch-per-second standard be adopted, alleging that an operator would subject blasting personnel to a great hazard with the one-inch-per-second standard because blasting would have to be conducted more often in order to break up the same amount of overburden. Analysis of this claim does not reveal that it is substantial.

The primary method for reducing ground motion from mine blasting is to reduce the charge weight of explosives per delay (Ref. 7 at 93; Ref. 14, p. 73; Ref. 13, pp. 8-9). In most instances, the same amount of rock can be broken in a single blast by increasing the number of delays used in a round of blasting. Commercial delays, in conjunction with sequential timers, provide between 100 and 200 delay intervals per blast round. (Ref. 17, pp. 1-2). Readily available sales literature indicates that cap manufacturers market 20 different delay periods. Furthermore, detonating cord delay-connectors can be used to provide an essentially unlimited number of delay periods per blast. Delay blasting switches (sequential timers) can be used to increase the number of delay periods available when using electric controls (Ref. 12, p. 9).
A few commenters alleged, however, that increasing the number of delays requires reducing drill patterns, thereby reducing the size of individual blasts and requiring more total number of blasts. Ref. 1, pp. 372-397, however, makes no provision for needing to reduce blast patterns because of an increased number of delays. (See also, Ref. 11 and Ref. 12 and 17, supra.) Moreover, the extent that the commenter's assertion might be true, the Act requires precluding damage from ground vibrations.

One commenter also stated, without providing data, that by increasing the number of delays, there is an increased chance of propagation between charges which could lead to damage at closely adjacent buildings. (Propagation is the initiation of a charge by means of an earthborne or airborne shock wave radiating from a nearby detonation.) The blasting agents used in surface mining today are, however, very insensitive to accidental initiation and not subject to charge-to-charge propagation in surface blast designs. (See, e.g., Ref. 7 at 93.)

(b) Some commenters that recommend the two-inch-per-second level relied on technical literature or their own experiences to argue that a two-inch-per-second standard is "adequate" for protection of structures against blast damage. However, none of the commenters who cited their own experiences submitted detailed data showing comparisons between damage and peak-particle velocity from blasting in representative sets of mining blasting situations. Without such data, the Office could not evaluate the claims of those commenters who cited personal experiences, which in any event, appear contrary to the weight of data available in the relevant literature.

Technical literature cited by commenters urging the two-inch-per-second standard was primarily Bulletin 656 (ref. 14), Medearis (ref. 12) and Laadegard-Pederson (ref. 10). Bulletin 656, however, states that the two-inch-per-second standard will protect structures from damage only 95 percent of the time. (Ref. 14, p. 73.) This is not an adequate standard, because the Section 515(b)(15)(C) of the Act requires prevention of damage. Medearis does not support the two-inch-per-second criterion, but a complex structural response criterion, discussed later. Ref. 10 is a review of various other papers and presents no new data.

One other commenter recommended eight additional publications for study of the peak-particle velocity limitation. Four of these involved only nuclear explosion data, not coal mining, and are not sufficient for establishment of a coal mining standards on a national basis.

The fifth article cited by the commenters was Bulletin 656, (ref. 14) which has already been discussed. The sixth was Bulletin 442, the data from which form part of the analysis in Bulletin 656. The other two suggestions were references 23 and six, both of which are addressed elsewhere and which support the one-inch-per-second standard.

Another commenter suggested that Wiss and Nicholls, ASCE, 1974, supports a two-inch-per-second standard. However, this publication does not deal with structural damage criteria of any type from ground vibration.

(c) When published in 1971, Bulletin 656 was the most comprehensive and best information available on the peak-particle velocity limit. Bulletin 656 recognized (at p. 73) that the probability of damage for a two-inch-per-second standard is about five percent. Commenters pointed out that this probability estimate was based on four instances ("points") at which damage could be shown at levels below two-inches-per-second and that these points had the greatest standard deviations.

However, none of the literature cited by the commenters established that no damage will occur at the two-inch-per-second standard. Ref. 12) feels that peak-particle velocity in itself is not a good criterion, although he is the only published authority in our records who takes this specific position. Further, on page 87 of Ref. 12, Medearis states that his criterion would be more strict than current practice with regard to one-story structures.

Another commenter said that repeated blasting will not cause fatigue damage. The Office has never contended that this was a factor. The damage from repeated vibration discussed in the preamble to the proposed final rules refers to induced splitting through compaction of material on which a house is built. Vibration is a standard civil engineering technique for compaction of material. Vibration damage data typically are of a single event type and thus do not consider accumulated effects from multiple blasts. One of these effects could be induced settlement. This is a contributing factor, although not a major one to lowering the limitation from two-to-one-inch-per-second, i.e., several small vibrations may do as much damage as one larger one.

(d) One of the commenters who criticized the one-inch-per-second standard recognized that the two-inch-per-second standard is not really adequate to preclude damage. A careful review of the technical literature, as a whole, shows that the one-inch-per-second limit is what is necessary to preclude damage to buildings from blasting. The best available information clearly shows that damage to property may result from blasting vibrations below two-inches-per-second. Indeed, this literature recognizes that even a limit of one-inch-per-second is not absolutely protect structures from minor damage.

Integration of data from Dvorak (Ref. 6) yields 32 points of damage below two-inches-per-second. Gustafson (Ref. 8, pp. 207-210), using information developed from over 100,000 blasts, recommended a safe level for peak-particle velocity down to 0.7 inch-per-second, depending on conditions, and a threshold of damage as low as 1.2 inch-per-second. This is a very impressive volume of actual blast data and, by its very number, encompasses a wide variety of conditions similar to that present in coal mining across the U.S. Tynan, (Ref. 23, p. 19) recommends a peak-particle velocity of 0.75 inch-per-second. These sources thus indicate that a particle velocity specification below two-inch-per-second is necessary in order to protect the majority of structures from damage, and that one-inch-per-second is a reasonable criterion.

(e) Some commenters alleged that the use of the one-inch-per-second limit would be burdensome on operators. Costs will probably be small, because of additional delays required and a small amount of additional loading time. Based on a comparison of use of a scaled-distance formula of 0.5 to achieve two-inch-per-second to use of a scaled-distance formula of 0.6 (to achieve one-inch-per-second), the charge weight per delay will have to be reduced about 30 percent.

\[ \text{Example: Calculation comparing scaled distances: } D = \text{distance}/\text{Charge weight} \]

\[ \text{Example: Calculation comparing scaled distances of 50 to 60 using an absolute distance of 1,000 feet.} \]
would have to use approximately 40 percent more delay intervals to achieve the one-inch-per-second based on use of the scaled-distance data.\textsuperscript{16} Ref. 14, p. 17. Delay intervals, however, are not a major component of the total costs associated with blasting.\textsuperscript{16} These additional costs will, however, be offset by reduced damage to structures and reduced human annoyance. Further, some additional cost is not a valid reason for allowing for blasting with a significantly greater probability of structural damage and human distress, since Section 15.15(b)(15) of the Act requires that blasting be conducted so as to “prevent” damage and injury. Moreover, no commenter indicated that surface mining would have to cease in any locations because of increased cost associated with the Office’s blasting regulations.

One commenter complained that a large coal company had recently purchased a new drill to acquire capability of drilling smaller holes to meet the one-inch-per-second standard and the entire cost of $250,000 for the drill was an expense in imposing this standard. However, replacement drilling time for older, larger drills and thus the older drills will last longer. Also, the company will have more operational flexibility, by the ability to drill more holes. Moreover, there was no way for the Office to calculate accurately how much the drill purchase cost the company in the long run. When lower maintenance (resulting from a newer drill), increased operational flexibility (resulting from an extra drill), fewer complaints and damages (resulting from lower ground vibrations), and better fragmentation (resulting from smaller holes with closer spacings) are considered, the company could even conceivably have saved money by making this purchase.\textsuperscript{(c)}

\textsuperscript{(c)} A few commenters recommended lowering the allowable vibration level to below 1 inch/second. In most of these comments, reliance was put on information developed by a State agency and the recommendations contained in Appendix C of the Committee on Bioacoustics and Biomechanics Report (Ref. 5). As was pointed out in comments by an industry commenter, Appendix C was not an actual recommendation made by the CHABA working group, but was included as background information. The material quoted in Appendix C of the report is based on the 1976 draft standard, International Standards Organization, Technical Committee 108, Standards Committee 2, Working Group 3. The actual recommendation of the CHABA report was that since structural damage had been observed to levels as low as one-inch-per-second, even that level should be regarded as one of potentially adverse exposure.

A few comments stated that the one-inch-per-second standard was arbitrary or discriminatory against coal mining as compared to other methods of mining. The above material demonstrates that the standard is not arbitrary. Moreover, since the Act requires establishing a standard to prevent property damage and injury from surface coal mine blasting.

Alternative 4. Use of Scaled-Distance Formula Only.

One commenter proposed that the ground vibration criterion be eliminated completely, appearing to recommend that all reliance be placed on explosive charge weights and distance formula. Although charge weight-distance formula is one method of protecting structures from ground vibrations (Ref. 14, pp. 70–74 and Ref. 13, pp. 8–9), use of seismographs to predict adequate charge weights is also acceptable. Section 816.67(b) provides that a different charge weight-distance formula can be used, if it can be shown that the maximum peak-particle velocity is not being exceeded. Thus, the Office decided not to accept this comment.

One commenter objected to the provision in Section 816.65(c) that the maximum allowed peak-particle velocity is to be lowered below one-inch-per-second, if required by population density, age of structures, geology, hydrology, or frequency of blasts. The commenter did not feel that a relationship between these elements and ground vibration had been demonstrated.

Gustafsson (Ref. 7, p. 208) found that older structures cannot withstand ground vibrations as well as newer structures. Some evidence does exist that the frequency of blasting does have an effect on structures (Ref. 8, p. 209). Density of population may require a lowering of the ground vibration standard limitation because of the possibility of increased human distress. Ref. 14, p. 28, shows that the percentage ofpersons affected by distress is a function of the level of ground vibrations. In high density population areas, a larger number of persons will be disturbed than if the number of persons affected is determined by multiplying the percentage of persons expected to be affected by the number of persons in a given area.

In some cases, geologic structure may cause vibrations to propagate more efficiently through the ground and cause more complaints or damage than normal. With regard to effects on hydrology and water supplies, it is clear that blasting can adversely affect ground waters by rock fracturing. (Ref. 7, at p. 2; Ref. 26 at p. 25; Ref. 27, Vol. 1, at p. 120). The regulatory authority, therefore, needs to be provided with authority to specify a lower peak-particle velocity, where use of one-inch-per-second is insufficient.

One commenter objected to the one-inch-per-second standard, saying that mine-caused blasting damage is due to enforcement of the one-inch-per-second standard, rather than to actual ground vibration levels at two-inch-per-second. The data cited in this discussion, particularly Dvorak (Ref. 6) Gustafsson (Ref. 6) and Tynan (Ref. 23) show, however, that because damage and distress occur below two-inches-per-second, one-inch-per-second is needed.

Alternative 5. The Office received a number of comments which objected to the adoption of a peak-particle velocity standard which is based upon the assumption that all structures respond in the same manner to a given ground vibration, as opposed to a standard which is derived from analysis leading to a “structural response criterion.” These comments urged the latter criterion be used, based on the work of Medears (Ref. 12) to determine allowable maximum vibration levels.

Medears’ work involves the determination of how a structure will respond to a ground vibration. This response will vary with the frequency of the ground vibrations, the height of a building, the type of ground on which the structure is built, and the type of construction and age of the structure. Medears’ system requires that the natural frequency of structures be determined by test blasting, along with spectral response curves showing the response of the structure when excited by different frequencies and amplitudes of ground vibrations. The predominant frequencies of the ground vibration, which will vary with the distance from the blast, must also be determined.

It is important to note, too, the Medears’ studies were performed at actual blast sites. Medears’ studies involved records of 74 blasts provided by,
XI. Section 816.65(c) in proposed rules.

(A) Several commenters requested that this provision be modified to afford additional relief from the one-inch-per-second peak-particle velocity limitation at certain structures. Several commenters suggested allowing for a waiver of the peak-particle velocity limits at any location under control of the operator or at any property of any other person willing to grant a waiver of the peak-particle velocity limit. Section 516(b)(15)(C), of the Act however, requires that blasting be limited to preclude damages to underground mines and to surface or underground waters. Thus, allowing for waiver of this peak-particle velocity merely at a particular location would not satisfy the requirements of the Act (See Refs. 26,27), because:

1. An underground mine might be located at or under the surface location agreed to by the person agreeing to the waiver, and
2. A spring or stream used by downstream or downstream persons might pass through or under location of person agreeing to the waiver for structures on adjacent property or public or private property overlying surface or groundwaters.

Therefore, the Office decided it could not authorize waivers of the maximum peak-particle velocity limit, without preserving restrictions to protect underground mines and surface and ground waters. As a result, any waivers must be appropriately based on pre-conditions, as specified in Section 816.65(c).

B. Some commenters felt that an operator should not be required to protect his or her own structure from vibrations merely because the structure was leased to another party. If the requirement were dropped completely, a lessee of the property owned by the operator would lose the right under the Act to protection from discomfort and damage from ground vibrations caused by blasting. Thus, the waiver provision in the final rule was adopted to protect the lessee's rights and still permit the operator to seek relief from the basic requirement of the regulation.

C. Some commenters felt that a structure owned by the operator, even though it is off the permit area, should be exempt from the one-inch-per-second limitation. The Office agrees that the location of the property with respect to the permit area should not be a determinant in authorizing waivers to the permittee. The final rule reflects this.

D. Several commenters felt that the one-inch-per-second limitation should be subject to waiver by a private homeowner or lessee thereof. In addition to structures owned by the permittee. Allowance for these types of waivers, however, can easily subject homeowners and their lessees to undue coercion by the mine operator. Additionally, homeowners may waive rights to protection of their property without realizing the significance of this action. The average lay person is not likely to have adequate technical knowledge for intelligent selection of an alternative peak-particle velocity ground vibration level under a waiver. In comparison, the permittee should have employed competent experts to conduct blasting and upon whom the permittee can rely for advice in deciding whether to use the waiver of the one-inch-per-second limit. Thus, the Office feels that a provision for a waiver from private homeowners or their lessees, other than the permittee, is unjustified.

XI. Section 816.65(k) and (l) Sections 816.65(f), (m) of proposed rules.

A. Several comments were received on the use of a scaled-distance formula of 60 as an acceptable means of compliance with the one-inch-per-second peak-particle velocity limitation of Section 816.65(c). As a result of the comments, the following alternatives were considered, and alternative 1 was adopted.

(1) Retain the text of the proposed rules;

(2) Reduce the scaled distance equation to 50;

(3) Use a scaled distance greater than 60.

B. (1) Scaled distance is an expression which relates the absolute distance from a blast to a structure to the square root of the charge weight of explosive per delay. Although vibration data tend to have considerable scatter, equivalent scaled distances tend to give similar vibrations. The scaled distance equation is as follows:

\[ SD = \frac{R}{\sqrt{W}} \]

Where R is the distance from the blast to the structure in feet, and W is the charge weight per delay. Although the following examples will illustrate this. Given distances of 1,000 feet and 5,000 feet, what is the maximum charge weight per delay that can be used in complying with a scaled distance of 60? A scaled distance of 50?

\[ 1000 \text{ ft} \times 60 = 5000 \text{ ft} \times 60 \]

\[ SD = \frac{R}{\sqrt{W}} \]

\[ SD = \frac{5000}{\sqrt{W}} \]

(2) Analysis of Comments and Alternatives

(a) Alternative 2. Several commenters stated that a scaled distance of 50 should be adopted, based either on ref. 14 or on the commenter's practices. Ref. 14 discussed use of 50 as a...
basis for meeting a peak-particle velocity standard of two-inches-per-second, and it was the information in that bulletin that set the established practice.  

Because the particle velocity limitation is being reduced to one-inch per second, a higher scaled distance was required for compliance with this lower limitation. The scaled distance of 60 was derived from the combined velocity data, p. 71, Ref. 14. The Office recognizes that the 60 scaled distance is an empirically derived number with a built-in safety factor, and therefore, permits the operator to seek relief by deriving a site-specific scaled distance factor, based on seismographic data from a particular blast site, subject to approval by the regulatory authority. (Section 816.67(b)).

(b) A few commenters stated that a scaled distance of 60 will keep vibrations in the 0.5 inch per second range. The data on page 71 of ref. 14 refute this assertion. In any event, if the operator has a property at which the scaled distance of 60 is unduly restrictive, he may seek relief under Section 816.67(b), by use of site-specific seismograph data.

(c) Several commenters argued that the scaled distance of 60, when compared with the scaled distance of 50, results in a reduction by 30 percent of the weight of explosives to be detonated at one time. This is true, but the fact remains that the scaled distance of 60 is necessary to keep vibrations below one-inch-per-second, unless the operator seeks relief under Section 816.67(b) or meets the higher scaled distance by enlisting more delays in the blast.

(d) Alternative 3. A State environmental agency recommended that the scaled distance should be 100 for compatibility with one inch per second, but provided no detailed data to substantiate this. The combined data on page 71 of ref. 14, furthermore, based on recordings of 159 blasts in 24 operations, refutes this contention.

(e) Other comments,

(1) A commenter stated that no scaled distance is adequate to protect against a specific level of ground vibrations because of variations in blasting-cap firing times. (Ref. 23, pp. 17, 21, 24 and 27). Manufacturers and the industry have been aware of this firing time scatter since the development of delays. However, the data enumerated above, from which the 60 scaled distance was derived, are empirical data obtained from blasts using detonators with assumed scatter in firing times. Thus the cap scatter is automatically incorporated and accounted for by the results of the data analysis supporting the 60 scaled distance.

(2) One commenter recommended that the specification that the scaled distance be determined by reference to the distance to the nearest structure should be clarified, to be the "shortest distance that seismic waves would propagate through the earth or along the surface of the earth," because the operator is believed to be too restrictive, in some cases, for complex terrain. However, the scaled distance has historically been measured on a horizontal plane analogous to land surveying techniques. (Ref. 25, Ref. 13, Ref. 14, p. 70-72) If the scaled distance of 60 is too conservative in certain instances in complex terrain, relief is available through Section 816.67(b).

(3) Several commenters suggested rewording from "within any eight-millisecond period" to "with at least eight milliseconds separation in time from all other detonations." The Office rejected this suggestion because it would unduly restrict an operator's options in blast design. The use of delay intervals (Ref. 13, pp. 8, 9 and Ref. 14, pp. 40, 70, 71) is that any amount of explosive detonated within an individual interval may act as a single source of producing vibrations. For an efficient blast design, an operator may want to delay intervals of less than eight milliseconds. This is permissible under the scaled distance concept, as long as the maximum weight of explosive fired within any eight-millisecond period is used in the scaled distance calculation.

(4) A few commenters argued that the eight-millisecond figure is not specified in Bulletin 656. This is true, but the data used in calculating the eight-millisecond specification are accounted for and used in calculations of the scaled distance formula in Bulletin 656.

XIII. Proposed Section 816.65(m).

A few commenters requested that the provision in the proposed regulations for limiting the duration of ground vibrations be deleted. Based on the review of the comments, the Office decided to accept this recommendation.

The commenters recommended deletion of this section on the grounds that it is unnecessary, confusing, and simple to circumvent. The Office agrees that the Section is unnecessary. The Office's rationale for proposing this Section was that ground vibrations of one-second duration constitute steady-state conditions. This contention cannot, however, be supported. This Section was adopted from a State regulation. Subsequent comments from that State revealed, however, that the rule is not based on sufficiently accurate and available data. Many delay systems designed to have vibration durations of longer than one second have been in use for years with no reported problems, as the commenters noted. Spreading vibrations over a longer time period is one of industry's most effective ways of reducing peak vibrations, and thus this Section would be counter-productive to industry's efforts to control vibrations. The Office believes that peak vibrations be minimized under other paragraphs of these Sections.

XIV. Proposed Section 816.65(n).

Numerous commenters felt that the requirement for regulatory approval of the use of delay systems combining surface and in-hole delays, as specified in the proposed rules, should be deleted. Based on rationale provided with these comments, the Office decided to delete this provision.

Most of the commenters stated that combination surface/in-hole delay systems have become common practice for reducing blast vibrations. They felt that the scaled distance requirement in Section 816.65(m) and the one-inch-per-second peak-particle velocity limitation in Section 816.65(j), is adequate, so that a requirement for specific regulatory authority approval to use combination systems is unnecessary. Several commenters felt that the Office is needlessly specifying to industry how to achieve the required results, instead of simply specifying the required results.

A few commenters felt that an additional time delay criterion or continuous monitoring requirement should be added. However, according to Ref. 17, pp. 1, 2, these combination systems have been widely used, with excellent results, to control ground vibrations. Placing additional restrictions on their use will discourage operators from using the latest available technology to control vibrations. The Office argues that the public is adequately protected by Sections 816.65(i) and 816.65(j) and that approval of combination delay systems by the regulatory authority is a significant burden, without benefit:

§ 816.67 Use of explosives: Seismograph measurement.

(A) A number of individuals or organizations submitted comments in this section objecting to various provisions. A few of these stated that the frequency response of structures and the conditions of structure should be considered to allow for variances for use of the prescribed charge weights of the scaled distance (requirements of Section 816.65(jj) and (k)). Some commenters stated that Section 816.67(e) should be deleted and one commenter stated that the provisions of Section 816.67(c) should be used only if a complaint has been made by a citizen. One commenter felt that significant economic risk should be considered in deciding when a waiver of the scaled dis-
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formance formula is allowed. One commenter stated that the "remoteness of an area" should also be a consideration for allowing for waivers of the scaled distance formula. Another felt that because seismograph monitoring may be required, a scaled distance of 50 should be used. One commenter wanted this Section's specification of a peak-particle velocity of one inch-per-second replaced by two inches-per-second.

Consideration of the comments led to the following alternatives, and alternative 1 was chosen.

(1) Clarify Section 816.67(c) to provide that the regulatory authority requires the collection and recording of seismograph data, it also has the authority to specify the monitoring location. Leave other provisions unchanged.

(2) Allow a structural response, economic risk, or "remoteness" to be used as additional factors to authorize waivers of the scaled distance formula under Section 816.67(a).

(3) Delete the authorization to the regulatory authority to require seismographic readings or limits its application.

(B) (1) Several commenters stated that the frequency response of structures (Ref. 12) and the condition of structures should be considered when allowing for waivers of the scaled distance tables based on seismographic measurements. The above discussion on the one-inch-per-second peak-particle velocity limitation in Section 816.67(1) provided detailed reasons for not adopting a system of limiting ground vibrations from blasting, based upon the Medearis theory of structure response. It is not adequately developed for use at this time, is very complex, and requires costly, time-consuming analyses. Condition of a structure is not grounds for changing the allowable peak-particle velocity. Section 816.65(1) and (2) provide that the one-inch-per-second particle velocity may not be exceeded at any structure not owned or leased by the permittee.

(2) A few commenters stated that Paragraph 816.67(c) of these Sections should be deleted because it confers too much discretion on the regulatory authority to require seismographic readings by permittees. However, to provide a mechanism for enforcing the one-inch-per-second velocity limit, it is essential that the regulatory authority have the option to require seismograph measurements, where questions arise as to the operator's compliance with the limit by use of the scaled distance formula. It is not expected that the regulatory authority will use its discretion arbitrarily.

(3) One commenter stated that Section 816.67(c) should be used only when there has been a complaint made to the regulatory authority about a permittee's blasting. No reason was given by the commenter for this. It is anticipated that this provision will only be applied where there have been complaints. However, if blasting records or inspectors' observations cast doubt as to the operator's compliance with the one-inch limit by use of the scaled distance formula, the regulatory authority needs the option to require measurements because use of the scaled distance formula is not considered to provide absolute protection against exceeding a specific ground vibration level. (Ref. 17)

(4) One commenter felt that Section 816.67(c) should be employed only where there is significant economic risk. A determination of economic significance would provide a vague standard which is difficult to administer, particularly in the field. Detailed economic data, including property valuation materials, would be required. This data would be costly to assemble and temperature and condition of a structure, whatever the actual distance, is necessary to assume that the structure is adequately protected, by either the scaled distance factor or a seismograph record.

(5) A few commenters suggested changing the wording of Section 816.67(c) to "explosives detonated within any milliseconds' separation in time from other detonations." Based on the detailed rationale discussion in the preamble under Section 186.65(k) and (1), the Office has decided not to make this change, because delay intervals of less than eight milliseconds are permissible under the scaled distance concept, as long as the total weight of explosive fired within any eight-millisecond period is used in the scaled distance calculation.

(6) One commenter suggested that temperature be added as a specific requirement in Section 816.68(e).
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14, p. 65, and Ref. 13, p. 11, state that airblast propagation is influenced by temperature and wind. So that the blast record will be useful in determining possible causes for high airblast noise levels, the wording "including temperature, wind direction and approximate velocity" has been added to Section 816.68(e).

(4). Section 515(b)(15)(B) of the Act requires that the blast record contain, "the order and length of delay in the blasts." The simplest and clearest way to accomplish this is through a sketch of the delay pattern. Therefore, a provision for this has been added to the blast record requirements.

(5). For clarification and consistency, Paragraph (m) now reads "initiation system" and the word "person" is replaced with "operator" in Paragraph (a). The name of the blaster-in-charge is already listed in Paragraph (c) to check compliance with 30 CFR Part 850, which specifies the allowable maximum number of persons on individual blasting crews, a requirement has been added to record the number of persons in the blasting crew.

(6). One commenter felt that having a blast record open for public inspection is undesirable because it would be misunderstood and misinterpreted. Section 515(b)(15)(B) of the Act specifically requires maintaining the availability of records for public inspection.

§§ 816.71-816.74 Disposal of excess spoil.
30 CFR 816.71-816.74, along with the definitions of "head-of-hollow" and "valley fills" in Section 701.5, regulate excess spoil. Section 816.71 lists general requirements that apply to all fills, including valley fills. Section 816.72-816.74. These requirements are basically safety and environmental protection standards which the engineer designing the disposal area must satisfy. If the particular spoil disposal area does not fall within the definitions of head-of-hollow or valley fill, the requirements of Section 816.71 are the governing regulations. If the spoil disposal area falls within the definition of valley fill, then in addition to the more general requirements of Section 816.71, the valley fill must also meet the requirements of Section 816.72. If the particular spoil disposal area falls within the definition of head-of-hollow fill, then in addition to the more general requirements of Section 816.71 and 816.72 the fill must comply with Section 816.73. Section 816.74 provides an alternative method of constructing a head-of-hollow or valley fill.

These different approaches were adopted to allow increased flexibility for the operators and the State regulatory authorities while maintaining the public safety and environmental protection that Congress mandated.

The flatter fill areas are covered by the more general requirements of Section 816.71 since the risk of failure or pollution of ground or surface water in valley fills is less than in head-of-hollow areas. Both Sections 816.72 valley fills and Section 816.73 head-of-hollow fills are defined in Section 701.5 of the final regulations.

For valley fills, Section 816.72 provides for a fill with a rock underdrain constructed with diversion ditches that carry surface water away from and around the fill. The engineered rock underdrain and diversion ditch system are necessary because valley fills block a path of water flow from a watershed above the valley fill. If the fill is a head-of-hollow fill, then there will be a smaller watershed, in which case it may be possible that the fill may be constructed with a rock chimney drain and water may be diverted toward the rock chimney. Section 816.74 governs a special type of either head-of-hollow or valley fill that is built on up to 6 percent of the area by volume of sandstone, limestone, or other durable rocks that do not slake in water. In such fills, internal drainage is more free and failure because of saturation is much less of a risk, and erosion should be minimal. Therefore, special methods of construction are allowed.

Spoil disposal practices in mining operations have had a major impact on the environment and, in some cases, represented a significant hazard to life and property. The requirements outlined in these Sections of the final regulations provide positive measures to protect life, property, and the environment. Among other things, the Sections provide for the disposal of excess spoil materials while achieving adequate drainage control and long-term stability. For reference to the potential environmental impacts of excess spoil disposal see: "Final Environmental Impact Statement OSM-EIS-1," pp. III-13-15.

If excess materials are improperly placed across drainage channels and provide inadequate drainage and stability, disturbance to the hydrologic balance and impact on safety could be profound. (Comptroller General of the U.S., 1977, pp. 1-2; Coalage and others, 1973, pp. 93-94; Hopkins and others, 1975, p. 9; Taylor, 1948, pp. 406-407). The purpose of detailed construction standards for disposal of excess spoil is to construct fills which will not require maintenance over the life of the fill. Fills constructed for highways, railroads and buildings are not only carefully engineered, but also monitored and maintained for their lifetime. In contrast, excess spoil fills are ultimately the responsibility of the surface landowner who is likely not to have the capital or equipment for long-term maintenance or remedial action. Therefore, it is essential to design and construct excess spoil fills properly.

Major issues which have been identified based on public comments were separated into five areas:

(1) Semantic interpretations of the terms "haul or convey" versus "transport and placed";

(2) Durability requirements for rock used in underdrains;

(3) Lift thicknesses for excess spoil placement;

(4) Allowance of alternative spoil disposal methods; and

(5) Provisions for the disposal of coal processing waste in excess spoil fills.

Each of the principal issues, as well as additional comments, are addressed below.

The authority for these proposed Sections is found in Sections 102, 201, 501, 503, 504, 507, 509, 510, and 615 of the Act. The rationale for selecting the final regulations in lieu of the alternatives analyzed in the Regulatory Analysis is found in the context of this general preamble discussion, the disposition of submitted comments related to the proposed regulations, and the preamble to the proposed regulations for these Sections.

Technical literature used in the preparation of these Sections is listed in the preamble discussion for Section 816.91-816.93 in addition to the following:


Dodson, Gerald F. Memorandum to the Administrative Record, dated November 6, 1978 and copy dated November 7, 1978.

Ettinger, Charles. Transcript of testimony given at public hearings held by OSM on October 25, 1978, pp. 7-22.


Goal, Paul F., Jr., and Leer, Steven F. Written memorandum dated November 21, 1978, submitted at public hearing held by OSM on November 22, 1978, 10 pp. with Exhibits and Appendices, transcript of hearings, pp. 40-64.

Green, B. C. Written comments submitted to OSM, dated November 27, 1978, 23 pp. with figures and illustrations.


NCA/AMC Joint Committee, Comments received proposing addition of 816.74. Submitted to OSM, November 27, 1978, 8-193 through S-194.


§ 816.71 Disposal of excess spoil: General requirements.

Section 816.71 requires controlled placement utilizing current engineering practices common in embankment construction for all types of permanent disposal areas. This Section implements the general requirements outlined in the Act and is applicable to all excess spoil disposal areas. For definition of different types of fill see 30 CFR 701.5.

Disposal of excess spoil in designated offsite storage areas such as pre-existing mined benches is presently practiced in several States. In some areas, disposal of excess spoil has occurred without benefit of permits, sufficient bonding, or minimal provisions for environmental control. Under the proposed permanent regulations, Section 816.71(a), disposal of excess spoil was to be permitted in areas only “other than mined workings or excavations.”

The Office recognizes the constructive and beneficial results for disposal of excess spoil in such workings or excavations, and strongly encourages this practice which is feasible and consistent with both the Act and the permanent performance standards. As a result, the wording of Section 816.71(a) has been modified to clarify the language.

Commenters said the first cut or box cut spoils should not adhere to the same requirements as excess spoil. The commenters said Section 515(d) of the Act separates the requirements of steep versus flat slopes regarding excess spoil disposal. The legislative history and the Act in Section 515(b)(22) do not indicate that excess spoil regulations should be divided based upon mining terrain slopes. Therefore where box cut or first cut spoils are not required to achieve approximate original contour or cannot be handled in accordance with Section 816.101, they should be treated as any excess spoil. Moreover, the requirements of Sections 816.71-816.74 contain an approach that “standards require controlled placement of spoil. Spoil must be transported and popularly placed, sufficient.” This method makes it possible to achieve consistent with the post-mining land use and stability of the site.

Commenters proposed the variance allowing small depressions or impoundments in the rear of fills, which were demonstrated to be consistent with the post-mining land use and stability of the fill. Commenters said that such impoundments would enhance post mining use and stability of the fill. Commenters said that such impoundments would enhance post mining land use and stability of the fill.
mass so as to maintain the lowest possible hydrostatic pressure within the fill. (Hopkins and others, 1975; Cede- gren, 1967; Chassie and Goughnour, 1976; U.S. Army Corps of Engineers, 1952). The existence of depressions or impoundment conditions or imperious conditions may increase the phreatic surface within the fill. Therefore the prohibition of impoundments on fills is retained in Section 816.71(g) in the final regulations.

Commenters argued that the prohibition of terraces in the proposed final regulations was inconsistent with the definition of approximate original contour in Section 701(2) of the Act. It is agreed that terraces, if properly constructed, are desirable to break long slopes, control erosion and enhance stability. Therefore, the requirements of Section 816.71(h) have been altered to allow terraces in accordance with Section 701(2) of the Act. OSM will consider the regulations of the regulatory authority. (Curtis, 1971b, pp. 189-199; Curtis and Super- fesky, 1978, p. 166; Paker, 1965, Figure 1; Skelly and Loy, and others, 1978, pp. 143-145.)

Commenters raised objections to the specification in Section 816.71(i) that the toe of the fills rest on a 20 degree or flatter slope. Since the consideration of the slope of natural ground at the toe of the fills is an integral part of the stability analyses, this requirement was deleted in the final version of the regulations. (Huang, 1978, pp. 11-12; Lambe, 1959, pp. 366-367.)

Commenters said rock buttresses and keyway cuts are not always necessary (e.g., if the design achieves a 1.5 factor of safety). The use of keyway cuts and buttresses is intended to increase the stability of embankments where steep foundation conditions necessitate special treatment to resist the sliding movement created by the weight of the fill. (Chironis, 1977, p. 107; Huang, 1978, pp. 5, 11-12; Lambe, 1969, pp. 366-367; Loy and others, 1978, p. 8; Comptroller General of the U.S., 1977, pp. 1-2; Chassie and Goughnour, 1976, p. 66). The Act in Section 515(b)(22) of the Act are consistent with 30 CFR 77.216-3, and the WV Code, Chapter 20, Article 5-D-9, and in keeping with construction standards for quality assurance. At the suggestion of one commentor, “critical construction periods” have been clarified in Section 816.71(j). The commenter stated that without this clarification operators would be subject to an indeterminate number of inspections, which would increase cost. While most design and construction engineers should be able to provide guidance on critical construction periods, a list, which should not be considered all inclusive, has been provided in Section 816.71(j).

Commenters suggest that inspection frequency be increased due to variations in embankment construction schedules. The quarterly inspection frequency would be a minimum; however, the regulatory authority may increase the inspection frequency if fill construction is so rapid that quarterly inspection will not be adequate. The Office agreed that the capability of the Office to monitor construction practices effectively is an important concern about long-term stability of large fills, especially in the steeper areas, such as the Appalachia coal fields. CH. Rept. No. 95-218, 95th Congress, first session (p. 198-199; Curtis and Superfesky, 1976, p. 66). The Act in Section 515(b)(22) of the Act are consistent with 30 CFR 77.216-3, and in keeping with construction standards for quality assurance. The Act in Section 816.71(g) have been altered to allow terraces in accordance with Section 701(2) of the Act. OSM will consider the regulations of the regulatory authority. (Curtis, 1971b, pp. 189-199; Curtis and Superfesky, 1978, p. 166; Paker, 1965, Figure 1; Skelly and Loy, and others, 1978, pp. 143-145.)

Because of the risks associated with excess spoil fills are less in flatter areas, the disposal of waste was allowed in spoil disposal areas which do not fall within the definition of head-of-hollow or valley fills. However, waste is still excluded from fills that fall within those definitions. This distinction was made because valley and head-of-hollow fills are in steeper areas where side slopes in excess of 20 degrees and average profiles in excess of 15 degrees may be present. Therefore, such steeper areas are more prone to failure, and the effects of failure more damaging.

Coal waste frequently has properties that contribute to instability, especially wet fine coal wastes (Coalgate and others, 1973, p. 6; Comptroller General of the U.S., 1977, pp. 1-2; Preamble, Section 816.81). Moreover, depending on the characteristics of the coal seams being cleaned or processed, coal waste often has acid- or toxic-forming potential (Coalgate and others, 1973, pp. 14-18). The stability and toxic-forming characteristics of a given sample of coal waste can be determined by testing and analysis. Depending on the analysis, the use of a given material may be authorized in a general manner, but more frequently a given coal waste will require special handling, such as mixing in a place with spoil being used in the fill. In the latter case, stability or freedom from toxic drainage is only assured when the waste is handled as prescribed. Moreover, the characteristics of the waste often change due to breakdowns or changes in the seam or seams of coal being processed.

Because of all these variables, regulatory control of fills including coal waste is much harder to achieve. The Office, therefore, decided to exclude coal waste from fills in steep areas. For fills in flatter areas, which generally pose less stability and toxic-forming problems, the Office allows the use of coal waste, provided it is handled to minimize the problems that may be associated with its use.

In response to commenters' assertion that because coal waste is allowed in fills, it is noted that coal waste is allowed in dams under careful control, because dams are more highly engineered in general, typically built with greater quality control and are constructed over a shorter time. All these factors make regulatory control and environmental safeguards easier to achieve. Waste disposal areas designed and constructed specifically to handle coal processing waste, as specified in the regulations, therefore, are justified.

§ 816.71 Disposal of excess spoil: Valley fills.

This Section establishes the requirements for valley fills. This type of fill is characterized by a structure located in a valley where the fill material has been hauled and compacted into place, with diversion of upstream drainage
around the fill. For definition of "valley fill", see 30 CFR 701.5.

Some commenters asserted that the 1.5 static, long-term factor of safety requirement for fills was too stringent, while others supported it as necessary to provide adequate safeguards. Reduced factors of safety were considered as alternatives for all fills and also for remotely located fills.

The factor of safety is a standard engineering practice for earth and rockfill structures located where failure could cause loss of life or property damage. (Canada Department of Energy, Mines and Resources, 1977, p. 80; Canada Department of Energy, Mines and Resources, 1972, pp. 5-27; MESA, 1975, p. 5.143; MESA, 1976b, p. 3; Lambe & Whitman, 1969, p. 373). MESA (1975, p. 5.143) and Canada Department of Energy, Mines and Resources (1972, p. 5-27) recommend the use of reduced factors of safety when the potential of property damage and loss of life does not exist. Meyerhoff, 1970 (pp. 349-355) discusses the correlation of probability of failure with variable foundation conditions, piezometric surface, and other assumptions utilized in the computations of safety factors. He recommends the standard for safety factors should be increased to 1.7 to account for these relationships, thus further reducing probability of failures. Bishop (1955, p. 7) states that even with high factors of safety, overstress can occur below a 1.8 factor of safety.

While most discussions of fills focus on the protection of life and property, the Act also mandated the protection of the environment. The Office believes that the added degree of protection by the above alternatives for all fills is warranted, and well justified due to the necessity for: (a) protection of the environment from excessive erosion, contribution of pollutants, and other adverse landuse effects as necessary to control migration of fines from the foundation or fill material into streams. If fills where drains become nonfunctional due to the migration of fines and subsequent blockage, failure is common. The control of seepage is one of the most critical areas of structural design. (ASCE, 1966, p. 550; Canada Department of Energy, Mines and Resources, 1977, pp. 5-18 to 5-56; Canada Department of Energy, Mines and Resources, 1972, pp. 5-9; Sherard and others, 1953, pp. 61-91; Terzaghi and Peck, 1967a, p. 57; Cedergren, 1967, p. 178; U.S. Army Corps of Engineers, 1962, pp. 10 and 16; U.S. Bureau of Reclamation, 1973, pp. 306-307; West Virginia Department of Natural Resources, 1978, p. 1; MESA, 1975b, p. 3; MESA, 1975, pp. 5.24-5.25 and 8.55-8.56; Coal Age and others, 1973, p. 95.) Therefore, OSM has not removed the fill requirement.

Comments were received regarding the minimum rating requirements for underdrains and the gradation restrictions for the rock comprising the underdrains. None of the comments provided alternative drain sizes, but instead insisted upon the deletion of the table and stressed reliance on site-specific engineering design. Another suggestion was to leave the table and allow the operator an option of submitting a site-specific design, including adequate drainage features. The rock drainage criteria in Subsection 816.71b(3) represent recommendations of current studies concerning valley fill design and construction. (West Virginia Department of Natural Resources, 1975, p. 56; Loy and others, 1978, pp. 6-8; Chironis, 1977, pp. 104-110.) The criteria attempt to strike a balance between site-specific drain design (based on in-depth determination of permeabilities, gradations and local geologic, topographic and hydrologic conditions) and the simplicity of standardized design. The methods used to obtain and place the materials vary; the sizes of the materials are not particularly large considering the amount of material involved. As a result, the requirements of Section 816.72b(3) remain unchanged.

The Office is aware of the problems with ensuring that rock size meets the requirements of Section 816.72b(3). In certain instances, the operator will have to provide multi-staged filter systems in order that the drain, filter, and fill achieve acceptable transitions. In the table of Section 816.72b(3), commenters noted omission of a value specifying the height of drains in fills exceeding one million cubic yards in volume. This was a typographical error and should read "16 feet" in the final version (Chironis, 1977, p. 108).

Commenters questioned the durability standards set forth in the proposed regulations. Commenters noted that the requirements differed from the material control specifications from which they were derived. While there existed a lack of clarity in the proposed Section 816.72b(3), the intention of the regulation was to insure that subdrain material be sufficiently durable to prevent degradation which could result in blockage of the drain and subsequent failure of the fill (Terzaghi and Peck, 1967a, p. 57; Cedergren, 1967, p. 178; U.S. Bureau of Reclamation, 1973, pp. 306-307; Loy and others, 1978, pp. 6-8; U.S. Army Corps of Engineers, 1952, p. 161). The regulations have been modified to reflect the supporting technical specifications.

Since the availability of underdrain material capable of meeting these standards could be cost restrictive in some areas of the country the final regulations will be permitted to allow underdrains which consist of non-degradable, non-acid or toxic-forming rock, which will not slake in water. This provides greater flexibility in that more frequent use of site available rock will be permitted.

The following list of references are provided as acceptable, but not exhaustive guidelines for determining the slake index of rock:
(c) Heley, W., and Mackver, B. N., 1971, Development of Classification Index for Clay Shales, TR5-71-G, pp. 85-95, Report I Water Resources Experiment Station, U.S. Army Corps of Engineers.

Commenters questioned the requirement in Section 816.72c(1) that eighteen-inch lifts be used in the construction of excess spoils embankments. Requirements for lift thickness in earth fill construction vary with the method of placement and the type of embankment, construction equipment used and gradation of the fill material. The boundary conditions, such as phreatic surfaces within the fill and adjacent areas, may vary from site to site and must be determined from on-site investigation or can be taken into account by conservative assumptions. The eighteen-inch lift thickness proposed in the regulations is based on literary
ture which is applied to dams, groins, and highway embankments as well as spoil fills (43 FR 41761). After further examination of the problem and of the comments received, the Office has determined that larger lift thicknesses are, in contrast to fills from small areas (Citronis, 1977, p. 106; Greene and Raney, 1974, p. 8; U.S. Army Corps of Engineers, 1971, pp. K 10-39, M-15; U.S. Navy Bureau of Yards and Docks, 1971, table 9-3; Grim and Hill, 1974, p. 61). Accordingly, Section 816.72(c) has been modified to allow lifts no greater than four feet in thickness, or less, to achieve densities necessary to ensure mass stability, prevent mass movement, avoid contamination of fill drainage systems, or the creation of voids. The regulatory authority has the discretion to require thinner lifts, if the gradation of the material warrants thinner lifts.

Commenters questioned the requirement in Section 816.72(d) relative to stabilized diversions off the fill and the necessity for sediment control at the exit of diversions. Commenters said that stabilized channels "off the fill" created an unnecessary disturbance and that channels on the fill could protect that portion of the fill from erosion. Diverion of water away from the fill surface is considered sound engineering practice (Canada Department of Energy, Mines and Resources, 1977, pp. 58-59, 95-96; U.S. Environmental Protection Agency 1976b, pp. 32-33, 78; WVDNR, 1976, p. 2; EPA, 1976, Canada Department of Energy, Mines and Resources, 1972, p. 2-2; Coalgale and others, 1973, pp. 93-94; Calhoun, 1968, p. 70; Casagrande, 1978, pp. 3 of attachment; Loy and others, 1976, pp. 79 and 82; MESA, 1976b, p. 1; Comptroller General of the U.S., 1977, pp. 1-2). The material making up the fill structure is generally less resistant than the surrounding bedrock, thus, more stringent design criteria are necessary to protect against erosion of the diversion's weaker material. The Office realizes that construction of diversions off the fill structure will affect more area than if the diversions were on the fill surface. However, based upon sound engineering practice, OSM believes that less environmental harm will result from retaining the requirement to build diversions off the fill structures. Consequently, the language of the regulation remains unchanged.

The use of the 100 year storm and 24-hour duration storm is discussed in the preamble for Sections 816.43 and 816.73(c) which is incorporated herein by reference.

Commenters said that sediment control should not be required at the discharge of the diversion carrying runoff from the drainage area above the fill. They assumed that this area was undisturbed. One commenter recommended sediment control be required only at those diversions carrying runoff from the fill surface. The proposed language has not been changed. Sediment load must be controlled off fill core, either diversions, or from mining activities existing above the fill. See Section 515(b)(10) of the Act.

§816.73 Disposal of excess spoil: Head-of-hollow fills.

Section 816.73 contains requirements for construction of head-of-hollow fills. These fills may be constructed with rock-core chimney drains or diversions, as for valley fills. The rock-core chimney drain system is designed to direct water falling of the surface of the fill to a central rock-core by means of surface grading. The rock-core extends from the top to the head of the fill and is designed to confine surface flow of the fill. A system of lateral underdrains will dispose of water from seeps emerging beneath the fill. Filters are provided for the core and subdrains. This fill construction method is relatively new, but as commenters point out, has been used with success in West Virginia for the past several years (Green, 1978, p. 21).

Allowing rock-core chimney drains was based on the following course of events. On December 13, 1977, final rules were adopted for the interim regulatory program which covered the disposal of spoil from surface mining in areas other than mine workings or excavations, and authorized only the rock underdrain system of fill construction. Following adoption of the rules, the Office received petitions for change of the rules affecting head-of-hollow fills. Examination of the petitions, as reflected in this preamble, has resulted in revisions to the rules.

The State of West Virginia and coal mine operators said that the Office should consider only one construction method for building head-of-hollow fills. They claimed that the "rock-core system," authorized in West Virginia, provided as much or more protection as the "rock-underdrain system" in the interim program.

Fills built with the rock-core method are stable at present. However, the development of steady-state seepage through fill masses can take many years, and the results of such seepage may not be obvious for some time to come. The following discussion describes some of the problem areas with head-of-hollow fills from the petition comments.

On the one hand, several professional engineers stated that long-term clogging of the rock core by fine-grained sediment in the drainage and in some cases piping (internal erosion) caused by the flow of water within the fill could lead to instability and potential failure of the fill (Loy and others, 1978, p. 106; Robins and others, 1977, pp. 1-4; Report of Committee on Interior and Insular Affairs H.R. 95-218, 1978, p. 125). Commenter said the rock-core method should be prohibited because rock drains should only be used for passage of seepage or groundwater flows, not surface flow. The Office appreciates the possibility of siltation and blockage of the drain. A deposit of fines within the upper portion of the rock core can occur, since the core will act as an energy dissipater when flows from above the structure lose energy upon reaching the core. The hydraulic gradient increases as the flow passes through the core. There is a potential for blockage of the drain, and water flowing away from the core, the designer may require additional camber.

In an effort to combat some of the problems identified with the rock-core method of excess spoil disposal, two requirements are added to decrease the potential for blockage of the core. Fill, rock-core, and rock underdrains must be surrounded by a properly designed filter. This will reduce piping potential from groundwater in the fill mass, and from flows through the core (see preamble Section 816.74(1)). The construction control measures necessary to prevent contamination of the filters as the size of the collection area increases will prove difficult because the surface of the fill slopes toward the core, and surface runoff will carry large amounts of sediment onto the fill.

Second, these structures must be located in the upper reaches of valleys or hollows and be designed to fill the disposal site to the approximate elevation of the nearby ridgeline (Greene & Raney, 1974, p. 7). The requirements are premised on widely accepted concepts. For a discussion of the necessity of contouring, see the preceding preamble of Section 816.72(b).

The need for minimizing or controlling the surface runoff above a site has been the basis of state-of-the-art diversion design. This concept applies

To date, the Office is not convinced that rock core fills are potentially less stable than the rock underdrain fills. Some engineers have expressed doubt that the rigorous West Virginia construction requirements could be adequately met at sites where, just beginning a strict inspection program and that inadequate engineering practices would be more likely to result in failure of the rock core system. The Office emphasizes that it is critical that the rock core maintain its permeability throughout. If one impermeable section of the core is constructed or if a section subsequently becomes impermeable, failure could result.

In summary, the rock-core method has been the subject of debate, but it reflects currently acceptable technology based upon the performance record of 250 fills (Green, 1978, p. 2). On the basis of the investigation, the Office is providing a permanent program revision to the regulations permitting the rock core system of head-of-hollow fills to be used at the discretion of the regulatory authority with adequate inspection and supervision. At the same time, the Office is instituting a formal study to investigate various types of fills.

The Office also has determined to permit the use of the rock-core method of disposal where the final crest of the fill is at or near the elevation of the coal seam. These type fills will be limited to disposal volumes of 250,000 cubic yards or less. (Heine, 1978, p. 1). The Office believes these fills are relatively small and that any increases in the risk of failure because of the use of the rock core drain is offset by their small size. However, these fills should also be located to minimize the upstream drainage area into the fill.

Section 816.73(b) contains criteria for the rock chimney drain, including size, filters, drainage sump, terrace and grading requirements (West Virginia and erosion. (GAO, Virginia and erosion. (GAO, 1977, p. 76; Hinger, 1978, pp. 7-22). In response to reports on potential clogging of the rock core, see General preamble discussion for Section 816.73. Commenters said that clogging of the rock core will not be a problem because of revetment requirements reducing sediment yield. This is only true after construction when the disturbed areas have been reclaimed successfully and erosion and sediment load entering the fill have been eliminated. During construction, the area above the fill is generally disturbed by haulroads and mining and reclamation operations which contribute sediment capable of plugging the core. The crest of the fill itself cannot be reclaimed, as is the outislope, therefore, sediment from the crest is also directed into the core.

Commenters were concerned about the expense and availability of enough rock to construct underdrains. Since no details were presented regarding cost, current practices or engineering which would substantiate this claim, the Office finds that only, the record contains numerous examples of fills constructed on all types of terrain, this comment was rejected. Moreover, the requirement for a rock underdrain is a critical element for safe fills. (See, preamble for Section 816.72(b)).

Section 816.73(c) specifies the hydrologic design capabilities of the drainage control system. The 100-year frequency storm is a standard criterion for control of runoff above nonimpounding structures (West Virginia Department of Natural Resources, 1975, p. 2; MESA, 1976b, p. 1). The 24-hour duration storm was chosen over the 6-hour storm, because it generally results in a runoff volume and peak somewhat higher than that of the 6-hour in the same area (Chow, 1964, pp. 9-50 through 9-59; U.S. Department of Agriculture, Soil Conservation Service, 1972, Chapter 21; U.S. Weather Bureau, 1961, pp. 50-58). A commenter requested clarification of the applicability of the final regulations to partially constructed hollow fills. Many commenters support the adoption of site specific standards for durable rock fills. The Section has been adopted solely for durable rock fills. Many fill structures have been dumped in place (Davis and Sorenson, 1969, p. 18; U.S. Bureau of Reclamation, 1973, p. 60; Terzaghi and Peck, 1957a, pp. 599, 604; Huang, 1978, p. 5; Robins and others, 1977). As the state-of-the-art progresses, it becomes obvious to designers that this was an inaccurate and cost-effective method of construction (U.S. Department of Energy, 1978, p. 4; Young, 1978, pp. 79-94; Good and Leer, 1978, pp. 1-10 with Exhibitor Council on Wage and Price Stability/Regulatory Analysis Review Group, 1978, pp. 12-17; Loy and others, 1978, pp. 107-176). Little compactive effort or minimal hauling and handling is required, as the material consolidates under its own weight. In dams, where this method was widely utilized, the sole problem results from differential settlements of the structure, which created cracked, impermeable zones and other similar problems, which can lead to instability.

Other problems, such as infinite slope failures, resulted from the existence of outslopes at the angle of repose. These types of failures are generally shallow, but can become progressive (Canada Department of Energy, Mines and Resources, 1972, p. 2-3). In addition, if less, durable or more impermeable zones were dumped, which created weak layers parallel to the outislope of the fill, failures could occur. (Canada Department of Energy, Mines and Resources, 1972, pp. 88-89; Taylor, 1948, p. 476; Loy and others, 1978, pp. 88-89).

Section 816.74 of the final regulations is based upon the premise that the solution to safe end-dumped fills is rock durability. The existence of dumped rock fills was carefully considered. A number of the dumped rock embankments considered were disturbed and durable igneous rock such as hornblende, granodiorite, granite and quartz monzonite. These rocks are crystalline in structure and are thus generally more durable than sedimentary rocks. Even though the consideration ofend-dumping this type of rock does not directly transfer to regions with sedimentary rock, it does show that rock must be durable when end-dumped.

The variability of excess spoil material supports the use of site specific design requirements. The Office has tried to strike a balance between objective standards and a multitude of possible alternative methods which address special situations, while still satisfying the objective standards required by law. The concept presented by this Section has been supported by progressive generation of their criteria design and appears to promote more cost effective spoil disposal. The following discussion details the requirements of the Section.
(1) The introductory paragraph of Section 816.74 allows 80 percent durable rock to be placed in a single lift, if site-specific conditions and justification by experienced engineers warrant. Durable rock is determined by the stable durability factor, which is identified in the preamble to Section 816.72(b)(5). This introductory paragraph incorporates the requirements of Section 816.71 by reference.

(2) Section 816.72(a) provides for the stable configuration of the fill by requiring controlled placement and the consideration and proper handling of less durable materials. This is consistent with the Act, Section 816.71(c), and standard engineering practice (Canada Department of Energy, Mines and Resources, 1972, pp. 2-3 and 2-9).

(3) Section 816.72(b) specifies stability analyses of the structure to show the long-term stability factors of safety achieve 1.5 and 1.1, respectively. These requirements reflect the intent of the Act and provide accepted standards for stability, as discussed in the preamble to Section 816.72(a).

(4) Section 816.74(c) states criteria for achieving proper subsurface drainage control, which are consistent with Sections 816.71(a)(1) and 816.72(b). See, particularly, for Sections 816.71(a)(1) and 816.72(b).

(5) Sections 816.74(b), (c), (d), and (g) provide specific requirements for control of surface drainage, grading and terracing. The requirements parallel the comparable subsections of Sections 816.72 and 816.73.

The provisions of Section 816.74 reflect options developed after deliberation of the following items:

Literature used in consideration of alternatives and regulations show that the earth’s crust is made up of approximately 35 percent clay-bearing rock (Franklin and Chandra, 1972, p. 325). This would include igneous, metamorphic, and sedimentary rocks. Sedimentary rocks are estimated to comprise as much as 82 percent shale, 12 percent sandstone and 6 percent limestone. Mason (1966, p. 153), Drnevich and others (1976, pp. 56-51), Welgie (1966, p. 67), Huang (1978, p. 30), and Cumming and others (1965, p. 10) have shown that surface mine spoils are composed of relatively high concentrations of clay and silt-sized particles. Some commenters have criticized the Office for applying criteria which address earthfill structures, when most mines are dealing with rockfill. While OSM realizes that overburden materials are of variable grain size, plasticity and permeability, the Office is of the opinion that the excess spoil problem involves both earth fill and rockfill.

As literature has shown, overburden materials may contain silt and sand-size particles. The ability of these materials to withstand weathering and deterioration is dependent upon the type of sediment which occurs as a initial deposit before consolidation and upon the type of cementing material. Laboratory tests on shot-into-place rock (Mason, 1966, pp. 153-156), Drnevich and others (1976, p. 58) and the U.S. Department of the Navy (1974, pp. 7-7-14) have shown that surface mine wastes with rock-size particles lose shear strength with time due to exposure to water and weathering. Shales have historically caused many geotechnical problems from improper treatment and required elaborate remedial design (Chassie and Gough-nour, 1976, pp. 65-66; Shamberger, and others, 1975, pp. 1-8; Bragg and others, 1975, pp. 1-5; and DIMillo, 1978, pp. 153). These types of materials cannot be indiscriminately disposed of. Past excess spoil disposal practices, both in drainways and over mine bench outcrops have resulted in numerous safety and environmental problems which was placed by gravity methods. (Appalachian Regional Commission and the Department for Natural Resources and Environmental Protection 1974, pp. 5-7; Welgie, 1958, p. 67; Robins and others, 1976, pp. 1-3; Loy and others, 1976, pp. 69-74; and Plass, 1967, p. 1).

Comments, which were pertinent to the inclusion of this Section in the regulation, questioned the specificity of excess spoil disposal requirements. The majority of the comments discussed the lack of flexibility in the proposed regulations for designs of a site-specific or innovative nature. Other comments agreed with the requirements and suggested that they also proposed specific criteria for adoption. Essentially these criteria from the latter group of commenters have been adopted as shown in the context of the final regulations (U.S. Department of Energy, 1978, pp. 1-15; Casagrande, 1978, Attachment, pp. 1-4; NCA/AMC, 1978, pp. S-190 through S-194; Young, 1978, pp. 15-17; and Ettinger, 1978, pp. 7-22).

OSM believes that the adopted regulatory scheme provides for a site-specific design for each valley, head-of-hole, or other excess spoil disposal area. The final regulations ensure flexibility in that:

(a) The proposed criteria in the regulations have been retained to allow a type of design which is similar to a handbook approach.

(b) The criteria have been amended in final form to the extent of durable rock fills.

(c) Overview evaluations of different fill construction techniques will be performed through further research by OSM.

(d) The Office also believes that the opportunity for innovative, flexible design in mining and reclamation practices is permitted by Section 785.13.

While the Office has allowed the use of end-dump durable spoil, it recognizes several which may need consideration during design. The enddump method inherently produces large quantities of sediment due to the active free face. The free face is unreable of geotechnical problems which may require large or frequently cleaned sediment control structures. The sediment control should be close enough to the structure to serve its purpose, but not so close as to be subject to the consequences of shallow or deep movement at the free face.

The proper handling of less durable materials may become a quality control problem. It is essential that weak materials be placed in a way to contribute to stability. Mining operations with variable duration of exposure of excess spoil could conceivably require two or more types of disposal areas.

§ 816.79 Protection of underground mining

Section 816.79 is intended to protect the health and safety of miners working in surface and underground mines adjacent to each other, and to assure that economically feasible underground mining is not foreclosed by nearby surface mining activities, causing both a loss of resource recovery and environmental degradation. Authority for this Section is found in Sections 102, 201, 501, 503, 504, 515, and 516 of the Act.

As specified in Section 515(b)(12) of the Act, Section 816.79 requires a 500-foot separation in all directions between active non-commercial coal mines and any appropriate State safety agency.

One suggested alternative considered by OSM was to specify unique situations where the proximity limits would be waived, such as recovery of partially mined coal deposits in danger of wastage through mine fires, an abandoned underground coal mine which is to be surface mined, or mines that have been operated as a source of non-commercial coal. The Office believes that each case would be different enough to thwart the utility of an extended list of special cases; thus this alternative was rejected.

A second alternative considered was the complete reliance upon MSHA regulations for mines within the 600-foot limit. This alternative was rejected as contrary to the Act and because OSM believes that a Joint decision on close proximity of surface and under-
A suggestion that a specific State agency should be designated to work with MSHA on joint approval of variances was rejected by OSM. The Office feels that agency designations vary too widely from State to State, and that OSM should not dictate its will in this matter.

§ 816.81-816.88 Coal processing waste.

(1) Authority for these sections is found in Sections 102, 201, 501, 503, 504, 507, 508, 510, 515 and 517 of the Act.

(2) Technical literature utilized in the preparation of these sections is contained in the list of references in the preamble to Sections 816.91-816.93.

(3) The bases and purposes of Sections 816.81-816.88 are discussed generally herein. See FEDERAL REGISTER, Vol. 43, pp. 41762-41766. Although some modifications have been made to the proposed regulations for clarity and in response to public comments, the basic premises remain valid.

(4) The quantities of raw coal which require cleaning or processing prior to marketing the product have been on the increase for many years. The major influences affecting this situation are production increases in coal, and increased coal production, requirements for cleaner burning fuel, coal mine mechanization and extraction of “dirty” coal deposits (McNay, 1971, p. 3). The resultant coal processing waste must be handled and disposed of in a manner which will not pose a threat to health and safety of the general public or adversely impact the surrounding environment. Most recently, coal processing waste structural failure has been attributed to spontaneous combustion. The control and minimization of spontaneous combustion in post combustion is necessary to ensure the integrity of the coal deposit and to prevent destruction of the environment.

(5) The potential for damage to the environment from improperly constructed coal processing waste banks is included in the discussion of effects of mining on the natural environment; pp. 818-17; and on the human environment under safety; p/ BII, 108; of the final environmental impact statement for the OSM permanent regulatory program. These regulations complement the Mine Safety and Health Administration (MSHA) regulations on coal processing waste disposal under 30 CFR 77.214-77.215 and incorporate standard engineering practices.

§ 816.81 Coal processing waste banks: General requirements.

(1) Section 816.81(a) outlines the requirements that must be met in order to dispose of coal processing wastes that are generated on the site and deposited in disposal areas within the permit area. Controlled placement requirements reflect current prudent engineering practices utilized in embankment construction for all types of mining fills (Greenough and Fenner, 1967, a, pp. 440-451; see also ASCE, 1977; USMESA, 1975; USNAVY, 1971 U.S. Comptroller General, 1977, pp. 1-2; Coalgate, et al, 1973 p. 5, 41; EPA, 1978, p. 73-177).

(2) Section 816.81(b) outlines the requirements that must be met in order to dispose of coal processing waste materials that are generated outside a permit area and deposited in disposal areas within the permit area. The regulations allow for the disposal of coal processing waste coming from operations outside the permit area because this practice, currently utilized in industry, minimizes the number of disposal areas and consequent disturbances.

(3) Commenters stated that requiring coal processing waste material to be hauled or conveyed to a fill area and placed in a controlled manner was inconsistent with Section 515(b)(22)(a) of the Act. The commenters argued that the regulations should be broadened to allow greater flexibility in the techniques for hauling and disposing of coal waste. Many asserted that end-dumping of coal waste should be permitted. OSM was not convinced by the comments that the regulations should be broadened. Coal waste disposal practices have historically drawn attention because of disastrous slides such as the Aberfan slide in Wales and numerous slides which have occurred through the Appalachian coal region for years (McNay, 1971, pp. 12 and 13). Many of these slides occurred in waste piles which had been end-dumped from a hilltop or mountainside and consequently the internal frictional forces were violated and a slide occurred. Water brought into contact with burning coal causes violent explosions (Andreuzeit, 1970, p. 19). Similar explosions have occurred when natural surface water came into contact with burning refuse material ultimately resulting in bank failures (McNay, 1971, p. 14).

End-dumping of coal waste into disposal areas is not an acceptable method of placement because the material will remain at the natural angle of repose until water contact with the coal waste or continued loading of the fill causes a failure. End-dumping does not reduce the air voids within the fill and thus will contribute to the possibility of spontaneous combustions. Coal waste must be placed in horizontal layers and compacted to assure stability and reduce the possibility of burning. (U.S. Comptroller General, 1977, p. 1-2; Coalgate, et al, 1973, p. 1, 29; Canadian Department of Energy, 1977, pp. 14-15).
The following alternatives were considered in developing the final rules:

(a) Change the regulation and broaden the methods by which coal-processing waste may be transported to the fill area.

(b) Retain present language of the regulation.

(c) Clarify the regulation to make it clear that end-dumping into waste disposal areas is not permitted.

The Office chose to retain the proposed regulation language in Section 816.81(a) which requires that coal-processing waste be hauled or conveyed to a fill area and placed in a controlled manner.

The MSHA requirements for disposal of the coal-processing waste have been in effect for several years. Considerable success has been achieved by requiring that coal waste material be transported in lifts under control, and compacted in two-foot layers (Coalgate, et al., p. 41; MESA, 1976, p. 3; EPA, 1978, p. 73-79). To permit end-dumping of coal waste material into a coal waste bank is contrary to current prudent engineering practice. End-dumping creates large unstable areas of potentially combustible material which is easily susceptible to erosion.

Placement of coal processing waste in lifts retards the airflow across the waste material, thus preventing combustion.

§ 816.82 Coal processing waste banks: Inspection.

(1) Inspections of coal processing waste banks by an engineer or qualified person approved by the regulatory authority are intended to assure observance of any physical changes in the waste bank which may signify potential danger of erosion, or other hazards to health and safety or the environment and to control construction practices which could lead to such changes (US MSHA, 1975, p. 98; see also Bonny and Flood, 1973; CEDMR, 1972; Clough, 1972; Comptroller General of the U.S., 1977; National Coal Board, 1970; Wood, et al.).

(2) Commenters stated that the weekly inspection requirement was too stringent, especially for small sites which have a low hazard potential. They requested that the regulation be changed, basing the inspection frequency on the potential hazard to human life and property.

The following alternatives were considered in developing the final rules:

(a) Change regulation to read “the inspection shall occur at least once each week or at such other inspection frequencies as the regulatory authority may require” beginning within 7 days after preparation of the disposal area begins and * * *

(b) The word “quarterly” should replace the wording “once each week.”

(c) Retain present language of the regulation.

The Office has chosen to require quarterly inspections of all waste banks, but the regulatory authority may require more frequent inspection intervals based on the hazard potential to human life and property, or potential damage to land, air, and water resources.

Quarterly inspections of coal-processing waste banks were chosen to assure that effective monitoring of changes at coal waste banks will be conducted by the operator (US MSHA, 1975, p. 98) and is consistent with the requirements of Section 816.72(i). Large amounts of coal waste are produced at many mine sites, increasing the possibility of potential hazards. However, waste banks at smaller mines will not change significantly over long periods of time. The regulatory authority has the option to require more frequent than quarterly inspections if conditions at the specific coal waste bank warrants such action.

The regulations require the maintenance of records of inspections so that trends in physical changes can be monitored by the regulatory authority. Notification to the regulatory authority of potential or imminent emergency situations will allow prompt formulation of remedial action and for the institution of emergency action to safeguard life, property and the environment.

§ 816.83 Coal processing waste banks: Water control measures.


(2) Response to specific comments on the proposed rules are:

(a) Commenters stated that the large ‘underdrain requirements for valley fills should not be applicable to coal waste disposal areas. The following alternative were considered in developing the final rules:

(i) The language of the regulations to require the design of a sub-

(drainage system for site specific conditions.

(e) Retain the present language of the regulations.

The Office has chosen to change the language of the regulation to allow the design and construction of a subdrainage system for site-specific conditions.


(b) Commenters suggested that section 816.83(b), which requires that diversion ditches around coal-processing waste banks be designed on the basis of a 24-hour duration, 100-year frequency storm be made less stringent. The following alternatives were considered in developing the final rules:

(i) Use a design storm of lower intensity.

(ii) Change to 6-hour duration, 100-year frequency storm.

(iii) Retain proposed language of the regulations.

The Office chose to retain the proposed regulation. The requirement for diversion ditch design based on the 24-hour, 100-year frequency storm is compatible with MSHA regulations and current prudent engineering practices. Diversion ditches are necessary to reduce the potential for creating impoundments behind coal waste areas and to reduce the possibilities of erosion on the face of the waste bank. Water infiltration into the fill, which is easily susceptible to erosion, is prevented in part by diversions, would decrease the overall stability of the embankment (Lambe and Whitman, 1966, p. 432; Terrazghi and Peck, 1967, p. 337). For intense storms or a 6-hour duration storm were considered as design events. However, the 24-hour storm generally produces a runoff larger in total volume and peak than the 6-hour storm and design to that level will provide more substantial long-term protection to the embankment. OSM believes that the risk to public safety and to property posed by potential failure of coal waste embankments justifies the use of the more intense design storm (West Virginia Governor’s Ad Hoc Commission of Inquiry, 1972, pp. 1-1-12; Thomson and Rodin, 1972, pp. 8-13).

§ 816.85 Coal processing waste banks: Construction requirements.

(1) Section 816.85 (a) and (b) contain requirements that are within gen-
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eral acceptable engineering practice and the basis for these requirements is discussed in the Preamble to Sections 816.71–816.72.

(2) Section 816.85 (c) requires that coal processing waste be placed in lifts not to exceed 24 inches and compacted to a maximum dry density no less than 90 percent of Standard Proc­

1tory authority. Change Section 816.85 (c) to “The coal-processing waste banks bordering streams shall be constructed in layers no more than 24 inches in thickness."

(3) Section 816.85 (d) requires that coal processing waste banks be covered with a minimum of 4 feet of the best available non-toxic and non-combusti­

ble material. Coal processing waste material is quite variable in physical and chemical properties. Adequate cover must be applied to prevent upward migration of toxic salts that may affect plant roots and provide a barrier to prevent oxidation of acid­

forming material (Brundage, 1974, pp. 183–185; Dean and Havens, 1972, pp. 482–485; see also Adams, et al., 1974; Calhoun, 1968; CDEMR, 1972; Capp, et al., 1973; Hornsby, 1974; Coal­


(4) Responses to specific comments on the proposed rules are:

(a) One commenter suggested that Section 816.85(a) be altered to allow flexibility in the design of waste banks but require all changes to be approved by the regulatory authority. Change Section 816.85(a) to “The coal-processing waste banks shall be constructed in compliance with this section and if app­

icable Sections 816.71 and 816.72.”

(ii) Retain language of the proposed regulation.

The Office chose to reject the proposed alternative because of the necessity in the design of any earth structure to follow standard engineering practice and procedures which Sections 816.71 and 816.72 provide. It cannot be left to the discretion of the operator to determine if these sections should be followed. This is true par­


cularly in regard to the water control measures and stability requirements.

(b) Commenters stated that the proposed eight-inch lift thickness for coal

processing waste disposal was not neces­sary. According to commenters, ade­

quate compaction for stability and the prevention of combustion can be ob­
tained using MSHA’s two-foot require­

ment. In developing the final rules, two alternatives were considered:

(i) Change the regulation to allow coal-processing waste to be spread in layers no more than 24 inches in thickness.

(ii) Retain language of the proposed regulation.

The Office has chosen to change the proposed regulation to allow coal-processing waste to be spread and compacted in lifts no greater than 24 inches in thickness.

Several studies of fill construction and current prudent engineering methods support the position that refuse banks can be constructed safely with the specified compaction percent. Present MSHA test data show that 90 percent Standard Proc­
tor dry density can be obtained in lift thicknesses exceeding 8 inches with compaction equipment commonly used (USMESA, 1975, pp. 8.65–8.68).

(c) Commenters objected to the 90 percent compaction criteria. Some stated it had no sound engineering basis and should be deleted from the regulations. Others wanted design spec­
cifics removed from the regulation. Commenters suggested the regulation be changed to read “to provide for compaction to design densities to pre­
vent spontaneous combustion and provide the required strength for stability of the waste banks.”

This suggestion was rejected because the 90 percent compaction criteria provides an objective standard to de­
terminate the effectiveness of the compaction process (Terzaghi and Peck, 1967, p. 441). Since the degree of compaction depends to a large extent on the moisture content of the refuse material, it is important to be certain that compaction has reached a level where excess fluids have been removed from the waste material. Investi­
gations have led to the conclusion that no one method of compaction is equally suitable for all types of soil (Terzaghi and Peck, 1967, p. 441). It is nec­

ecessary, therefore, during the place­
ment of the waste for the engineer to have the means for determining whether the specified compaction is being achieved (USMESA, 1975, pp. 9.107–9.110).

OSM has chosen to retain 90 percent as the maximum dry density require­
ment for compaction of coal processing­

ate. This density requirement, which is a normal construction specifi­
cation for compacted fills (Terzaghi and Peck, 1967a, pp. 433–448; US­

INBYD, 1971, pp. 7.8.1–7.8.10), will:

(i) Assis through the volds, a major factor in ignition and perpetuation of coal

waste fires.

(ii) Act as an easily measured standard throughout the industry.

In order to avoid requiring the con­
struction of large slurry ponds for coal waste disposal, to avoid the environment­
mental hazard associated with such ponds, and to avoid additional land disturbance and cost of designing and building such ponds, OSM has chosen to change the final rules to allow for the disposal of dewatered fine refuse on a waste bank. The statement “vari­
ations may be allowed on these require­
ments for the disposal of dewatered fine refuse (minus 28 sieve size) with the approval of the regulatory authority” was inserted in the final rules.

(e) Commenters suggested that coal processing waste need not be compact­
ed if it is placed in depressions or pits. Two alternatives were considered in developing the final rules:
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(1) Allow variation in compaction criteria for disposal of coal processing wastes in pits or depressions.

(ii) Retain the present language contained in the proposed rules.

One of the major purposes of compaction is the prevention of coal waste fires by reducing airflow through the material (see discussion in Section 816.85(c) above). Coal waste in pits or depressions will ignite if care is not taken to prevent conditions favorable to combustion (Comptroller General of the U.S., 1977, p. 2). In order to assist in preventing such combustion, OSM chose to retain the language of the proposed rules.

(1) Commenters suggested the final 4-foot cover requirement for coal processing waste was unnecessary to achieve adequate vegetation. Some of the commenters are concerned about the availability of such soil. This should not present a problem because the regulations require that only the original topsoil removed from the waste disposal site must be redistributed. Where the topsoil is fine, nontoxic spoil material can be used to achieve an adequate depth of cover.

The Office has decided that the regulations should require a 4-foot cover on coal wastes, unless it can be established by chemical and physical analysis that a thinner layer is adequate on nontoxic material for environmental protection and reclamation. The topsoil must be replaced in all cases. The regulatory authority may allow less than four feet of cover material based on physical and chemical analysis which shows that the requirements of Sections 816.111 through 816.117 will be met.

Covering of graded portions of the coal processing waste disposal area promotes vegetation, seals the fill from percolation of surface runoff, retards airflow to prevent combustion and conserves the carbon dioxide. See 37 F.R., p. 183; Coalgate, et al., 1973, p. 52; CDEM, 1972, pp. 7.10-7.16.

(g) Commenters stated that Section 816.85 is too restrictive and suggested that MSHA regulation 30 CFR 77.215(a) can adequately control the construction of coal processing waste banks. Two alternatives were considered in developing the final rules:

(i) Replace Section 816.85 with MSHA regulation 30 CFR 77.215(a).

(ii) Retain the language as presented in the proposed rules.

The first alternative was rejected by the Office because the purposes of these regulations and those of MSHA are different. Section 102 of the Act requires stronger environmental controls over mining than does the Coal Mine Health and Safety Act which primarily addresses problems relating to the safety and health of miners. For this reason, it is appropriate for these regulations to be more restrictive than MSHA's regulations. This is necessary in order to protect the environment as required by Section 102(d) of the Act.

§816.86 Coal processing waste: Burning waste utilization.

(1) This Section is established to set forth the requirement for extinguishing burning coal refuse fires in accordance with procedures approved by the regulatory authority and MSHA. The Office has relied on several reports to describe the health effects and numerous accidents and deaths at and nearby burning coal waste banks (McNay, 1971, pp. 6-13; Harrington and East, 1948, pp. 22-24). These incidents are unacceptable and as such the Office has taken the position that additional control measures are necessary to ensure that construction, maintenance, and abandonment practices are adequate to provide long-term protection.

(2) In recognition of the unilateral responsibilities between the Office and MSHA, the Office has taken the position to extinguish a burning coal refuse fire must be in concurrence with MSHA standards before plans will be approved.

(3) Incidences of severe accidents and deaths associated with the extinguishment of coal refuse fires (McNay, 1971, p. 12) clearly necessitates extreme caution and proper planning when dealing with fire control. The development of engineering and technical specifications for the issuance of notices for required remedial or maintenance work is established in Section 816.87 of the Act. Because of this legislative mandate and the potential impact of the problem, the Office has incorporated language similar to the MSHA standards in 30 CFR 77.215(j) requiring that burning coal refuse banks be extinguished only by persons authorized by the operator and knowledgeable of the hazards and applicable control procedures.

(4) In Section 816.86(c) of the proposed regulations, acceptable control techniques for extinguishing coal refuse fires were listed. A number of demonstrations have been conducted which described many such control or abatement techniques (Andreuzzi, 1976, pp. 6-13; Carr, 1948, pp. 169-177; Dixon, 1957, pp. 9-13; Harrington, 1948, pp. 11-14; Flegal, 1973, pp. 13-46; Hebley, 1948, p. 38; Hebley, 1950, p. 337; Hebley, 1956, p. 29; and McNay, 1971, pp. 15-22). The effectiveness of these abatement techniques varied from temporary control to complete extinguishment (Flegal, 1973, pp. 16, 18, 20, 22, 24, 28, 29-30, 32, 34, 36-37, 40, 41-42, 43-44, and 46). The proposed control techniques in the proposed regulations were intended to be a list of possible abatement techniques; however, their listing was considered to mean the only available, thus acceptable, extinguishment method. In addition, some of the techniques were found to be unacceptable, and as such the Office has, therefore, deleted any specific reference to these control techniques. The operator is referred to the above references to acquire data for the selection of the appropriate technique(s) for development of a contingency plan to prevent sustained combustion as required by Section 815(b)(14) of the Act and is required by Sections 780.13 and 784.13 of the regulations.

(5) Commenters asserted that the proposed regulations should be deleted because MSHA has established adequate controls for handling burning coal refuse. The Office has considered the arguments that adequate control for extinguishing burning coal waste has been adopted by MSHA regulations (30 CFR 77.214, 77.215 and 77.215-4). The Office believed that these arguments were unfounded on the basis of the testimony in the legislative history which discussed the need for additional safety and environmental protection with respect to disposal of coal processing waste and their inherent capability of combustion. In part, this is supported by intent and purpose of health and safety legislation which basically provides for the health and well-being of miners and not the general public and environment (U.S. Comptroller General, 1977, pp. 1-2).

OSM is required under Section 515(b)(14) of the Act to ensure that materials which constitute a fire hazard are treated and buried and compacted . . . to prevent sustained combustion." OSM has, therefore, rejected the comments as being contrary to the intent and purpose of the Act.

§816.87 Coal processing waste: Burned waste utilization.

(1) This Section allows utilization of burnt coal processing waste, known as "reddog," after the regulatory authority approves plans for its utilization. The plans shall describe the operational procedures to be utilized during the excavation and removal of the material and outline safeguards that must be carried out in case an adverse environmental event occurs or a hazardous working condition is created. These plans and associated drawings shall be certified by a qualified engineer. Reddog removal operations must be carried out in such a way as to avoid loss, damage to equipment, personnel, and injuries resulting from gas inhalation or falls into voids resulting from volume change during burning.
MSHA is concerned with the safety of underground coal mines, the agency must be consulted during the permitting process before waste is put underground. The author suggests that the alternative was chosen. The final rules require that MSHA and the regulatory authority approve the disposal plan before any coal processing waste can be returned to underground workings.

§ 816.89 Disposal of non-coal wastes.

Authority for this Section is found in Sections 102, 201, 501, 503, 504, 515 of the Act. This Section specifies requirements for the procedures to be followed in the disposal of non-coal wastes generated from surface coal mining operations. The utilization of these procedures will minimize environmental degradation caused by improper disposal procedures.


Paragraph (a) of this Section specifies the manner in which non-coal wastes must be disposed. The following comments were received on Section 816.89.

(a) Several commenters suggested the word "timber" be deleted from the final rules in Section 816.89(a). They stated that the wording as proposed could be interpreted to mean that no timber that has been used in mining activities and should not be interpreted to include timber cleared from surface mining operations.

(b) Several other commenters suggested that the requirement for a minimum of 2 feet of soil cover in Section 816.89(b) be replaced by terminology such as "adequate soil cover" since in some cases there may not be enough preparation of cover material to meet this requirement. This suggestion was rejected and the final rules remain as proposed because most existing laws governing sanitary landfills include more stringent requirements concerning the covering of waste materials, and a minimum of 2 feet is a standard for sanitary landfill design (Brunner and Keller, 1972). The Office believes that the proposed wording of the rule should be maintained to give authority for the regulatory authority to require a minimum environmental protection where local laws are not enforced.

§§ 816.91-816.93 Coal processing waste: Dams and embankments.

Authority for these Sections is found in Sections 102, 201, 501, 503, 504, 515, and 517 of the Act.

Technical literature used in the preparation of these Sections is as follows:


FEDERAL REGISTER, VOL. 44, NO. 50—TUESDAY, MARCH 13, 1979


Holland, C. T. 1965. Final report on the effect of mining upon and methods of protecting earth fill dams located in the upper Buffalo Creek drainage basin of West Virginia University, 32 pp. and appendices.


Moulton, L. E. 1973. Development of state-of-the-art information on coal waste embankments. West Virginia University re-
search proposal No. 73042 (RFP No. S013042), 40 pp.


Sprik, Frantisek. 1973. Budou no Vyspakh Lesy (Will forests survive on waste em-
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The final rules were developed by the incorporation-by-reference of SCS design requirements contained in Section 816.49 as the design criteria to be followed in designing all impoundments, including coal processing waste dams and embankments. Because of this, the requirements contained in Sections 816.92(c), 816.91(a), 816.91(b), 816.91(c), and 816.91(d) of the proposed rules were moved to Section 816.49(d), 816.49(c), 816.49(b), and 816.49(a), respectively, of Section 816.49. These requirements are now in Section 816.49 because they are general requirements that are applicable to all dams and embankments. Specific design requirements that were contained in the proposed rules were moved to Section 816.49 if and only if the related standard design or construction requirements for all dams and impoundments were modified to reference the new rules directly. These requirements were accepted in part and the final regulations were modified to reference the new rules directly when the rules overlap. Specific requirements which were not contained in the proposed rules were moved to Section 816.49 if they related to standard design or construction requirements for all dams and impoundments, whereas special design or construction criteria for waste dams and impoundments were retained. These changes are in the final version of these sections.

§ 816.91 Coal processing waste dams and embankments.

The requirements of Section 816.91 prohibit use of waste in dam construction, unless proven as a suitable fill material, in accordance with standard engineering procedures. Special care must be exercised to provide proper strength, stability, and protection of public health, safety and environment. These requirements do not apply to earth, concrete, or other embankments. Different types of embankments which may exist in the permit area unless they are intended to impound coal processing waste. Permanent water impoundments, however, are covered under Section 816.49, and sedimentation ponds are regulated under Section 816.46.

These regulations cover all dams and embankments constructed of coal processing waste or intended to impound coal processing waste, whether temporary or permanent and whether or not they meet the size or other criteria of 30 CFR 77.210. The regulations require all dams to be designed for location, construction, operation, maintenance, enlargement, modification, removal, or abandonment of the structure.
Paragraph (b) requires that surface drainage which may cause erosion to the coal processing dam be controlled through the diversion of 100-year, 24-hour precipitation event. The diversion of the 100-year, 24-hour event is appropriate for permanent structures or structures which can constitute hazards to people, property, and the environment. (Canada DEMR, 1977, pp. 95–98; National Coal Board, 1970, p. 121. See also ASCE, 1972; Canada DEMR, 1972; Casagrande and McVey, 1970; Coalgate and others, 1973; Davis and Sorenson, 1969; Glover, 1971; Henderson, 1969; Hejilek and Cassidy, 1975; Nunenkamp, 1972a; Terzaghi, 1943; USMESA, 1975, pp. 8.80–8.84. See also USDA, 1976.)

816.93 Coal processing waste: Dams and embankments: Site preparation.

Paragraph (a) of Section 816.92 requires clearing, grubbing, and removal of organic and other combustible material, a standard construction practice for satisfying the commenter's concern. All diverting structures were designed to comply with the requirements of Section 816.43. Diversions that divert upstream drainage from impoundment areas shall be designed to carry the runoff from a 100-year, 24-hour precipitation event. The diversion of the 100-year, 24-hour event is appropriate for permanent structures or structures which can constitute hazards to people, property, and the environment. (Canada DEMR, 1977, pp. 95–98; National Coal Board, 1970, p. 121. See also ASCE, 1972; Canada DEMR, 1972; Casagrande and McVey, 1970; Coalgate and others, 1973; Davis and Sorenson, 1969; Glover, 1971; Henderson, 1969; Hejilek and Cassidy, 1975; Nunenkamp, 1972a; Terzaghi, 1943; USMESA, 1975, pp. 8.80–8.84. See also USDA, 1976.)
the final rules before the Chief of En-
gineers would concur as required in Sec-
tion 515(d) of the Act. Alternatives for
small reservoirs and runoffs were con-
sidered but rejected because of per-
cived need for prudence in designing
a structure that has such a high po-
tential for creating damage and harm
to downstream areas.

Paragraph (a) contained in SCS design
criteria and modified by Section
818.83(a)(2) are taken from stand-
ards currently used by various State
and Federal agencies for construction
and long-term analyses. (Canada
DEMB, 1977, pp. 76-101; National
Sewer Board, 1970, pp. 119-121; USMESA,
1975, pp. 5.142-5.144. See also Alger-
missen, 1969; Bishop, 1965; Busch and
others, 1974; Busch and others, 1975;
Canada DEMB, 1972; Casagrande and
McIver, 1970; Casagrande, 1973; Ceder-
gren, 1967; Griffths and King, 1965;
Harr, 1962; Hirschfeld and Paulos,
1973; Kealy and Soderberg, 1969;
Kealy and Williams, 1970; Kealy and
Williams, 1973; Lambe and Whitman,
1951; Lambe, 1955; Marks, 1973; Morgenstern
and Price, 1965; Newmark, 1965; Sherard
and others, 1963; Taylor, 1948; Ter-
zaghi and Peck, 1967a; Terzaghi, 1943;
Taylor, 1937; USBR, 1973; USDA, 1973a;
USMESA, 1976b; USDA, 1976a; USNSD,
1971; USCSS, 1968; Whitman, 1969;
and Wiggert, 1972; Newmark, 1965;
Sherard and others, 1963; USACOE,
1965; USBR, 1973; USDOT, 1961, 1965,
1971, 1975; USMESA, 1976b; USCSS,
1965; and Wiggert, 1972; Newmark, 1965;
Sherard and others, 1963; USACOE,
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1965; and Wiggert, 1972; Newmark, 1965;
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Sherard and others, 1963; USACOE,
1965; USBR, 1973; USDOT, 1961, 1965,
1971, 1975; USMESA, 1976b; USCSS,
1965; and Wiggert, 1972; Newmark, 1965;
Our analysis could not be completed due to the complexity and volume of the text. However, we can provide a sample of the text for your review:

"...the freeboard is still required above this elevation (Ifft, 1978a)."

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fugitive dust. The proposed regulations mandated fugitive dust control plans for operators in the first instance. Commenters added that the regulatory authority should "approve or disapprove" control plans rather than ".design a fugitive dust control plan which meets the criteria of the regulations. This is consistent with Sections 508(a)(9) and 510(a) of the Act, which state that the applicant has the initial burden of specifying the steps to be taken to comply with applicable air quality laws. Should the applicant fail to submit an adequate fugitive dust control plan the regulatory authority is authorized to specify necessary measures. This is consistent with Section 510(a) of the Act which provides that the regulatory authority is authorized to "...grant, require modification of, or deny..." (emphasis added) an application for a permit based upon the requirements of the Act and regulations.

(2) Commenters suggested that fugitive dust control measures should be included under Section 760.15, permit requirements, rather than Section 816.55, performance standards. Section 816.55 establishes minimum, performance standards for surface mining activities as required under Section 510(a) of the Act. The required performance standards must be complied with during all phases of surface coal mining and reclamation operations. Permit application requirements are designed to allow the regulatory authority to evaluate whether the proposed operation meets the requirements of the Act and regulations. The structure of the air quality regulations, which includes an ongoing monitoring program, envisions additions and adjustments in fugitive dust control measures which can most appropriately be made in the context of required performance standards rather than permit application requirements.

(3) Commenters said the language of Section 816.55(b) suggested that all 20 specified fugitive dust control measures must be employed. Commenters suggested language which would accord such measures the discretionality rather than mandatory. The proposed regulations mandated fugitive dust control measures, depending upon applicable air quality standards, climate, existing air quality, size of the operation, and type of the operation. The Office was not proposing that all 20 fugitive dust control measures be required in every case. In particular, regarding the control of fugitive dust from haul roads, some of the measures are obviously mutually exclusive. See Section 816.55(b)(2) and (3). The final regulations have been modified to clarify any potential ambiguity in the language. Fugitive dust control measures listed in Section 816.55(b) and (c) are required only, as necessary, to meet the criteria of Section 816.55(a) and (b).

(4) Commenters suggested that periodic water applications should not be specified according to a quantitative standard. The Office has accepted this suggestion, to allow the regulatory authority the discretion to prescribe the minimum quantities of water according to the criteria of Section 816.55(a) and (b). The regulatory authority is given the flexibility to establish a quantitative standard or other methods to control fugitive dust from haul roads.

(5) Commenters suggested that chemical stabilization of unpaved roads should not include the requirements to mix dust with lime as an alternative. The Office has decided to modify this suggestion, to allow the operator the option of using crusting agents which may only penetrate the surface portion of the roadway.

(6) Some commenters further suggested that the planning phase is not a cost effective method for controlling fugitive dust. The Office has decided to retain and the planning section of the regulations for the following reasons:

(a) Roads are the major source of fugitive dust from surface coal mining operations, and generally are responsible for twice as many emissions as the next source. PEDCO Report at 65 (1975). When heavy vehicles, especially heavy multi-wheeled vehicles travel over an unpaved road, the force of the wheels on the road surface cause pulverization of surface material. Particles are lifted and dropped from the rolling wheels, and the road surface is efficiently disturbed in a turbulent shear with the surface. The turbulent wake behind the vehicle acts on the road surface after the vehicle has passed. Minn. at 11.3-1 (1976). Because of the pulverization of particles, major portions of haul and access road dust can remain suspended in the ambient air, and portions of the dust can fall within the range of inhalable and respirable particulate matter (PEDCO Report at 58 (1975)). Health Effects Considerations for Establishing a Standard for Inhalable Particulate 1-14 (1976); Morrow, at 83 (1973)). Un-controlled fugitive dust from roads can thus pose a danger to public health and safety and the environment.

Several commenters contend that, regardless of impact, to build a paved haulroad system is impractical. The Office believes that paved haulroads should be an available fugitive dust control measure to be considered along with other available measures to control road dust under the criteria of Section 816.55(a) and (b).

The final regulations establish reasonable criteria to be utilized in determining necessary fugitive dust control measures. Under the Act, the size and type of operation, climate, existing air quality, and air quality standards are used to determine appropriate criteria for determining necessary control measures. Based upon these criteria, a Western surface coal mine with an extended production life presents a particularly challenging case for a long-term permanent fugitive dust control measures than periodic waterings of haul roads. The paving of roads is estimated to have a 90 to 95 percent control efficiency. (PEDCO Report at 116 (1976). Moreover, it led haul roads, in some instances, to create an increased danger to public health, especially those from road dust. (PEDCO Report at 110 (1976). Thus, when compared with the control efficiencies of other fugitive dust measures, the paving of haul roads warrants consideration during the planning of surface mining activities.

(7) Commenters suggested that the requirement to promptly remove coal, rock, soil, and dust-forming debris from roads should be limited to paved roads. The Office has decided to retain the language of the proposed regulation. The intent of the regulation is to reduce fugitive dust from both paved and unpaved roads.

Paved roads with heavy layers of dust are not effective in controlling fugitive dust from heavy multi-tired vehicles. Such dust should be promptly removed to maintain the paved surface. It led haul roads, in some instances, to create an increased danger to public health, especially those from road dust. (PEDCO Report at 44-49 (1976). Under such circumstances, it may also be impractical to require the prompt removal of this material.

(8) Commenters suggested that Section 816.55(b)(5) should be rewritten to clarify the requirement to restrict the speed of vehicles to control fugitive dust. The Office has accepted this suggestion. The quantity of dust emissions from a given segment of unpaved road varies linearly with the volume of traffic. In addition, emissions depend upon average vehicle speed. Field tests have shown that emissions are directly proportional to vehicle speed. (Minn. 11.2-1 (1976). If properly enforced, speed control regulations can reduce fugitive dust from roads. (Minn. 11.5-4 (1975).)

(9) Other commenters suggested that the requirement to stabilize the areas adjoining roads should be deleted. The Office has retained this fu-
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76-84 (1976), Identification of a Feasible Regulation for Controlling Fugitive Dust Emissions, Appendix at 2-4. (undated).

(13) Some commenters suggested that orienting mining piles so as to place temporary spoil piles or ridges perpendicular to prevailing winds to reduce wind erosion is impossible. According to them, the orientation of the pit is always determined by such factors as the variability in the mining operation. Other commenters suggested that orientation according to the proposed regulation could increase rather than decrease emissions. This requirement has been deleted in the final regulations. Close observation of coal mining operations, such as pick-up trucks associated to them, legitimate mining activities, such as loading trucks and railroad cars, thereby significantly reducing fugitive dust from surface coal mining and reclamation operations to effectively control attendant air pollution. As has been stated previously, the phrase "surface coal mining and reclamation operations" is defined broadly in the Act. This phrase clearly covers the use of haul trucks and railroad cars to the extent necessary to carry out the purpose of the Act.

The Office has decided to retain this control measure in the final regulations. Minimizing the area of land disturbed, by careful planning, is an effective fugitive dust control measure consistent with Section 515(b)(4) of the Act. This section requires that operators stabilize and protect all surface areas affected by such efforts. Other commenters suggested that this section is beyond the authority of the Clean Air Act. With the projected increase in coal production and attendant fugitive dust emissions, the regulatory authority is able to require, as necessary, the restriction of activities during periods of acute air pollution.

Commenters added that the Office should have more detailed monitoring regulations, specifying the required data and methodology.

Further, Section 515(b)(4) is not limited to land surface. The Act requires that soil air pollution from "all surface areas" affected by such operations must be controlled. Even assuming that Section 515(b)(4) of the Act is limited to land surface, to adequately monitor and protect public health and property from fugitive dust, control of attendant air pollution from transportation facilities is necessary.

(12) Other commenters suggested that the requirement to use alternatives for coal handling methods, restriction of dumping procedures, and wetting of disturbed materials during handling and compaction of disturbed areas was unduly vague. The Office has decided to retain the language in the final regulations, to provide operators and the regulatory authority the flexibility to select from a mix of fugitive dust control measures to meet criteria of Section 816.95, namely, in the final regulations, the same commenters said such flexibility was essential to take into account site specific conditions and promote innovative control techniques. Identification of a Feasible Regulation for Controlling Fugitive Dust Emissions, Appendix at 2-4. (undated).

(14) Commenters said that requiring conveyor systems, in lieu of haul trucks; and the covering of conveyor systems is beyond the authority of the Act and not feasible. Another commenter submitted photographs of a covered conveyor system for loading coal at Gulf Oil's McKinley Mine in Gallup, New Mexico. According to the commenter, these photographs, coupled with other submitted photographs, graphically show that major sources of fugitive dust can be effectively controlled.

The Office has retained this control measure in the final regulations. Conveyor systems may be used to transport material from the active mining area to the processing area or to deliver the processed material to the consumer. (PEDCO Report at 57-62). Closed conveyor systems can reduce or eliminate the need for haul trucks and rail cars, thereby significantly reducing fugitive dust from surface coal mining and reclamation operations. Effective conveyor systems are now in use at Gulf Oil's McKinley Mine in Gallup, New Mexico and Amax's Belle Ayr Mine in Gillette, Wyoming. (15) Further, a commenter suggested that the requirement to minimize the area of disturbed land should be deleted. This comment was rejected. Prompt reclamation is effective for controlling fugitive dust, by reducing the source of dust. Where We Agree at 207 (1977). Identification of a Feasible Regulation for Controlling Localized Fugitive Dust Emissions, Appendix at 2 (undated).

(16) A few commenters suggested that the planning of special windbreak material would probably be ineffective in controlling fugitive dust. The Office has decided to retain this control measure in the final regulations. Wind can contribute to all of the mining fugitive dust sources. Diverse forms of windbreaks such as tall grasses, or grains adjacent to exposed areas can be appropriate control measures. (Identification of a Feasible Regulation for Controlling Localized Fugitive Dust Emissions, Appendix at 1-4 (Undated)).

(17) Some commenters suggested that restricting the area to be blasted at any one time to reduce fugitive dust is impractical. This control measure has been retained in the final regulations. The shock fugitive dust load emitted by the blast can be reduced by limiting the area blasted at any one time. (PEDCO Report, 33-36 (1978)).

(18) Commenters suggested that the requirement to extinguish any areas of burning coal should be deleted as impractical and inconsistent with the Clean Air Act. This control measure has been retained in the final regulations. The regulatory authority should require this measure consistent with applicable episodic air stagnation plans approved under the Clean Air Act. With the projected increase in coal production and attendant fugitive dust emissions, the regulatory authority is able to require, as necessary, the restriction of activities during periods of acute air pollution.

Commenters added that the Office should have more detailed monitoring regulations, specifying the required data and methodology.

Under the final regulations, monitoring becomes the central tool to judge the efficiency of the fugitive dust control program approved by the regulatory authority. An adequate monitoring program will not only signal the need for additional measures at the site, but also guide the regulatory authority in approving subsequent fugitive dust control plans. A monitoring program is mandatory for all Western surface mining activities with production levels in excess of one million tons per year. This assures that the majority of Western surface mines will be monitored.

(19) Commenters suggested that the requirement to extinguish any areas of burning coal should be deleted as spontaneous combustion of coal may be a function of water content which could be aggravated by this measure. This Section of the regulations has been retained. To the extent that water aggravates spontaneous combustion of coal, methods other than wa-
ter may be authorized including layering and compaction, placement of day seals, and digging out “hot spots.” See 30 CFR Section 816.36.

(20) The restriction of fugitive dust at spoil and coal transfer and loading points with water sprays and other devices to prevent additional fugitive dust that, when applied to mobile sources such as draglines and shovels, according to some commenters. This Section of the regulations has been retained. Such control measures may be appropriate for regulating fugitive dust from draglines and shovels. For example, a simple water spray device can reduce fugitive dust from such operations. Identification of a Feasible Regulation for controlling Localized Fugitive Dust Emissions, Appendix at 3 (undated); PEDCO Report at 57-71 (1976).

(21) A few commenters suggested that Section 816.35(c) should be modified, to allow the operator to show that control measures in Section 816.3(b) should be required because the standard was caused to be violated in part by non-mine related sources. Other commenters suggested that the regulatory authority should have a mandatory discretion to require additional measures should a violation of air quality standards occur. Commenters suggested that the operator should have the discretion to apply additional fugitive dust control measures.

This phrase was reworded to provide the regulatory authority with the discretion to require additional measures and practices, as necessary, when the regulatory authority determines that the application of fugitive dust control measures listed in Paragraph (b) is inadequate. Under this regulatory scheme, additional measures beyond those listed in Section 816.35(b) may be required, even though all measures in Section 816.35(b) have not been implemented. The monitoring program, if required, should be designed to identify the effectiveness of existing fugitive dust control measures and the need for additional control measures under this section of the regulations.

Some commenters suggested that the monitoring requirement should be deleted from the regulations and left to EPA. Other commenters suggested that monitoring should be mandatory at all sites, be they Eastern or Western, surface or underground. According to such commenters, monitoring is necessary to verify and assure maintenance of air pollution control requirements. Commenters added that the Office should have more detailed monitoring regulations specifying the required data and methodology. Under these regulations, monitoring becomes the central tool to judge the efficiency of the regulatory authority’s approved fugitive dust control program. An adequate monitoring program will not only signal the need for additional measures at the site but also guide the regulatory authority in approving subsequent fugitive dust control plans. A monitoring program is mandatory for all Western surface mines that produce more than one million tons of coal per year. This assures that the majority of Western surface mines will be monitored.

The Office appreciates the need for additional guidance regarding the requirements for an adequate monitoring program. In cooperation with EPA, the Office may formulate and release a guidance document to assume: (a) adequate data are collected to evaluate the effectiveness of fugitive dust control measures and (b) state regulatory authorities have sufficient criteria for approval of monitoring programs.

§ 816.97 Protection of fish and wildlife.

The final regulations relative to fish and wildlife have two basic premises: The operator is required to (1) use the best technology currently available (BCTA) to minimize disturbances and adverse impacts on fish, wildlife, and related environmental values and to enhance those values where practicable (Section 515(b)(24) of the Act), and (2) to restore the land affected to a condition capable of supporting those uses or better uses, than it was capable of supporting prior to mining (Section 515(b)(2) of the Act). For purposes of this Section, the Office has construed “related environmental values” to include all the elements of the environment upon which fish and wildlife resources depend, including air, water, food sources, cover, and the space they occupy. Collectively, these components comprise fish and wildlife “habitat.”

If disturbances and adverse impact on fish and wildlife are to be minimized, and the land capabilities to support fish and wildlife restored, then monitoring assessments and conditions must be established. This will be accomplished through documentation resulting from the fish and wildlife information (studies) required by Section 779.20 and the fish and wildlife plan required by Section 780.16. The preamble discussions supporting Sections 779.20 and 780.16 are incorporated herein by reference. Section 816.97 addresses the issues of fish and wildlife which are important to a habitat critical to the survival of a threatened or endangered species. A State conservation department stated that those agencies should determine the “best technology currently available” (BCTA). The Office has responded, by incorporating into Sections 779.20 and 780.16 a requirement that the regulatory authority consult with the State fish and wildlife agency. Under these regulations, fish and wildlife resource information and plans. Section 786.17(a) further strengthens the fish and wildlife agency role by allowing a
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review of the adequacy of the applicants' fish and wildlife plan.

2. A commenter questioned the authority of the Office to protect golden eagles; once reared, the eagle is protected by the regulatory authority. Golden eagles are protected by the Bald Eagle Protection Act, as amended, (16 USC 668-668c). Eagles, as well as nests, must be protected by the Bald Eagle Protection Act. See sections 201, 202, and 303 of the Act. Protection of eagles is integral to the regulatory authority's responsibility to assure compliance with the Bald Eagle Protection Act. See sections 201, 615(8)(24), 702 of the Act.

3. Commenters expressed major concern that the proposed regulations covering transmission lines and facilities were too broad, thereby including facilities over which operators have no control. The Office has changed the language of the rule, to limit the definition of "lines and facilities used for or incidental to surface mining activities." Commenters said that telephone lines should not be deleted from the Section since they pose no electrical hazard. It is true that, while some birds are killed or injured in collisions with telephone lines, electrocution is a primary threat to birds (Moore and Mills, 1977, p. III-112, 136). However, the regulatory authority may use the persistent pesticides. Examples which may warrant use of persistent chemicals might be the control of noxious plants which threaten to suppress desired vegetation, stabilize steep slopes. Accordingly, the Office has changed the regulation more in line with the language of the Act.

4. Most commenters said the fencing requirements, as well as the prohibition on new barriers, were unnecessary. The Office maintains that fencing may reduce the adverse impacts on migrating wildlife, by steering wildlife away from hazardous road traffic and into safer passageways. Furthermore, new barriers should not interfere with traditional migration routes (Moore and Mills, 1977, p. III-113; Spaulding and Ogden, 1968, p. 12). The Office agrees that this change brings the regulation more in line with the language of the Act.

5. Commenters objected to the provision requiring fencing to exclude "fauna" from ponds containing toxic-forming materials. Deletion of the Section was considered and rejected, because toxic substances are hazardous to wildlife (Moore and Mills, 1977, p. III-112, 136; Spaulding and Ogden, 1968). "Fauna" was changed to "wildlife," thus accommodating the commenter's concern. The intent of the regulation is to exclude the higher forms of wildlife, such as deer. Moreover, the regulation specifies ponds containing "hazardous concentrations" of toxic-forming materials. Thus, not all ponds would require fencing. Sections 515(b)(10) and (24) of the Act provides ample authority to require this technology to minimize adverse impacts on wildlife.

6. Commenters suggested adding language to this Section to require enhancement "where practicable." The Office agreed with the suggestion, which makes the provision consistent with the language of the Act.

7. With reference to Section 780.16, a commenter suggested that the term "unique" was not a proper modifier of "habitat." The Office has determined that the original use of the word "unique" was meant to connotes habitats that have "unusually high" value for fish and wildlife. Accordingly, the Office has deleted the requirement from the final regulations.

8. A commenter suggested the words "where practicable" be added after "enhance" relative to riparian vegetation. The Office has determined that this is a subjective term, the Office is relying on the consultation process between the regulatory authority and the appropriate fish and wildlife agencies to establish, on a case-by-case basis, what an "unusually high" value for fish and wildlife. Accordingly, the Office accepts the recommendation and has changed the term "unique," to "unusually high," in this Section, and wherever it applies in fish and wildlife regulations. The Office has deleted the requirement from the final regulations.

9. Commenters objected to a provision which would require operators to advise their permanent and contractual personnel of laws pertaining to fish and wildlife. The Office has deleted this provision from the final regulations.

10. Section 816.97(d)(7) of the proposed regulations was deleted pursuant to the rational presented for Section 816.97(d)(6) above.

11. The proposed regulations (former Section 816.97(d)(9) contained a provision which would require operators to advise their permanent and contractual personnel of laws pertaining to fish and wildlife. Commenters objected to that requirement. Most felt it was not founded in the Act, was unreasonable, and placed an inordinate responsibility on operators. The Office essentially agrees. Mine operators may be responsible for illegal actions of their employees, but each individual is responsible for knowing and abiding by all laws. The Office has deleted the requirement from the final regulations.

Suggestions were made that the regulations require streams to be restored to an environmentally-acceptable gradient and that fish and wildlife habitat be restored. Commenters from the Western United States and recommended that the provision be deleted; and specific requirements for avoidance or restoration of both intermittent and perennial streams be addressed in the hydrology sections (Sections 816.44 and 816.57). The Office agrees and the changes have been made in the permanent regulations. This Section and Sections 816.44 and 816.57 afford strong protection for streams and their aquatic communities.
13. Commenters wanted changes in regulations to allow the use of fire as a forest or range-management tool. Since the purpose of the proposed regulations was to control wildlife, the Office sees no inconsistency by permitting controlled burning. The Office recognizes that foresters, biologists, and range managers do use fire as a management tool, and foresees uses of controlled burning of mine reclamation areas to control unwanted vegetation and to reduce competition for desired plant species. Accordingly, the Office has changed the regulations to permit the regulatory authority to approve controlled burning as a part of the management plan.

14. A commenter desired clarification of the language regarding vegetation. In particular, the commenter said plants used on reclaimed areas need only provide food or cover for fish and wildlife, not both. The Office agrees that clarification is needed. The Office's intention in that regulation is that a plan be useful as a source of the food or cover necessary for conservation of the wildlife habitat. Therefore, the use of "where practicable" is not applicable.

15. Another commenter requested that "where practicable" be inserted before "enhance" in Section 816.97(d)(11)(i)(C) of the proposed regulations. The Office has construed the section that approved by the regulatory authority as food or cover for wildlife to be an enhancement of the wildlife habitat. Therefore, the use of "where practicable" is not applicable.

16. A commenter suggested that, in rocky, semi-arid areas, the placement of large rocks on the surface in areas of anticipated excessive runoff to control erosion and improve cover for wildlife should be allowed. The Office rejected this on the basis of determination that it conflicts with the provisions of Section 515(b)(3) of the Act.

17. Some commenters were concerned about the desirability of exotic plant species for wildlife. Those concerns are accommodated by language in Section 816.112 which requires that exotic plant species will have been field-tested and proven to have desired qualities, and that they be compatible with the plant and animal species already established in the area. This provision should prohibit the use of plants poisonous to wildlife or which could be locally or otherwise outcompete desirable plant and animal species.

18. Concerning enhancement of row crops for wildlife, by requiring that fields be surrounded with wildlife habitat, most commenters questioned the Office's authority to require a landowner to enhance land for wildlife, especially when the proposed postmining land use is to be agriculture. Moreover, it was pointed out that in some precipitation ranges, the proposed rule would require row crops which would not be appropriate. This, in effect, would have forced the landowner to reduce crop production. The Office agreed with these arguments and has changed the regulation to require enhancement for wildlife only on croplands farmed on lands diverted from premining wildlife habitat. The Office believes that requirement to be consistent with the intent of Section 515(b)(24) of the Act.

19. A commenter urged the Office to retain the strong protection afforded wetlands. Provisions relative to wetlands were maintained as proposed.

20. A commenter stated that the proposed rule's requirement for greenbelts on lands where the primary use was to be residential, public service or industrial, be modified, to take into account the size of the mined area, and surrounding operations. The Office agreed that this suggestion has merit. For example, a greenbelt would not be compatible with an airport, since wildlife attracted to the greenbelt might collide with aircraft, causing a threat to human life. The Office has modified the final rule, to allow omission of greenbelts, where they are inconsistent with the approved postmining land uses.

21. Another commenter recommended a provision requiring a fish and wildlife monitoring program. The Office accommodated this concern by including monitoring provisions in the fish and wildlife plan requirements. The Office has made no change.

22. A commenter urged the Office to remove the regulation to permit the regulatory authority to approve controlled burning as a part of the management plan.

§ 816.100 Contemporaneous reclamation.

This Section sets forth requirements applicable to all phases of reclamation activity. Authority for this Section is found in the Act in Sections 102, 201, 501, 503, 504, 507, 508, 509, 510, and 515. Reclamation activities, including, but not limited to, basic filling and grading, topsoil replacement, and revegetation of all land that is disturbed by surface mining activities must occur as contemporaneously as practicable with mining activities.

The Office considered an alternative approach of attempting to quantify the term "contemporaneously", for all activities and to enumerate maximum delay periods after which, if an activity has not been undertaken, this standard would be breached. This alternative approach was rejected, in favor of general language. The alternative selected should allow the regulatory authority the necessary flexibility to approve mine plans with varying reclamation timetables, based on specific site conditions. No major issues were raised by comments regarding the proposed language of this Section.

§§ 816.101-816.105 Backfilling and Grading.

Sections 816.101-816.105 are regulations for backfilling and grading of areas disturbed by surface coal mining operations. Disturbed areas are to be reshaped to approximate original con-
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tour, in a manner that minimizes ero-
sion and water pollution and prevents
slides. A level of surface productivity
equal to that attained prior to mining
and under proper management is to be
achieved on the restored area. Confor-
mity for these Sections is Sections 102,
201, 501, 503, 504, 506-510, and 515 of
the Act.

Literature used in writing these Sec-
tions is included in the following Sec-
tions of this preamble relating to:
(a) Change the wording of the Sec-
tion to read: "Rough backfilling and
grading shall follow coal removal by
not more than 60 days or 1200 linear
feet."
(b) Retain the proposed wording the regu-
lation.
(c) Leave the matter to the discre-
tion of regulatory authority.
(d) Change the distance requirement to
1500 linear feet.
(e) Shorten the time period from 60
days to 30 days.

The Office chose to retain the 60
day time limit for backfilling and grad-
ing on contour mining operations and
to increase the linear distance to 1500
feet, to provide additional work space
for haulage ramp construction and
other mining operations. The time-
frame is more stringent than the time-
frames set by the regulations of sev-
eral States (i.e., Kansas, Montana, Ohio,
Pennsylvania, and Tennessee) and less
stringent than several others (i.e., Illi-
nois, Kentucky, and Missouri).

It was argued by some that the time
requirement should be reduced to 15
days following coal recovery or 45 days
following land disturbance. These sti-
pulations were identical to the existing
requirements of Kentucky. The Office
rejected these comments because it
was believed that safety in the mine
area would be jeopardized by requiring
backfilling and grading within a few
hundred feet of the coal removal op-
eration. The requirement also would
impair coal recovery from certain coal
deposits such as pitching seams or
thick overburden. Since no spoil can be
placed on the overburden, any oper-
ations will be depositing spoil as close
as possible to the coal removal phase
in order to minimize spoil haulage dis-
tances. The additional flexibility also
is reasonable to handle unexpected
delays or weather-related equipment
failure. The Office believes this time
period to be a reasonably prescribed
time limit for reshaping the area,
giving full consideration to weather
conditions, while at the same time
minimizing environmental degrada-
tion.

The size of the ungraded area for
contour mining would be restricted by
the 1500 linear foot requirement. Sev-
eral commenters argued convincingly
that severe operational constraints
would be levied on the operator by the
proposed 1000 linear foot requirement.
With this restriction, safety in the pit
would be impaired. It would also result
in overburden and coal removal, con-
struction of haul roads and regrading
operations would be confined to this
restricted, high-intensity work area.
It also was stated that the original 1000
linear foot requirement would adverse-
ably impact the quantity of coal uncov-
ered at any one time. Should a major
piece of overburden handling equip-
ment breakdown, operators would be
unable to meet their contract require-
ments. The final regulation is similar
to Kentucky and West Virginia regu-
lations and exceeds the distance require-
ments set in Wyoming regulations.
The standard is necessary and reason-
able to minimize water degradation
and expedite rehabilitation of the dis-
turbed area, while also giving consid-
eration to operational logistics. The regu-
ulatory authority may grant additional
additional time for rough backfilling and
grading on contour mining operations if
the permittee can demonstrate through a
written analysis that additional time is
needed.

1. OSM believes that incremental
cuts for open pit mining (Section
816.101(a)(2)), in areas of thin over-
burden, create site-specific problems
both with environmental protection
and coal-removal operational con-
straints, when a time frame for rough
backfilling and grading is not ade-
quately defined. The regulatory authority, when
approving a time schedule as specified in the regulations, needs to be specifi-
cally mindful of the environmental significance of the schedule, as well as the
operational need of the mining ac-
tivities. No issues were raised regard-
ing this regulation.

3. Commenters stated that the time
and distance requirements for rough
backfilling and grading (Section
816.101(a)(3) of the proposed regu-
lations) were too stringent. According to
commenters, during extremely cold
weather, area strip mines in northern
States can have frozen spoil ridges. Snow and ice in troughs, if covered,
later thaw and produce an undulated
surface where the previously frozen
material settled. Additional delays
may result from adverse geologic and
climatic conditions in any area mining
within two spoil ridges.

The following alternatives were con-
sidered:
(a) Require backfilling and grading
within two spoil ridges.
(b) Retain the language of proposed
Section 816.101(a)(3) which required,
backfilling and grading within 90
days following coal removal and limit the
number of spoil ridges to four.
(c) Increase the time allowance.
(d) Allow exceptions by the regula-
tory authority, based on written analy-
theses submitted by the permittee.

The intent of the Act is to compel
reclamation as "contemporaneously as
practicable" (Section 515(b)(10)). "For
as possible" (Section 102(e)). If it
is necessary to establish a maximum
time limit for backfilling and grading,
to insure that toxic-forming material
in the spoil will not remain exposed to
surface runoff over an indefinite
period of time.

One comment suggested backfilling
and grading be required within two
spoil ridges of the active operation. It
was their concern that the four-spoil
ridge requirement of the proposed regu-
lations did not encourage sufficiently
contemporaneous reclamation. This
comment was rejected, because of cli-
mato:logical and operational problems.

In order to prevent the harmful
environmental consequences noted
above, the Office has decided that the
time span for rough backfilling and
grading be increased to 180 days, be-
cause the regrading and stabilization
problems encountered during ad-
verse weather conditions in many
Western and Central state regions.
The Office further believes that addi-
tional latitude is necessary to permit
certain pit configurations to be operat-
ed under particular constraints, such as
type of equipment utilized and gen-
eral boundaries of permit and outcrop
areas. (Final EIS, 1979, pp. BII-41-56).

The regulatory authority may allow
additional time if the permittees can
show, through detailed analysis, that
time limitations are too restrictive be-
cause of weather and local soil condi-
tions. In no case shall backfilling and
grading be delayed longer than re-
quired by existing State standards.
In addition, the requirement that
the maximum number of spoil ridges be
limited to four will insure that large
area mines will be reclaimed in a
manner that limits the disturbances of
the hydrologic balance, as required by Section 515(b)(10) of the Act. For unusual mining or weather conditions, the regulatory authority may grant additional time for backfilling and grading, if the permittee can demonstrate that it is necessary.

4. Section 816.101(b) sets forth the requirements for backfilling and grading of the disturbed areas. Paragraph (b)(1) states that lands must be backfilled and graded to approximate original contour, in accordance with Section 515(b)(3) of the Act. The Office chose to retain the proposed language of Section 816.101(b)(1). In order to conform to the language of Section 515(b)(3) of the Act that provides that all spoil shall be “graded to eliminate all highwalls, spoil piles and depressions.”

The Office recognized these unique situations during the Interim program at page 52864, Federal Register, December 13, 1977.

“Box cut spoils should be limited in amount and in land area affected and should be graded to blend into the surrounding terrain. The concept of approximate original contour allows return of all spoil to a mine, when the result is a higher elevation that blends with the surrounding terrain.”

The Interim program further sets forth at the same page as above, four provisions which must be satisfied, if special treatment of box cut spoils is allowed in accordance with other requirements, such as topsoil removal and grading of the mined area to approximate original contour; (2) the box cut spoils also are graded to approximate original contour or to the lowest practicable grade; (3) the reclamation achieves an ecologically sound land use compatible with the surrounding region; and (4) other provisions pertaining to spoil handling in all types of mining.

The Office recognizes that provision (4) cannot be satisfied by these operations if the excess spoil requirements are enforced. The Office believes that the regulatory authority should have the discretion to establish the final provisions for the disposal of box cut spoil with the above four requirements as the minimum standard. In addition, the Office believes that additional provisions must be stipulated to insure that this exception is not misinterpreted in applications to: (1) any excess spoil, including box cut spoil, which is deposited on lands satisfies the slope angles specified in the (30 CFR 701.5) regulations; (2) valley fills and stockpiles of exploration spoil; and (3) the grading of box cut spoil with the above four factors.

The Office recognizes that provision (4) cannot be satisfied by these operations if the excess spoil requirements are enforced. The Office believes that the regulatory authority should have the discretion to establish the final provisions for the disposal of box cut spoil with the above four requirements as the minimum standard. In addition, the Office believes that additional provisions must be stipulated to insure that this exception is not misinterpreted in applications to: (1) any excess spoil, including box cut spoil, which is deposited on lands satisfies the slope angles specified in the (30 CFR 701.5) regulations; (2) valley fills and stockpiles of exploration spoil; and (3) the grading of box cut spoil with the above four factors.

5. Several commenters objected to the use of the term “haul or convey”, when referring to the placement of spoil in fills, which is supported by provision (1). The Office recognizes that provision (1) must be removed prior to spoil placement. Within the required time or operating restrictions, the spoil is graded to blend in with the spoil from the second panel cut and the surrounding terrain. It was argued that this practice should be continued.

The Office identifies two distinct concerns with this practice. First, the box cut spoil is cast in a manner which requires the disturbance of lands outside the mine pit area. By definition, this class of spoil must then be classed as excess spoil, since they are not returned to the pit area. Because the spoil is dropped from the bucket of a dragline or shovel, and the topsoil is then removed, the spoil are not placed in layers and compacted as required by Section 515(b)(4) of the Act. The second problem is that, because of the progression of this type of mining, there is no spoil available to reclaim the final cut as specified by 30 CFR 816.101. The highwall must, however, be covered and the disturbed lands returned to the approximate original contour, in accordance with Section 515(b)(3) of the Act. The steep slope variances granted in Section 515(c) and those of Section 515(c) do not exempt operators from the requirement of eliminating the highwall.

6. Several commenters suggested the insertion of an additional Section which would permit the placement of the box cut spoil on unmined areas adjacent to the box cut. The spoil would be graded to blend into the surrounding terrain. Most dragline and overburden spoil operations in the Western and Central States “side-cast” the box cut spoil. Depending upon particular conditions, the topsoil must be removed prior to spoil placement. Within the required time or operating restrictions, the spoil is graded to blend in with the spoil from the second panel cut and the surrounding terrain. It was argued that this practice should be continued.

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poorly reclaimed by previous mining in accordance with one of the purposes of the Act (Section 102(h)). Some previously mined areas lack sufficient available spoil or topsoil to achieve postmining conditions which meet all the land configuration and revegetation requirements. Reclamation activities for such operations are required to meet the minimum standards for backfilling and grading, including postmining conditions which will provide adequate surface drainage, groundwater protection, and soil and vegetation on the bench and grading to completely eliminate the highwall and maintain a stable slope.

10. The regulations in Section 816.102(a) reflect the fact that premining slope measurements are required to take into account natural variations in slopes. In many cases it would be appropriate for the permittee to develop accurate topographic maps for an area prior to backfilling and to develop an overlay of the proposed postmining topography where that topography blends in with the surrounding terrain, reestablishes the surface drainage system, and reestablishes the approved postmining landuse. Then the final graded slopes would be specifically defined on the approved postmining topographic contour maps, where they may be reviewed as a whole.

The use of topographic maps, aerial photography, and other photogrammetric methods of measuring premining and postmining slopes is appropriate only when topographic maps and photographically-produced maps are of sufficient accuracy to ensure adequate measurements. Thus, while maps and photographs might be used in addition to, or in place of field measurements, the maps and photographs must be established by the permittee as accurate. Commonly-used professional engineering practices are suitable for slope measurements, and surveys could still be required by the regulatory authority as a result of these comments for several reasons. For example, if the permittee addresses the outslope for a terrace which will only be permitted with approval of the regulatory authority under the stipulation that the operator has provided adequate design provision for assured stability and the requirements in 30 CFR 816.102(a) are satisfied. It is OSM's intention that permission for leaving terraces will be an exception and not the general rule.

Secondly, to permit recommended slopes as proposed would violate the intent of Section 515(d) of the Act which establishes the slope requirements steep slope mining. The rationale for requiring a static factor of safety of 1.3 for steep slopes is found in the Preamble discussion for 30 CFR 826.12(b) and 30 CFR 826.15(a). The Office further believes that the safety of backfilled spoil is dependent upon the highwall stratigraphy, that is, overburden and immediately overlying strata are in their natural state highly susceptible to weathering and disintegration is subject to erosion or failure. A discussion of the stability problems inherent in disposal of shaly spoil is found in the Preamble for 30 CFR 816.74.

Finally, the Office has taken the position that compacted spoil layers and prescribed slope angles will not assure stability. Other influences such as foundation conditions and presence of water must also be taken into account. The commenters provided no technical data to support their recommendation.

15. Commenters recommended that OSM relax the requirements for stability and return to approximate original contour in Section 816.102(a). They contended that the heterogeneous nature of overburden made the analysis and safety design very expensive. The Office recognizes that analysis may be necessary to permit backfilling and grading operations to achieve the required slope stability, but OSM emphasizes the importance of the 30 CFR 816.102(b) (3), (4), (21), and (23) and 515(d) of the Act to mean that Congress intended that spoil instability problems characteristic of past mining activities be brought under control. In addition, the regulations in Section 816.102 discuss comments and rationale analogous to this comment and the reader is referred to those comments and the Act for additional discussion. The Office made no additional change as a result of these recommendations.

16. One comment was received which stated that an increased accident rate and equipment damage was incurred with the implementation requirements established in 30 CFR 816.102(b) and 816.102(c). The commenter offered no specific recommendation as to what action the Office should take, Operators may have to implement additional safety measures for the development and operation of backfilled areas and accidents do not occur. The Office has made no change to the regulations in response to the comment.

17. It was suggested by one commenter that portions of the highwall should be retained to provide habitat for raptors and other wildlife. This comment is rejected as being contrary to the congressional intent in Section 515(b)(3) of the Act. For additional discussion, the commenter is referred to the Preamble addressing 30 CFR 816.97.

18. One comment recommended that the Office should uniformly enforce the elimination of highwalls and allow for no administrative exemption to the permanent regulations. The Office did not intend to provide an exemption to highwall elimination for construction of a drainage facility, thus allowing a partially exposed highwall. The drainage facility must comply with 30 CFR 816.102(b)(3), which states that the construction of terraces may only be permitted if the highwall is eliminated.

19. Several commenters objected to limiting terrace width on backfilled areas. The Office chose to retain the proposed language of Section 816.102(b)(1), because the discussion of approximate original contour supports the use of terraces (Davidson 1974, p. 198) as long as the terrace is not used as an inappropriate substitute for construction of lower grades. The need to restrict terraces to those situations where breaks in the terrain are truly necessary must be emphasized (Coalgate et al., 1973, Fig. 18, p. 91). The Office believes that smaller diversion ditches are often more suitable than terraces for the control of water flow across graded
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slopes. Terraces are often viewed by industry as a means of access rather than for temporary control of erosion. Further, the terraces discussed in the regulations are those to be left after mining and regrading are completed. The Office does not intend that terraces be used for the purposes of controlling road access, unless approved in the postmining land use plan. It is the intent of this Section to require that disturbed watersheds be reclaimed to approximate original contour. The Act looks to the overall objective of the protection of the area and the general surface configuration, and indicates that the reclaimed area and any terraces used must conform to these criteria. Proposed terraces should have a well-defined role in supporting the approved postmining land use. The common practice of constructing small diversion ditches in the form of terraces on moderate slopes as an erosion control measure of the type proposed in these regulations, but such terraces should not lead to increased access to the area.

The purpose of the dimensional limits on terraces (Section 816.102(b)(3)) is to create land forms that ensure postmining land uses and provide erosion stability. Terraces are often used on valley fills and head-of-hollow fills to break-up otherwise uninterrupted slopes. Nonetheless, terraces and other types of fills constructed in this Section must be reviewed for suitability by the regulatory authority and must be constructed in a manner compatible with the postmining land use.

20. Several commenters objected to the requirement of Section 816.102(b)(3) that backfilled slopes have a 1.3 static factor of safety. The Office considered several alternative measures of slope stability and chose to retain the 1.3 measure because this factor is a commonly-accepted measure of safety. The static safety factor of 1.3 is based on the fact that failure of a section of land returned to its approximate original contour would result in some environmental damage, however, the damage usually would not be as extensive or significant as the damage from the failure of an excess spoil disposal fill. Regulatory authorities may specify higher safety factors when necessary, and permittees will then be responsible for design and construction calculations based on commonly accepted professional engineering practices. If it becomes necessary to specify methods, the Office would do so under these regulations.

21. Commenters objected to Section 816.103 that exposed coal seams, such as coal outcrop or coal seams of scientific value, should be exempt from the requirements of Section 816.103(a). The Office chose, however, that coal outcrop always be buried with 4 feet of cover. The permittee should identify those areas which will not be disturbed due to poor quality or will be left as a barrier to control stability and erosion in compliance with Section 515(b)(25) of the Act.

22. Commenters suggested that exposed coal seams, such as coal outcrop or coal seams of scientific value, should be exempt from the requirements of Section 816.103(a). The Office would automatically cover exposed coal seams. However, under these regulations, the Office considered the use of these materials to be major sources of acid-forming material. The Office considered these two techniques to be two of any number of methods which may be utilized to handle toxic materials. No change was made in the suggestion that permittees to analyze and treat or bury coal processing wastes. The Office believes that the language of Section 816.103(a)(3) be changed to insure protection against acid seeps from the reclaimed mine pit and other acid-forming materials. Concern was expressed that a blanket cover of 4 feet may not be adequate to prevent the formation of acid water or encourage the support and survival of revegetation efforts. It has been stated that spoil banks reclaimed with the proper intentions can cause acid-forming or toxic-forming materials, or if overburden analysis identified zones containing critical levels of toxicants (De spard, 1974, p. 4), then additional requirements to insure their isolation should be required (Gast, 1976, pp. 9-10).

23. Commenters suggested that exposed coal seams, such as coal outcrop or coal seams of scientific value, should be exempt from the requirements of Section 816.103(a). The Office chose, however, that coal outcrop always be buried with 4 feet of cover. The permittee should identify those areas which will not be disturbed due to poor quality or will be left as a barrier to control stability and erosion in compliance with Section 515(b)(25) of the Act.

24. Commenters suggested that exposed coal seams, such as coal outcrop or coal seams of scientific value, should be exempt from the requirements of Section 816.103(a). The Office would automatically cover exposed coal seams. However, under these regulations, the Office considered the use of these materials to be major sources of acid-forming or toxic-forming materials, or if overburden analysis identified zones containing critical levels of toxicants (De spard, 1974, p. 4), then additional requirements to insure their isolation should be required (Gast, 1976, pp. 9-10).
toxic-forming material. The Office choose to change the language of the regulation to require the placement of more than 4 feet cover to protect against the formation of acid or toxic seeps and require special compaction and isolation of toxic material from groundwater contact.

25. The intent of Section 816.103(b) is to provide the regulatory authority with a basis for establishing site-specific requirements to assure stability of backfilled materials, selective placement and stability of backfilled material, and selective placement and compaction of backfill material when necessary to prevent erosion and leaching of toxic substances into surface and subsurface water.

26. Several commenters objected to the use of the phrase "hauled and conveyed" since the Act uses the language "transported and placed." The legislative history makes clear that "standards require controlled placement of spoil and that spoil must be transported—hauled by truck or other vehicle placed and compacted..." (123, Cong. Rec. H-7582 (July 21, 1977)). The Office believed the commenter's request was to allow for end-dumping of spoil is clearly inconsistent with the intent of Congress. For additional discussion on the Office's policy regarding the hauling and placing of spoil, the reader is referred to the preamble to 30 CFR 816.71-74 and 30 CFR 816.81-88. The Office further believes that toxic-forming and acid-forming materials cannot be properly isolated and covered with non-toxic spoils unless adequate precautions are exercised at the mine operation. (Dollhoff et al., 1977, pp. 54-70). The Office has determined that such materials must be hauled and placed to insure protection of water quality and other related environmental values. No change, therefore, has been made to the regulation.

§ 816.104 Thin overburden.

1. One commenter requested that the last sentence of proposed Section 816.104(a) be changed to read "The provisions of this Section apply when compliance with Section 816.101 can be achieved only by disturbance of additional acreage outside the coal extraction area." The rationale was that additional disturbance of large areas needed for borrow would be prevented, thereby making it possible to achieve a realistic and efficient backfill plan. As noted in House Report No. 95-218, 95th Cong., 1st. Sess. at 96 (1977), it was realized that, in some cases, restoration of the original contour was impossible and the useless act of digging a new pit to achieve approximate original contour was unnecessary.

The intent of Section 816.104(a) is to clearly define the limits of when thin overburden is applicable. Thin overburden requirements apply when the final thickness of the swelled overburden is less than 80 percent of the sum of the overburden thickness and coal thickness prior to coal removal, and where the surface profile cannot achieve approximate original contour.

It is felt that Section 816.104(a) implies this rationale and does not imply that borrow pits are needed. Therefore, the comment was rejected.

2. A commenter felt that Paragraphs (b)(1) and (b)(2) of the proposed rule were contradictory, with regard to constructing slopes steeper than 2:1 and maintaining a factor of safety at 1.3. The Office intends for the slopes to be graded to ensure stability, so as to protect against adverse environmental impacts due to slope failure, and to protect the health and safety of public and private property. Since slope failure with or without sliding pit, the Office believes that severe damage would not occur as a result of a slope failure. Therefore, since the hazard rating appears to be low, a 1.3 static safety factor was chosen (MESSA, 1973, pp. 8.142-8.144; Canadian Department of Energy, 1977, pp. 79-80). Even though this static safety factor was chosen as a design criteria, the Office maintains that slope stability rather than a design criteria must be ensured.

The commenter argued that slopes steeper than two to one can be constructed and still maintain a factor of safety of 1.3. The Office realizes that this is confirmed by Lambe, 1969 (Soil Mechanics, p. 193). However, House Report 95-218 (p. 105) states that, in thin overburden, the regrading standard requires that the overburden be used to cover the floor of the mining operation, to provide drainage, and to establish a slope of at least the angle of repose against the highwalls, completely covering the coal seam and extending to the original contour. An angle of repose fill against the pit face will achieve a surface which may be more stable than the highwall with respect to weather. In addition, the slope of natural repose has an added safety value, since it does not present a hazard to either wildlife or human life, as would a vertical face. In various materials the angle of repose varies greatly; i.e., 1:2 to 1:4 to 1:2. (Lambe, 1969, Soil Mechanics, p. 149). From the legislative history and the Office's interpretation of Section 816.104(b)(2), if equipment can be operated safely on a 50 percent slope, tracking in with tractor-crawler equipment can be operated safely on a 50 percent slope, as long as the equipment is not running along the contour. Exceptions may be allowed to equipment movement along the contour for safety reasons.

3. A few commenters felt that restoration leading highwalls should receive variances in some cases in western mining and Section 816.104(b)(2) should be changed to reflect this intent. Section 816.104(b)(2) of the Act requires covering of all highwalls. Legislative history also implies that no highwalls are to remain in thin overburden mine areas (H. Rpt. No. 95-218, 95th Cong., 1st. Sess. at p. 105). Therefore, the comments were rejected.

4. Another commenter questioned Section 816.104(b)(2), if equipment can be operated safely on a 50 percent slope. Tracking in with tractor-crawler equipment can be operated safely on a 50 percent slope, as long as the equipment is not running along the contour. Exceptions may be allowed to equipment movement along the contour for safety reasons.

5. A few commenters felt that restoration leading highwalls should receive variances in some cases in western mining and Section 816.104(b)(2) should be changed to reflect this intent. Section 816.104(b)(2) of the Act requires covering of all highwalls. Legislative history also implies that no highwalls are to remain in thin overburden mine areas (H. Rpt. No. 95-218, 95th Cong., 1st. Sess. at p. 105). Therefore, the comments were rejected.

6. A commenter felt that Sections 816.104(b)(3) and 816.105(b)(4) fail to acknowledge the impossibility of backfilling and grading to achieve a land use compatible with the prevailing land use in unmined areas, e.g. formation of a recreation lake. Under Section 816.133, postmining land use as approved by the regulatory authority may permit such uses which would ensure an improvement in land quality. Since Section 816.133 is applicable, there was no change required under Sections 816.104(b)(3) and 816.105(b)(4).
§ 816.105 Thick overburden.

1. One commenter objected that the 1.2 bulking factor was excessive and not consistent with the approximate original contour concept. Section 515(b)(3) of the Act states that where the overburden is more than sufficient to reproduce the approximate original contour the excess shall be backfilled, compacted, and graded to attain the lowest grade, but not more than the angle of repose. H. Rpt. No. 95-218 (1977) was cited by the commenter as not visualizing an increase in profile elevation. The definition of approximate original contour states that the reclaimed area should closely resemble the general surface configuration of the land prior to mining. OSM interprets this to mean that the approximate original contour, or configuration, of the premined land is intended, and minor changes in elevation are anticipated. The comment was rejected, and the 1.2 bulking factor retained.

2. A commenter suggested the bulking factor should be increased to 1.3. The Office recognized that in some materials bulking greater than 20 percent is possible. To establish minimum national standards, the 1.2 factor has been retained. This does not preclude regulatory authorities, from adopting standards that better suit their regions, as long as the performance standards are equal.

3. A commenter objected to total highwall elimination in all cases. According to the commenter, old highwalls offer protection and escape to sheep in Alaska and nesting for wildlife in Wyoming. Section 515(b)(4) of the Act requires restoration to approximate original contour of the land, with all highwalls, spoil piles and depressions eliminated.

The Office recognizes that in some cases spoil piles and depressions will retard development of life in Wyoming. Section 515(b)(3) of the Act states that where sufficient overburden is not available, and the reader is directed to the Preamble for that Section.

4. Several commenters objected to the words “hauling or conveyed” used in 30 CFR 816.105(b)(1)-4. The commenters requested the word “transport” be used to be more consistent with Section 515(b)(22)(a) of the Act. The intent of the change appeared to be to allow end dumping. The legislative history clearly shows that controlled placement of spoil is necessary. Spoil must be hauled by truck or other vehicle and “placed and compacted ...” 123 Cong. Rec. H-1782 (July 21, 1977). Further, the Office does not feel the use of the words “hauling or conveyed” will retard development of new technology in spoil-handling in surface mining.

5. A commenter suggested a language change in Section 816.105(b)(5), to be consistent with Section 816.102(c). The Office believes that depressions allowed under 816.102(c) would not be prohibited under 816.105(b)(5) if needed to minimize erosion, conserve soil moisture or promote vegetation. Thus, no change in the text of the rule was made.

§ 816.105 Regrading or stabilizing rills or gullies.

This regulation is intended to minimize soil loss and reduce sedimentation by requiring stabilization of rills and gullies that are more than nine inches deep. Authority for this Section is Sections 102, 201, 501, 503, 504, 507, 508, and 515 of the Act. Literature used in preparing this Section included "Soil Survey Manual", Agricultural Handbook No. 18 U.S. Department of Agriculture, S.C.S. 1951, p. 503, and the technical literature for Sections 816.41-816.42 and 816.45-816.46.

1. Commenters objected to the criteria for determining remedial action necessary for rill and gully control. The Office considered the following alternatives:
   (a) Permit rills and gullies to form, but not to exceed the size and number of the premined landscape.
   (b) Do not regrade or stabilize eroded areas until revegetation has been established.
   (c) Cost-benefit analysis should serve as a criterion for regrading of rills and gullies.
   (d) Allow greater depth criteria before applying remedial measures.
   (e) Retain the proposed language of the regulations.

OSM chose to retain the proposed language of the regulation. Rills and gullies concentrate runoff water into tiny rivulets and small channels and accelerate erosion (USEPA, 1976, Erosion and Sedimentation, Vol. 1 at 24-25). To distinguish between a natural rill or shallow channel through which overland flow is conducted, the Office has established a maximum acceptable depth of 9 inches, so as to preclude the formation of large gullies that will severely degrade the area. However, the size criteria may be reduced by the regulatory authority where 9 inch gullies are disruptive to the postmining landuse or if they cause excessive erosion or sedimentation.

Sediment derived from rills and gullies can be detrimental to water quality and every effort should be exercised to prevent such erosion. Furthermore, rills and gullies interfere with achieving revegetation and postmining and use. The intent of this provision is to allow stabilization through means other than regrading, if such methods produce equivalent or better results. Thus, the use of straw (Gilley, 1977, pp. 697-8), other physical or chemical methods of stabilization (Dean, pp. 452-7), or the use of small equipment to fill and regrade in a manner that disturbs little additional area may be permissible.

Rills and gullies formed along disturbed and reclaimed drainage channels would be permitted if adequate stabilization vegetation has been established. The soil losses and destruction resulting from rill and gully erosion are well documented. (USDA Soil Survey Manual, Figure 48, page 253.) As an alternative to the 9-inch requirement of this Section, 6-inch and 12-inch depths were considered, as well as deletion of the requirement entirely. The 6-inch depth would make it difficult in some locations to distinguish between those erosional features requiring repair and features that approximate natural drainage channels in highland (divide) areas. To delete the requirement entirely, or increase the depth to 12-inches, could result in excessive loss of plant growth media by erosion. The 9-inch depth was selected because it is the maximum depth that can be stabilized by most grasses, since a large portion of their roots occur in this surface layer. (USDA Soil Survey Manual p. 250).

§§ 816.111-816.117 Revegetation.

Authority for these Sections is found in Sections 102, 201, 501, 503, 504, 507, 508, 515 and 519 of the Act. These are regulations for achieving the requirements of Section 515(b)(1) and assuming the responsibility for successful revegetation as set forth in Section 515(b)(20) of the Act. Persons conducting surface mining activities must establish on the disturbed area a permanent vegetative cover that will minimize erosion and reduce water pollution which deteriorate the environment and which can be detrimental to the health and well-being of the residents of the affected area. The literature used in preparing the regulations is as follows:


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Holton, H. N., 1972. A concept for disfiltration estimates in water-shed processes, procedures, and methods, USDA, ARS 41-51, Fig. 6, 7, and 8, p. 23, 24 and 25.


Iowa, State of, Recommendations for establishment of vegetation on surface mined areas, Item 10, Time of seeding, Land Rehabilitation Advisory Board.


Critical area stabilization in New Mexico, New Mexico Inter-Agency Range Committee Report for the Critical Area Stabilization Workshop, 1973, p. 11.


Ohio I, II, III and IV, Chapter 1513, Strip Mining and Reclamation of Mined Land, Sec. 1513.16, p. 24.


A Guide for revegetating bituminous strip mine spoil in Pennsylvania. Research Committee on Coal Mine Spoil Revegetation in Pennsylvania, p. 21, and Appendix M.


§ 816.111 Revegetation: General requirements.

Section 816.111 requires that the operator, in accordance with the reclamation plan required by Section 780.15(b)(5), promptly seed or plant all disturbed areas, except water areas, road surfaces and intensive agriculture areas, and achieve a vegetative cover that is similar to the native species of the disturbed area. One of the principal effects of vegetation is to stabilize the soil surface with respect to erosion, through the revegetation of the soil with respect to erosion, not prevention of erosion. When it would otherwise be a natural process. The language of this Section has been changed to make it consistent with Section 815(b)(19) of the Act and Section 815.111(b)(1) of these regulations. The change was made by deleting the phrase "of species" and inserting the phrase "of the same seasonal variety." A commenter suggested that the logical topical sequence would be for topsoil to be placed in sequence with or just before revegetation. OSM has not accepted this comment. Regulations dealing with particular topics such as revegetation have been arranged so that related topics have been grouped together. OSM does not believe that each substantive topic can be located next to related topics. Topsoil is a good example. In the sequence of mining operations, topsoil is relevant early in the operation when it is removed, then when it is regraded and revegetation begins. The Office believes that the regulations are more useful if they are arranged by substantive topics rather than attempting to put them in a mining sequence. Part 816 was released as a preproposed draft in July 1978, organized in the logical mining sequence. Comments on that draft almost universally asked that it be reorganized into substantive topic groupings.

A commenter requested that because of the uncertainty of revegetation in the arid and semiarid West that general requirements of Section 816.111 make reference to the ability of the vegetation to withstand periods of drought with a resilience similar to undisturbed vegetation. This would change the requirements of a diverse, effective and permanent cover that supports the postmining land use, when complemented with the performance standards of Sections 816.116 and 816.117, to combine to measure hardness, no change was made.

A commenter disagreed with the desirability of using native vegetation, contending that it would not be acceptable to use native vegetation for revegetation of disturbed critical areas because of slow establishment rates and difficulty in obtaining seed. The commenter stated further that there are many species which do not happen to be native but for which seed is available, and which provide rapid cover until a permanent cover can be established. Section 515(b) (19) of the Act provides for the use of native and introduced species, and therefore, the
use of species that provide rapid ground cover is permissible under Sections 816.112 and 316.114 (b). A commenter suggested that any quick-cover species be of a type which is not palatable to wildlife. The Office has not changed the regulations based on the comment. The Office believes that the reclamation plan should specify the quick-cover species to be used. It is clear from Sections 316.113, 818.114, and 316.23Cb) that a quick-cover species is intended "to control erosion," to "provide adequate stability," and to protect against "excessive water and wind erosion." The operator and the regulatory authority will be able to determine whether wildlife foraging presents a threat to the quick-cover. The Office feels that a choice of cover which would be prevented from becoming established by wildlife foraging would not meet the requirements of the regulations. The operator protects the area from use by wildlife.

A commenter felt that, in addition to requiring signs and markers, the Office should require that the permit area be securely fenced during and after mining to protect people and animals and to prevent harm to reclamation efforts. This commenter asked that game-proof fences be required or, at a minimum, stock-proof fences. The Office has decided not to require fencing for all mines. Rather, the Office believes that the measures which are best suited to ensure safety and protect reclamation areas are better determined on a mine-by-mine basis by the operator and the regulatory authority. The Office has based this decision on the fact that fencing is expensive and may, on occasion, unduly restrict wildlife ranges. Also, in many mining areas there is no need to fence against livestock since livestock do not roam freely in the area. However, the lack of fencing regulations does not relieve the permittee of the responsibility associated with human safety and achieving acceptable reclamation which may, in some cases, require control of wildlife and domestic livestock.

A few commenters recommended a language change in Section 316.111(a) to exempt areas affected by mining activities prior to the effective date of applicable prime farmland provisions. The suggestion has not been adopted in Section 316.111(a). The issue of which lands affected by mining activities prior to the effective date of the Act are subject to the prime farmland requirements is addressed in 30 CFR 769.12 and the preamble for that Section.

A commenter suggested that "predominated" be added between the words "species" and "native" and that the Office delete "or species that will support the approved postmining land use." Since Section 316.112 already provides for the use of introduced species and species selection is based on postmining land use, these suggestions have not been specifically incorporated in the regulations.

A commenter suggested additional language for Section 316.11l(b)(1) that would specifically exempt "spoil pile areas prior to leveling" from the revegetation requirements. Section 316.114(a) of the Act requires that the operator stabilize and protect all surface areas including spoil piles to effectively control erosion and attendant air and water pollution. It may be difficult and often impractical to revegetate spoil piles while they are being "worked." However, when spoil piles are not contemporaneously worked, they must, because of their potential to be worked. Section 316.114(a) permits the use of alternative materials to control erosion. Since the regulatory authority may determine that revegetation is essential to stabilize spoil piles that are to be exposed for extended periods of time, the suggestion has not been adopted.

A commenter stated that in Section 316.111(b) (4) the term "Intensive agriculture" was not defined and suggested the term "cultivated crops" from Section 316.115 and a definition for "cropland." OSM has determined that the definition of "cropland" describes the intent of the Section and the term "cropland" has been adopted.

§816.112 Revegetation: Use of Introduced species

Section 316.112 provides for the use of introduced species when necessary to achieve the approved postmining land use or when a quick, temporary cover is desired in the area. Also, the introduced species must be compatible with animal and plant species of the area and meet the requirements of applicable State and Federal seed laws. In addition, the plan approved by the regulatory authority must provide for the establishment of permanent vegetation when introduced species are used for quick and temporary cover.

Many introduced species, annual and biannual, become established more quickly and provide more abundant growth than perennials and may in some instances be used to advantage in controlling erosion while permanent perennial species become established. Establishment of native species normally occurs over too long a period of time, often requiring 1 to 3 years for establishment, to effectively protect Section 318.114 provides for the use of species, especially annuals, to be used as a "nurse crop" to ameliorate severe conditions such as intense insolation, high surface temperature, and rapid evaporation that make establishment of permanent vegetation difficult on many sites (Plass, 1978). The advantages of using introduced species when reclamation mined lands is supported by Aldon (1978, pp. 76), Grandt (1978, pp. 64), Plass (1978, pp. 58-59), and Power and others (1978, pp. 70).

As stated in the preamble of the proposed regulations (43 Fed. Reg. 41775, Sept. 18, 1978), the requirement for appropriate field trials should be interpreted broadly to include successful experience with species in the mined area or a similar area. Naturalized species that have been in common usage, such as the tree species in the Great Plains, will generally have been demonstrated to be acceptable. However, the operator and the regulatory authority must be mindful of geographic adaptation of each species, since species became established under similar conditions similar to those under which they evolved (Sampson, 1952, p. 259), and of the many plant species that have been used to improve and stabilize the soil (Sampson, 1952, p. 259).

As a result of several comments, Section 316.112 has been modified to clarify the conditions for using introduced species. A provision has been added on the suitability of introduced species as related to the existing plant and animal species of the region.

A commenter suggested new wording for this Section that would establish a requirement for a reclamation plan. This comment has not been accepted because the reclamation requirements of Section 779.149 are an integral part of the Act which must be a surface area which has not been specifically referenced to Executive Order 11987, "Exotic Organisms." Since the regulations require that an approved State and Federal seed law be used, increased use of introduced species statutes, this reference has not been incorporated in the regulations.

A commenter did not want any use of introduced species allowed. The suggestion is contrary to Section 515(b)(19) of the Act and has not been adopted.

A commenter urged that a mix of introduced species be required and argued that this would add diversity to the flora. The present regulations allow use of introduced species for a variety of uses such as quick cover, or for wildlife. While a mixture of species when reclamation mined lands is covered, such a mixture containing introduced species may not be compatible with postmining land use. This suggestion has not been adopted.
A number of commenters contended that the requirement for appropriate field tests was unnecessarily rigid and that other criteria, such as growth chamber, greenhouse, or other validated research projects, as well as mine-site plots that are established using professionally recognized techniques, can be equally valid when determining suitability of introduced species. Field trials are basic to the regulatory requirement. As a result of these comments and because the purpose of the Section is to establish conditions for use of introduced species, a new paragraph requiring specific consideration of the introduced species' compatibility with the mutual biotic community has been added that requires that introduced species be compatible with the plant and animal species of the region. Several commenters suggested that "poisonous" and "toxic" are redundant because the words are virtually synonymous. Since most States have a noxious weed list and in order to avoid the spreading of, and subsequent propagation of, undesirable, poisonous and noxious species, the seed or seedlings used in revegetating disturbed areas would be required to meet Federal and applicable State requirements for purity. The suggestion to change "toxic" to "noxious" has been accepted.

A commenter argued that if introduced species are required in order to reclaim an area following mining, the area is unsuitable for mining. Another commenter contended that difficulty in obtaining seed and slowness of establishment make native species undesirable and that they should not be required. Because the Act provides for the use of native and introduced species "when necessary and desirable" (Sections 815(b)(10), the Office has retained the provision for their use.

§ 816.113 Revegetation: Timing.

This Section requires the operator to seed or plant during the first normal or recommended planting period for the land-resource area. To minimize erosion and reduce stream siltation, the regraded area should be seeded as quickly as possible after the reclamation grading is completed (Vogel, 1974, pp. 176, and Vogel and Berg, 1968).

Seeding immediately after grading takes advantage of a seedbed provided by the grading and can improve the chances of establishing a plant cover before erosion patterns are formed. When rills form, it becomes more difficult to establish a plant cover that effectively controls erosion. A temporary cover of small grains, grasses, or legumes is required when necessary to effectively control erosion while a permanent cover is being established.

The requirements of Section 816.113 are intended to assure that there will be no major time lag between completion of regrading and seeding, and planting of the area to be revegetated. As stated by Sampson (1955, p. 245), the time of seeding depends upon the method of land preparation and the forage species used; and Vogel (1974, p. 173) states that seedbed preparation that is essential for successful establishment of seeded vegetation. Annuals such as small grains, grasses, or legumes can be used to protect the site and aid in the establishment of perennial species (Fluss, 1978, p. 58). In many locations, suitable species are available and climatic conditions are favorable for establishing seedings that provide ground cover for erosion control throughout a major portion of the year (Fluss, 1978, p. 58).

The content of this Section is required in several State reclamation regulations. (Indiana, p. 8; Montana, p. 47; New York, p. 115; and Ohio, p. 241). Also, seeding-time benefits are recognized in various State guidelines (Iowa, Item 10; Kentucky, p. 12; New Mexico, p. 11; Pennsylvania, p. 21 and appendices I, II, III and IV; and Utah, p. 5).

Some commenters felt the last sentence of the Section was out of place since it referred to mulching, and it was suggested that the mulching language should be deleted from this Section. Other commenters suggested that the last sentence be deleted because the language of the proposed regulation states that mulching is required. These commenters argued that mulching was not required by Section 816.114. They contended that mulch should be applied only when necessary at a time and by methods that will not show adverse effects to establishing vegetation. The Office recognizes that duplication did exist and this sentence of the Section has been revised by deleting the mulching statement and retaining the requirement for seeding.

§ 816.114 Revegetation: Mulching and other soil stabilizing practices.

Under Section 816.114, the mulching requirement is flexible and the type, use, benefits, and necessity of mulch and soil stabilizing materials will be at the discretion of the regulatory authority.

Mulches such as straw, hay, bark, wood chips, and wood fiber, which are widely used for erosion control and establishment of vegetative materials, may be utilized. Also, regrading and seeding and establishment of annual, herbaceous plants provides an in situ mulch that will protect the site and aid in the establishment of a permanent cover composed of perennial plants. Selected
chemical soil stabilizers may be used alone or in combination with appropriate mulches not only to reduce erosion but to aid in vegetation establishment. Plass (1978) states that the use of annuals can be beneficial in establishing perennial species. The moisture-saving, soil-stabilizing, and consequent, seeding-establishment benefits of mulches and vegetative covers are matters the regulatory authority will determine they will provide. The base of a chemical binder or tack is to stabilize soil temporarily until seeding can be performed. EPA (1976, p. 61) states that chemical binders are effective in retaining soil moisture. Plass (1978, p. 60) states that polyvinyl acetate, acryl-

copic polymers, and vegetable gums can be applied safely with seed and fertilizer.

This Section has been restructured to set forth more clearly the subject matter. Paragraph (a) of the proposed regulations has been divided into Paragraphs (a) and (b). Paragraph (c) is virtually the same as in the proposed regulations, and a new Paragraph (d) that provides for the use of chemical soil stabilizers has been added.

A commenter stated that the Section heading “mulching” was too restrictive and suggested that a heading such as “mulches and soil stabilizing materials” would be more appropriate since reliable methods for erosion control include not only a variety of mulches but chemical soil stabilizers and annual vegetation. It is believed the term “soil stabilizer” is appropriate. However, the word “practices” is preferable to “materials” because the Section addresses the use of materials and cultural practices. The heading has been accordingly modified.

Several commenters requested language denoting that a sufficient quantity of mulch must be used. The term “suitable” connotes that a kind and amount of mulch adequate to achieve the necessary stabilization is required. Therefore, additional descriptive language is deemed unnecessary.

A commenter argued that the mulching requirements of Section 816.114 would be virtually impossible to enforce since they did not contain a specified minimum amount of mulch to be applied to the land. The regulations have not been changed to accommodate this request because of the varied site needs and benefits derived from the use of mulch. The regulatory authority should determine the amount and type of mulch on a site-by-site basis.

A number of commenters made the point that not all mulches under every condition require anchoring. This is valid and the regulations are revised to allow the regulatory authority to determine when anchoring is required.

5. Several commenters expressed concern that Section 816.114 of the proposed regulations was too restrictive and did not adequately address the use of annual grasses, especially cereals, and chemical soil stabilizers as mulch. This suggestion is adopted and the Section expanded to make it clear that chemical soil stabilizers and annual grasses may be used alone or in combination with appropriate mulches.

6. Several commenters requested the addition of a paragraph that would require mulching of a regraded area when topsoil has not been redistributed within 5 working days after completion of backfilling and regrading. Numerous factors such as slope, season of the year, and precipitation all affect determining the need for mulch; thus the mulching requirements, including time constraints, should be determined by the regulatory authority on a local or site-specific basis. The operator is required to control erosion during backfilling and grading as well as during the topsoiling operation; therefore, it will be necessary that the operator protect the disturbed area from erosion during periods of prolonged exposure.

§ 816.115 Regeneration: grazing.

Section 816.115 relates to grazing on recently revegetated areas. The purpose of the Section is to ensure that livestock control practices essential to the establishment of the ability of the species when established to withstand use by livestock where the postmining land use is to be range or pasture land. This Section must be interpreted as though the permanent vegetation will support livestock at about the number that would be supported had the area not been mined.

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and extent of grazing is to be such that it will establish the utility of the planted species and demonstrate the survival, coverage and productivity of the revegetation.

1. Several commenters felt that grazing of the reclaimed land should be done at a time and stocking rate agreed upon by the surface owner or manager and the regulatory authority. It was argued that there should be site specific decisions since grazing may not be practical or desirable due to size, location, accessibility, or various other factors related to livestock use. Since, the factors mentioned by the commenters would preclude pasture-land as the post-mining land-use, the area involved would not come within the requirement of this Section and these comments were not accepted.

2. A commenter argued that the permittee should be required to fence the area to prevent grazing while the plants are becoming established. The proposal was not adopted since Section 816.112 provides adequate controls to assure prompt establishment of an effective vegetative cover and Sections 816.116 and 816.117 ensure that permanent vegetation is successfully established. Thus, the absence of a fencing requirement does not relieve the permittee of the responsibility to use whatever methods are necessary, including fencing, to achieve successful revegetation of the disturbed area.

3. Commenters argued that the Section should be deleted since the revegetation standards for success are enumerated in Section 816.116. In addition, the commenters contended the language was ambiguous because of the phrase "stocking rate equal to or less than approved by the regulatory authority" could be construed to mean zero cattle (livestock). Since Section 816.116 does not provide a test of the vegetative cover that is to be used by livestock when the post-mining land-use is range or pastureland, the Section was not deleted. However, the language was changed to make it clear that the grazing requirement does not contain species and reclamation standards for determining success of the revegetation and would not want to jeopardize his cattle business and they stated that the Section should be deleted.

4. A commenter suggested requiring that the regulatory authority determine when vegetative cover that is satisfactory for grazing has been established. It was argued that the present wording would allow for the initiation of grazing immediately after seeding. The Office did not accept the suggestion to reverse the burden of proof for the success of the revegetation and would not want to jeopardize his newly established seedlings by initiating grazing before the vegetation was adequately established.

5. Commenters requested that the requirement should be five years instead of two. Other commenters supported the two-year requirement, stating it would allow the regulatory authority and the operator an opportunity to determine if the revegetation effort is successful for the intended land-use and will be an especially valuable test for the low-rainfall-severe climatic conditions of the West. To assure that grazing was not required during time critical to the growth and establishment of new seedlings, the grazing requirement was left at two years.

6. A commenter suggested requiring that the regulatory authority determine when vegetative cover that is satisfactory for grazing has been established. It was argued that the present wording would allow for the initiation of grazing immediately after seeding. The Office did not accept the suggestion to reverse the burden of proof for the success of the revegetation and would not want to jeopardize his newly established seedlings by initiating grazing before the vegetation was adequately established.

7. Commenters stated that the Section ignores good range management practices and suggested requiring that grazing "shall be in accordance with range management techniques constituting the best technology currently available." It was argued good management frequently requires alternating years of grazing and non-use of certain grazing land. The Office recognizes that many livestock operations rely on demonstration and real-time grazing systems to maintain or increase the amount of forage that is available for use by livestock. The Office believes that these grazing systems can be modified, when necessary, to meet the two-year grazing requirement without endangering the survival, coverage and productivity of the vegetation; therefore, the suggestion was not accepted.

The Office made this change to assure that the permittee has the opportunity to evaluate the grazing utility and the ability of the vegetation to sustain use by livestock.

Several commenters suggested leaving livestock grazing to the discretion of the applicant since they did not think OSM was proposing that the applicant must stock reclaimed land. The grazing requirement is intended to assure, when the post-mining land-use is range or pastureland, that the permanent vegetation can be maintained by livestock, if necessary, to support livestock numbers comparable to the number that could be supported.

RULES AND REGULATIONS


Section 816.116 requires that success of revegetation be measured by techniques approved by the regulatory authority. The regulatory authority is to consult with appropriate State and Federal agencies to determine the proper techniques for measuring the vegetation that will be involved. These requirements are based on Kuchler's work that is cited in the preamble for Section 779.19.

Technical guides published by United States Department of Agriculture (USDA) or United States Department of the Interior (USDI) or reference areas can be used for assessing adequacy of the ground cover and productivity of the revegetated area. Many Federal agencies have technical guides for evaluating the vegetative resource on the lands they serve. These technical guides set forth procedures to be used when collecting basic and sound resource information and contain standards for evaluating the land and associated vegetative resource. USDA and USDI have basic field data for most soils and types of vegetation. This basic, site specific, information must be used to collect the ground cover and production data. Site specific information is not readily available for the particular soils and vegetative type of the permit area, the procedures set forth in the technical guides can be used to collect the ground cover and production information.

When reference areas are used as a basis for determining success of revegetation it will be necessary that the operator measure, using standard techniques that are approved by the regulatory authority, the composition of the vegetation and the vegetative condition of the reference area and the permit area. The measurements of the two areas will be used to determine comparability since the reference area must be similar to and representative of the geology, soils, slope, and vegetation in the permit area. The areas will be used.
to measure ground cover, productivity (stocking for trees and shrubs), and species diversity. Any of a number of vegetation measuring techniques may be authorized by the regulatory authority to measure the vegetation of the reference area before mining and when measurements are required during the period of responsibility as set forth in Section 816.116(d)(3) of the regulations. When permit areas contain more than 90 percent of soil or vegetative type it will be necessary to use a reference area that is representative of each site. The measurements of the vegetation and ground cover of the reference area and the permit area will be used by the regulatory authority to determine when the disturbed area has been adequately revegetated.

The period of responsibility begins when the ground cover or productivity for cropland that is not designated as prime farmland equals the approved standard after the last year of augmented seeding, fertilizing, irrigation or other work intended to ensure successful establishment of the cultural practices of seeding, fertilizing, irrigating, and other locally acceptable practices will not be considered augmentative for cropland or pastureland when the cultural practices and the rate of application is an accepted local agricultural practice that can be expected to continue as a postmining practice. Also, to assure that the vegetation is capable of self-regeneration and plant succession, the process of revegetation shall be to use a reference area that is representative of the area when applicable shall equal the approved standard for the last two consecutive years of the responsibility period.

The period of responsibility is based on annual precipitation; this regulation provides a list of source documents that can be used to determine annual precipitation at the site. In addition to the source documents, the responsibility period may be based on 10 years of continuous and reliable precipitation records from stations located in or adjacent to the mine plan area. When annual precipitation is based on information other than that contained in official records that are cited in the regulation, the data must span ten years. This period is thought to be the minimum number of years necessary to obtain a reliable indication of the annual precipitation since extreme seasonal variations could result in misleading information if a shorter time-frame were used.

Ground cover and productivity of the revegetated area will be considered equal when they are at least 90 percent of the cover of production of the reference area with 90 percent statistical confidence. Eighty percent statistical confidence is required on shrubland. These are confidence levels commonly used for the respective vegetative types. When technical guides are being used, 90 percent of the standard approved by the regulatory authority will be considered equal. Exceptions may be made if the area has previously been mined, the area is to be used for industrial or residential use within two years after grading is completed, when the area is to be used for cropland or when the area is to be developed for a forest or wildlife or forestland. At a minimum, the ground cover of previously mined areas shall not be less than can be supported by the best available topsoil or other suitable material or no less than the ground cover that existed before the area was disturbed and shall be adequate to control erosion. Thus, the operator is required to provide erosion control equal to or greater than that which existed prior to mining and the replaced soil could, in instances where improvements can be made in the vegetative growth medium, support a vegetative cover that provides more protection than existed before the previously disturbed area. Temporary ground cover can be used when the area is to be used for residential or industrial purposes within two years after grading is completed but the operator is not relieved of his responsibility to control erosion. Thus, temporary annual plants, mulches, soil stabilizers or a combination of materials that will control erosion, could be determined acceptable by the regulatory authority.

The cropland requirements of this Section are intended to apply to land that is used as cropland but is not prime farmland. The success of revegetation of this cropland is based on production. This period begins when the area has five or ten years, is to start at the time of initial planting of the crop that is to be used to determine success. That crop should be specified in the reclamation plan and should be one that can reasonably be expected to be used as a postmining crop.

The crop production standard is to be based on a reference area or other standards that are based on the technical guides as approved by the regulatory authority. Production shall be considered equal to premining production if it is at least 90 percent of the approved standard for the last two years of the responsibility period. The use of the 90 percent of the approved standard as the standard of success is to allow for those climatic variations, e.g., temperature, timeliness of precipitation, etc., that may affect production during the two consecutive growing seasons that production is measured to determine revegetation success.

When the area is to be developed for fish and wildlife management or forestland, the success of revegetation shall be determined on the stocking of trees, shrubs or half-shrubs, and ground cover. Stocking rates are to be used to control establishment of live trees sufficient in number to ensure available and available growing space. When fish and wildlife or recreation are the primary postmining land use, a pattern of distribution varying in density may provide a higher or lower use than when plant species are distributed more uniformly. Stocking standards are required instead of yield standards (production) because of the number of years required for trees to reach a marketable age and shrubs and half-shrubs to reach a size that allows a direct measurement of yield as compared to the production of a reference area or technical guides on production.

The ground cover of areas to be used for fish and wildlife management and forest land due to use of grasses and legumes, when used for site protection, has discouraged tree planting. Fish and wildlife uses are contemplated, and Vogel, (1973, p. 204) states that herbaceous vegetation covering 70 percent or more of the ground will strongly complete with trees planted at the same time. Section 816.116(d)(1) and (2) of the regulations on ground cover approximates standards required in Section 816.116(d)(1) and (2).

The operator is required to maintain fences, if they are necessary, and to manage properly the vegetated area, and may be required by the regulatory authority to conduct periodic measurements of vegetation, soil and water when the regulatory authority determines that the management practices and measurements are essential to assure compliance with these regulations and achievements of vegetative success. The practices and measurements may be required for the duration of the period of responsibility. This Section provides for the use of a fixed standard for determining success of vegetation when permit areas are 40 acres or less. To be eligible the operator must have a permit for 40 acres or less and the permit area must receive more than 28 inches of average annual precipitation. The use of the standards in Section 816.116(d) is contingent on meeting the above requirements and obtaining the regulatory authority's
approval to use the standards of this Subsection when determining success of revegetation.

The operator will be required to maintain stock of 70 percent ground cover for five consecutive years on areas planted to herbaceous species as well as areas planted to herbaceous and woody species. When woody plants are part of the postmining land use, a minimum stocking of 400 woody plants is required per acre. A minimum of 600 woody plants is required per acre on steep slopes. Success of stocking is to be determined at the end of the five year period of responsibility. The basis for the ground cover requirement is discussed in the preamble of Section 816.117. The regulatory authority may set more stringent stocking and ground cover standards if they are required to prevent pollution, protect quality of the environment and health, safety and general welfare of the public. Since local and regional reforestation practices vary in the recommended number of trees per acre, it is believed the minimum of 400 woody plants and shrubs will provide sufficient flexibility to satisfy most regionally recommended reforestation practices and allow the regulatory authority to increase the number of trees per acre when local reforestation practices warrant.

These regulations will allow for the flexibility required, as a result of the diverse climatic and soil conditions, to properly measure the different vegetative types that are found in the mining areas.

1. Many commenters argued that the reference area concept is not practicable, that other established procedures and proven techniques should be allowed to determine success of revegetation, that measurement techniques should be left to the approval of the regulatory authority and that rewording is required for conformity. USDA Forest Service and Soil Conservation Service and USDI Bureau of Land Management, Bureau of Indian Affairs, Geological Survey, Bureau of Mines, and Fish and Wildlife Service currently have established technical guides and proven techniques for describing rangeland sites and evaluating the vegetative resource on the lands they administer or serve. The Soil Conservation Service range site guides and evaluation procedures described in the National Range Handbook (1976) are uniformly accepted and used for assessment of the private lands throughout the United States. The National Range Handbook was prepared for use by all rangeland managers interested in resource conservation programs. Other federal agencies cited above have established and proven techniques for evaluating success of vegetation establishment, condition and trend. These data banks are frequently relied upon when seeking information on vegetation. Therefore, the Office has decided to revise the proposed regulation 816.116(b)(c) to allow use of other technical guides in place of reference areas to measure the success of revegetation.

Section 816.116 has been rewritten to provide an alternate to reference areas as required by 816.116(b)(c) for the Director to approve technical guides from among those published by USDA or USDI which may be used in lieu of approved reference areas, as a basis for determining whether the re-vegetation is successful under the standards in Section 816.116(b)(3).

Section 816.116(b)(1) was amended to conform with the preceding Section which now allows the regulatory authority to use either reference areas or other technical guides approved by the Director for assessing ground cover and productivity.

2. Several commenters suggested changing the requirements of Sections 816.116(b)(c) to require maintenance of vegetation equal to reference areas (or other standards) to periods ranging from two years to 10 or more years. The regulations implement the time periods specified in Section 816(b)(3) of the Act so these requirements cannot be changed.

3. Many commenters objected to the requirement that ground cover and productivity be equal to the standards for each consecutive year of the responsibility period. They argue that annual measurements are unnecessarily expensive and such data from newly established vegetation has little utility. Further, it was requested that the regulations specifically address when the responsibility period begins.

Some suggest the only requirement should be to achieve equal ground cover and productivity by the end of the responsibility period. Numerous other time spans were considered both at the beginning and the end of the period. Since vegetative response varies greatly due to a wide array of factors, especially influenced by local climate, several commenters indicated that consecutive year measurement should be required to counteract the effects of an extraordinarily good year.

Section 515(b)(19) of the Act requires establishment of vegetation at least equal in extent of cover to the natural vegetation and Section 515(b)(20) requires five or 10 years of responsibility for at least that amount of restoration work assuring success. The Office interprets this to mean that cover must meet the standards at the start of the responsibility period and cover and productivity must meet the standards at the end of the responsibility period. Therefore, the regulations were changed to require measurements that show vegetation at least equal to standards for ground cover to initiate responsibility periods and standards for both ground cover and productivity for two consecutive years at the end of the period. The consecutive years should not immediately follow augmentation practices but occur at the end of the responsibility period to minimize the effects of the augmentation.

4. Several commenters wish to allow seeding, fertilizing or irrigation during the responsibility period. Section 515(b)(20) of the Act specifies that the period of responsibility extends for five (or 10) years after the last year of augmented seeding, fertilizing, irrigation or other work. Therefore, no additional seeding, fertilizing or irrigation can occur after start of the period of responsibility for determination of revegetation. If such augmentation is necessary, then the period begins to run anew. The augmented seeding, fertilizing and irrigation does not apply to cropland and pastureland that can be expected to exhibit natural revegetation and which should be managed in accordance with acceptable local agricultural practices.

5. Section 816.116(b)(2) was amended to provide for the use of a wider range of reliable source material when determining annual precipitation. To confine the determination of precipitation to the use of a small scale map would not provide accurate information in areas where precipitation averages are highly variable in short distances, such as mountains, mesas and valleys. The regulations now include a list of example materials that may be used as source documents when making determinations on precipitation.

6. Various commenters suggested either increasing or decreasing the percent of cover and productivity requirements of Subsection 816.116(b)(3). Further, some contended that success should be determined on the basis of annual measurements throughout the period of responsibility while others stated that success should be based on measurements taken the last year of responsibility. It is believed that the 90 percent requirements for ground cover and productivity is an equivalent measure of success since there has to be a basic assumption that productivity will continue to improve with time when the land has been restored and assure productivity. The additional increase resulting from time will be due to a combination of factors including microbial activity and increased organic matter content. Further, a two-year minimum time base is required to adequately assess the ability of a perma
nent vegetative cover to regenerate and sustain plant succession.

7. Several commenters were concerned that the use of introduced species would reduce the overall productive potential of an agricultural unit, especially grazing areas. The agency recommended additional phrases that were intended to ensure that the use of introduced species did not reduce the overall productive potential of an agricultural unit. Since the agency has been using introduced species to improve the overall productive potential of an agricultural unit, the agency believes these requirements are necessary to ensure that native species are used when necessary to maintain the overall productive potential of an agricultural unit, especially grazing areas.

In addition, these commenters suggested that measures be taken to establish native species in the introduced species to provide a quick, temporary, and stabilizing cover. Since the Act does not mandate that all areas disturbed by surface mining activities be restored, the introduced species are used to provide a quick, temporary, and stabilizing cover. However, the agency believes that to assure that measures are taken to establish permanent vegetation when introduced species are used to provide a quick, temporary, and stabilizing cover.

8. Some commenters argued that ground cover and productivity standards should both be measured for all land uses. The regulations, however, allow for consideration of productivity alone, in the case of cropland, and for ground cover, together with stocking, in the case of fish and wildlife habitat units. In all other cases, both ground cover and productivity standards must be met. The agency believes that the commenter's suggestion would have resulted in onerous requirements unrelated to sound reclamation goals. Under Section 515(b)(XO) of the Act, cropland is to be restored without regard to "cover," since productivity is the appropriate measure of farmland success. For fish and wildlife habitat units, productivity is less important than cover, since the floral community provides shelter to the animal communities, not only food. An emphasis on productivity would unduly restrict post-mining vegetation in a manner at variance with §515(b)(24) of the Act.

9. In response to comments, Subsection 816.116(b)(3)(i) has been modified. The proposed regulation required that the previously mined area, as well as the unmined portion of the mine plan area, be restored to ground cover equal to the ground cover of the best topsoil of the mine plan area. Such a requirement may not be attainable on that portion of the mine plan area that has been previously disturbed and would be cause for operators to ship previously mined areas when requesting a permit. Thus, the previously mined area may not be reclaimed to their potential. This Section has been revised to encourage vegetative improvement of the premined portion of a mining plan and, as a result, the vegetative cover equal to that which existed prior to remining.

These requirements should provide incentive for operators to include within their mining plan those areas that have been previously disturbed. It will also allow the regulatory authority to recognize the plant growth potential of the overburden materials of the disturbed area and require the operator to utilize the most favorable plant growth medium within the disturbed area. The operator may be required to improve the plant growth medium over that which existed prior to disturbing the area.

10. Some commenters argued that Subsection 816.116Cd) has accommodated the requested new Subsection for 40-acre permits in areas that have been previously disturbed. The agency agreed with these comments and eliminated the phrase "for any significant portion of the mined area" and should be deleted. It was further argued that careful selection of sampling or reference areas and nonblasted areas would allow for productive ground cover production and ground cover will produce results which will clearly show the degree to which portions of the rehabilitated area do or do not meet the revegetation requirements. The office agreed with these recommendations and this phrase has been eliminated from Section 816.116(b)(3)(ii).

11. Comments on standards for tree and shrub stocking suggested developing appropriate standards for assessing ground cover success when herbaceous plants are used with woody plants. The standards used to assess ground cover or productivity for other postmining land uses often reduce with time and require time to grow. A reduction in ground cover will favor better survival and improve growth. This is particularly important for commercial tree species. The new Subsection 816.116(b)(3)(iv) will provide a desired reduction in ground cover while providing acceptable erosion control. The degree of reduction approximates standards given in Section 816.116(d) (1) and (2), and is believed adequate to stabilize the revegetated area.

12. Comments on standards for tree and shrub stocking suggested developing appropriate standards for assessing ground cover success when herbaceous plants are used with woody plants. The standards used to assess ground cover or productivity for other postmining land uses often reduce with time and require time to grow. A reduction in ground cover will favor better survival and improve growth. This is particularly important for commercial tree species. The new Subsection 816.116(b)(3)(iv) will provide a desired reduction in ground cover while providing acceptable erosion control. The degree of reduction approximates standards given in Section 816.116(d) (1) and (2), and is believed adequate to stabilize the revegetated area.

13. A commenter suggested that Subsection 816.116(c)(2) be changed to require only annual soil tests to determine the amount of lime and fertilizer to be used as a topdressing. Since this proposal would not necessarily have a universal application and could eliminate other potential testing needs, it was determined that this part of the regulation should be retained. In addition, the existing regulation encompassed the suggestion and include other tests that may be approved by the regulatory authority.

14. Several commenters objected to the 40-acre limitation of Section 816.116(d) while others proposed a new Subsection for 40-acre permits in areas that receive less than 25 inches of annual precipitation. These regulations will allow use of the reference area concept where deemed necessary without imposing it where it is not necessary. The agency believes that Subsection 816.116(a) has accommodated the request by providing for the use of the reference area or technical guidance procedures that are approved by the regulatory authority.

15. Commenters argued that it was not necessary that the standards of Subsection 816.116(d) be met for five consecutive years. They contended that the important point is that cover be satisfactory when evaluated after five full years from the last complete reseeding effort. The Office concurs that a critical point exists at the time of release but to control erosion, it is equally important that the ground cover requirements be maintained throughout the 5 year responsibility period. Therefore, no change was made.

16. A number of commenters suggested that the ground cover requirements of Subsection 816.116(d)(2) were not adequate to control erosion. One commenter's recommendation varied from 70-90 percent. Since one of the primary purposes of vegetative cover is to stabilize the soil surface with respect to erosion, this suggestion was accepted and the ground cover requirements raised from 50 to 70 percent. This will allow adequate area adjacent to tree seeding that is competitive free. This competition free space is necessary for trees to survive and grow. This final determination of ground cover was based on USDA, Soil Conservation Service Technical Release No. 51 (Rev. 2), that indicates there would be about ¾ less soil erosion with 70 percent ground cover than with 50 percent ground cover. This minimum percent ground cover in paragraphs (1) and (2), does not preclude the regulatory authority requiring a higher percentage when determined necessary to correct specific erosion problems.
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17. Commenters suggested that because the term "steep slope" was used in Subsection 816.116(d)(3), it should be defined as being defined in Section 701.5, it does not need defining in this Section of the regulations. Further, it was suggested that the definitions for herbaceous species and ground cover, be included in the definitions in Section 701.5. Since these terms have special application to this Section they are retained in this Section.

18. A commenter suggested the phrase "grass like plants" should be a part of the definition of herbaceous in Section 816.116(d)(3). The Resource Conservation Glossary, Soil Conservation Society of America, 1976, p. 25g, defines grasslike plants as a "plant that resembles true grasses, for example, sedges and rushes, but is taxonomically different." These species occur in small amounts in some plant communities. However, the Office also recognizes that the frequency of occurrence of grasslike plants on a site may be due to use or abuse of the original vegetation of the site. Thus, the occurrence of grasslike plants on most properly managed sites would be undesirable and the Office has rejected the suggestion.

§ 816.117 Vegetation: Tree and shrub stocking for forest land.

Section 816.117 sets standards for reforestation. The Section establishes criteria for determining stocking of commercial and non-commercial tree species and shrubs or half-shrubs. The tree or shrub must have been in place for two years, be alive and healthy and have at least one third of its length in live crown to be countable toward the degree of stocking. When multiple stems resulting from root crown or root sprouts occur only the tallest stem is to be counted toward the number of stems per unit area.

To express the characteristics of a woody plant community, the term "stocking" was adopted since it is widely used and is a generally accepted term to describe the number of woody plants or stems per unit area.

Two general woody plant forms are usually recognized in a forest ecosystem. These are trees, commercial and non-commercial species, and shrubs which include the half-shrubs. Each should have separate stocking standards that recognize their respective biological and ecological requirements; therefore, the stocking standards are based on life form rather than geographical regions. This will allow for the use of trees and shrubs on all disturbed land as a logical revegetation alternative to provide at maturity protected land use. The recognition of the two woody plant forms will provide an opportunity to develop a more diverse plant community without interfering with the postmining land use objectives.

Section 816.117(b) sets forth the minimum performance standards for areas where commercial forest land is the approved postmining land use. These standards require a minimum stocking of trees and shrubs per acre. In addition, seventy-five percent of the countable trees or shrubs must be of commercial species. Ground cover on commercial forestland is to be determined in accordance with Section 816.116(b)(3)(iv). The five or 10 year period of responsibility shall begin when the ground cover is 70 percent of the ground cover of the reference area with 90 percent statistical confidence or when the regulatory authority determines that the ground cover is adequate to control erosion and when the stocking is equal to or greater than 450 trees and shrubs per acre. The operator is required at the end of the responsibility period to provide documentation showing that the standards for stocking of trees and shrubs and groundcover have been accomplished on the revegetated area.

The minimum stocking standards for commercial tree species were adopted to recognize variances in proven reforestation practices and they provide an acceptable minimum standard for eastern and western conditions. The regulatory authority is encouraged to increase the stocking rate when local and regional reforestation practices indicate that an increase is desirable. Permitting the use of shrubs would improve species diversity, enhance wildlife habitat and provide for the use of nitrogen fixing nurse crops for the commercial species.

The ground cover requirement is intended to reduce excessive competition for woody plants. Therefore, the ground cover is the logical criterion for assessing potential competition. Vogel, 1973, p. 204, states that "herbaceous vegetation covering 70 percent or more of the ground will strongly compete with trees planted at the same time." Thus, the reduction in ground cover is appropriate to mitigate the effects of competition on woody plant survival and growth; however, the ground cover must be adequate to control erosion.

The minimum standards for areas where woody plants are used for wildlife management, recreation, shelter belts or forest uses other than commercial forestland are set forth in Section 816.117(c). An inventory of trees, half shrubs and shrubs is to be conducted on a reference area, and the reclamation stocking and ground cover must approximate those of the reference area. Additional local and regional recommendations regarding species composition, spacing and planting arrangements are to be used, and tree and shrub stocking is to be equal to or greater than 90 percent of the stocking of the commercial species.

When the stocking requirements are met and acceptable ground cover is achieved, the five or 10 year responsibility period shall begin. Upon expiration of the responsibility period, the permittee must provide documentation showing that the stocking is equal to or greater than 90 percent of the reference area with 80 percent statistical confidence and that the ground cover on the revegetated area satisfies Section 816.117(b)(3)(iv).

The reference area is to be used to determine vegetative composition of the area prior to mining. This information will enable the regulatory authority to determine the extent to which the postmining land use will improve the area. The reduced ground cover requirement, compared to that contained in Section 816.116(b)(9), recognizes the need to reduce competition from herbaceous species when establishing trees and shrubs.

1. Several reviewers expressed concern that the introductory paragraph to Section 816.117 implied that the Section was restricted to commercial tree species. Since the Act specifies the establishment of a diverse effective permanent vegetative cover of the same seasonal variety native to the area, this Section actually applies to all woody plants, commercial tree species, noncommercial tree species, shrubs and half-shrubs. These comments suggest the introductory paragraph specifically identify the scope of Section 816.117. Differences in the biological and ecological requirements for species within the woody plant life forms preclude the use of one set of standards for assessing woody plant performance. Therefore, a separate stocking standard was developed for commercial tree species and one for the noncommercial tree species, shrubs and half-shrubs. The Section was revised to satisfy these comments.

2. In response to a commenter, the term "stocking," (the number of plants per unit area), was adopted as the measure to determine woody plant success. This term is comparable to the point count used in the California Forest Practices Act and similar Acts in Washington and Oregon. The criteria for identifying individual trees or shrubs to count as one toward meeting the stocking requirements are retained in Section 816.117.

3. Section 816.117(b) applies to those areas planted with commercial tree species. These are species recommended by local and regional reforestation plans to provide at maturity specific wood products. Several commenters recommended a minimum stocking of
400 to 450 trees per acre. The Office believes that 450 trees per acre will provide sufficient flexibility to satisfy most recommended reforestation practices and allow the regulatory authority to increase the number of trees per acre when adequate erosion protection warrant increasing the number. Local and regional reforestation practices which are regularly used to achieve specific forest management objectives vary in the recommended number of trees per acre. Public comments indicated minimum stocking of 450 trees per acre would be appropriate nationally. Therefore, there is no need to limit this Section to areas west of the 100th meridian.

4. A few comments relating to stocking advocated planting species of trees and shrubs useful for wildlife habitat with the commercial tree species. This would increase species diversity and provide opportunities for multiple use situations of the site. Since no specific number was proposed, a limit of 25 percent of the average stocking per acre was set. This percentage would provide about 400 trees of commercial tree species per acre which is the lowest stocking limit proposed by the comments.

5. A commenter proposed deleting the phrase "to achieve 90 percent statistical confidence for tree stocking when determining the beginning of the five to 10 year responsibility period." This was adopted because there will be adequate control over stocking at the end of the five to 10 year responsibility period.

6. Comments were made about the lack of standards to assess the adequacy of herbaceous ground covers used with woody plants. The standards for other postmining land uses require a ground cover that often reduces tree or shrub survival and growth. Reducing ground cover to a minimum that provides adequate erosion protection will favor tree survival and growth. Section 816.116(b)(3)(iv) has been adopted in response to these comments. The rationale for these standards is contained in the part of the preamble relating to Section 816.116(b)(3)(iv).

7. Subsections 816.117(c)(1)(2) and (3) apply to areas where commercial tree species, non-commercial tree species, shrubs and half-shrubs are used for wildlife habitat, shelter belts and other forest use. Reference areas are used to assess vegetation success since they will describe natural distributions of species, proportional distribution by life forms and woody plant stocking. Standards of ground cover specified in Section 816.116(b)(3)(iv) will apply. The objective is to approximate species diversity, seasonal variety and regenerative capacity at least equal in extent to the natural vegetation of the area.

8. A commenter stated that a forested area when denuded, will result in a loss of biomass which requires many years for replacement. This is recognized. The regulations have a self-regenerative requirement for vegetation and the operator is held liable until the regulatory authority is satisfied that the status required by the regulations is achieved. With this achieved, as in successful reforestation activities, the vegetation will continue to increase and the former biomass will be achieved in the future. No change in this section was needed, therefore.

§§ 816.131 and 816.132 Cessation of operations.

These Sections require persons conducting surface mining activities who cease operations on either a temporary or permanent basis to eliminate safety hazards and assure environmental protection, including erosion control and mitigation of visual degradation. Authority for these Sections is found in the Act in Sections 102, 201, 501, 503, 504, 509, 510, and 515. Section 816.131(a) specifies that in the event of temporary shutdown, surface facilities, including such items as equipment and storage facilities, that are in areas where mining has not yet commenced, shall be secured to insure against hazard to the public health and safety to the environment. One commenter suggested that operations should be allowed to temporarily cease as a result of unforeseen circumstances without closing all surface access to underground operations, and that no notice to the regulatory authority be required. Section 816.131(b) specifies that if the mining and the phrase "and close all surface access opening to underground operations" was deleted as inapplicable, since underground mines are regulated by Section 817.131. However, under paragraphs 816.131(b), notification may be required if it will assist in enforcement administration and will enable the regulatory authority to evaluate closure plans in a timely manner.

Under Section 816.131(b), the operator is required to advise the regulatory authority of his intentions to temporarily cease operations. The operator shall include in his cessation plans: the total area that will have been affected, kind of reclamation to be done prior to cessation and identification of those activities that will continue during the temporary cessation. One commenter contended that identifying the activities which will continue during the temporary cessation is unnecessary. However, Section 101(e) of the Act states that one purpose of the Act is to minimize, so far as practical, the adverse environmental effects of mining operations. The provision in Section 816.131(b) would assure notification to the regulatory authority of those activities which will continue to improve the environment and assure that the provisions of this Section were being met. It also would give the regulatory authority the opportunity to modify the plan if different measures were appropriate.

Several commenters suggested revising Section 816.131(b) by defining the temporary cessation of operations in terms of time (planned vs. unplanned) as well as deletion of the statement of activities that would continue during a temporary cessation. The adverse environmental effects from an operation during temporary cessation of operation would be essentially the same regardless of the fact that the cessation was planned or unplanned. However, due to the nature of surface mining, adverse weather, labor disputes, and the coal market itself, temporary cessation of mining is relatively common. Many of these temporary cessations are brief, often a week or less. To eliminate relatively unproductive paperwork, which would be both time-consuming and expensive and would place a large burden on the regulatory authority, the phrase "for a period of 30 days or more or as soon as it is known that a temporary cessation will extend beyond 30 days" was added to 816.131(b). OSM believes that in most cases regulatory authorities may find it difficult to respond to conditions in a meaningful way in less than 30 days. The plan which must be provided will assure that environmental protection measures necessary under the permit will continue or that appropriate alternative measures have been brought to the regulatory authority's attention. This will facilitate meaningful evaluation of the closure measures and permit their modification if necessary.

Section 816.132(a) defines the operations which must be completed when permanent cessation of surface mining activities occurs. In order to fulfill the purposes of the Act under Section 102, which basically are the protection of public health and safety and environment, complete reclamation is mandatory when an operation ceases. Additionally, this may deter an operator from abandonment of the site, since abandonment without proper reclamation would constitute violation of the performance standards and could lead to bond forfeiture.

A commenter suggested changing the language of 816.132(a) by deleting the word "permanently" from the phrase "or otherwise permanently reclaim all affected areas." The statute sets performance standards that require affected areas to be reclaimed.
The word "permanently" doesn't imply that the area cannot be restored in a future mining operation, only that the reclamation operations on the area are completed in a manner to ensure that no further surface disturbances occur. Utilizing the word "permanent" would not eliminate the possibility of redisturbing the area in order to facilitate future mining, although this is not encouraged. Accordingly, the suggested deletion was not made.

Under Section 816.132(b), removal of facilities and reclamation of affected land when mining occurs is mandatory. Exceptions will be granted for facilities required for environmental monitoring or suitable for the post-mining land use. This provision insures the public safety and environmental protection as required under Section 102 of the Act. Several commenters felt the need to change the language of 816.132(b) as proposed. They felt if the surface mining is to cease permanently, there should be no further surface mining activities and, therefore, no equipment should be left on the site for continued surface mining activities. Based on these concerns, the provision to delete retention of equipment for "continued surface mining activities," since OSM has not wished there to be any ambiguity. This Section applies at the end of all operations at the site, and not between mining phases, which is covered by Section 816.131.

§ 816.133 Postmining land use.

This Section sets forth criteria and procedures for use by the regulatory authority in determining postmining use of the affected area and approving postmining land uses which are different from premining uses. Section 816.133 is divided into three subparts: (a) sets forth the general requirement that the affected area shall be restored to conditions capable of supporting the premining use or an alternative better or higher use. Paragraph (b) sets forth criteria for determining premining use, and Paragraph (c) sets forth the criteria for approval by the regulatory authority of alternative postmining uses. As stated in the definition Section (Section 701.5), a change of land use or uses from one of the defined land use categories to another constitutes an alternative use which is subject to regulatory authority approval under Section 816.133 or 817.135. The criteria in this Section reflect Congressional recognition that, while surface coal mining operations are normally a temporary use of the land, it was necessary to ensure that the affected area be returned to a land use as soon as possible at least equal to that of the land's premining condition, and that the postmining condition be consistent with the surrounding landscape and not contribute to environmental deterioration.

It was the intent of Congress to require submission of sufficient information in order to evaluate an operator's plan and ability to achieve the postmining land use. These goals are intended to be accomplished under this Section together with other Sections which require that certain information necessary for land use decisions be included in the permit application (Sections 779.22 and 780.23, for example). Under this Section, alternative postmining land uses may be approved by the regulatory authority when they are found to be higher or better uses when compared to the premining use in situations where the land will be returned to approximately original contour; or an industrial, commercial, agricultural, residential, or public facility (including recreational facilities) postmining land use will be developed under a mountain top removal variance from approximate original contour pursuant to Sections 785.16 and 824.11; or an industrial, commercial, residential or public use (including recreational facilities) postmining land use will be developed under a steep slope variance from approximate original contour pursuant to Sections 785.16 and 826.16. The Office considers the criteria for identification and achievement of postmining land uses to be essential for achieving the purposes of the Act, and for enabling the regulatory authority to judge proposals as reasonably achievable and consistent with land uses and planning in the surrounding area. (Sections 516(c)(9)(B) and (C) of the Act).

Authority for Section 816.133 is found in Sections 102, 201, 501, 503, 504, 508 and 515 of the Act.

The following technical literature was considered in developing this section.

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1. A commenter suggested that proposed Section 816.133 tended to de-emphasize the multiple use concept of land restoration, in part, because the land use definitions have been moved from Section 715.13 of the initial regulations (42 Fed. Reg. 62,681, December 13, 1977) to designation sections of the permanent paragraphs, Section 701.5. The Office considered adding the concept of multiple use in Section 816.133(a)(1). Multiple land uses are not prohibited by the Act or the permanent regulations but are not specifically authorized by the Act or the permanent regulations. A prohibition and since emphasis on multiple benefits from reclaimed lands is already found throughout the regulations (See, for example, Section 816.97 (Fish and wildlife habitat) and Section 816.116-117 (Forest)). The Office believes that it is unnecessary to reword Section 816.133(a) to specifically authorize multiple uses.

2. A few commenters suggested that the “highest and best used” in determining postmining use of land which has been mined and not reclaimed, (Section 816.133(b)(1)), may not be compatible with the back to approximate original contour requirement. One commenter suggested that operators who are reclaiming previously mined areas without governmental assistance should be allowed to apply for a limited variance under proposed Section 826.13 (steep slope mining). The Office considered adding language to clarify in steep slope and mountain top removal variances are available prior to the release of lands from the permit area in accordance with Section 807.12(c). This change is necessary to make it clear that restoration must occur in a timely manner. The Office has considered changing the phrase to “before permanent abandonment.” This phrase has been replaced with “prior to the release of lands from the permit area in accordance with Section 807.12(c).” This change is necessary to make it clear that restoration in a timely manner must occur prior to release of the performance bond. Prior to this change, it was unclear when permanent abandonment occurred. The second change occurs in Section 816.133(c)(9)(i) where the Subchapter and Section references for the appropriate performance regulations were added for the convenience of the reader.

4. A few commenters objected to the entire structure of Section 816.133(c) and recommended deleting everything after the first sentence of Paragraph (c). These commenters stated that the criteria and procedures contained in Section 816.133(c) incorrectly incorporated the provisions for obtaining variances from original contour (Sections 515(c) and (e) of the Act). The Office realizes that the criteria and procedures stated in these three Sections of the Act are not identical. However, the Office believes that the land use concepts stated in these sections of the Act are integrally related and that a compromise of these concepts is a reasonable approach to setting forth the required requirements for approval of proposed postmining land uses.

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The Office has made two editorial changes to Section 816.133(c). In the introductory Paragraph of Section 816.133(c), the phrase “before permanent abandonment” has been replaced with “prior to the release of lands from the permit area in accordance with Section 807.12(c).” This change is necessary to make it clear that restoration in a timely manner must occur prior to release of the performance bond. Prior to this change, it was unclear when permanent abandonment occurred. The second change occurs in Section 816.133(c)(9)(i) where the Subchapter and Section references for the appropriate performance regulations were added for the convenience of the reader.

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A few commenters suggested that the introductory paragraph of Section 816.133(c) be required to be approved according to the land use definitions in the Act and the permanent regulations. The Office believes that a reasonable approach to setting forth the required requirements for approval of proposed postmining land uses.

A few commenters suggested that the Act's legislative history makes clear that Congress did not intend for the postmining use of land which had been improperly managed to be limited to its most recent premining use. Congress intended for the postmining use to be based on its "potential utility" for a number of uses before mining, not some low use which may have resulted from mismanagement. The Act's legislative history makes clear that Congress did not intend for the postmining use of land which had been improperly managed to be limited to its most recent premining use. Congress intended for the postmining use to be based on its "potential utility" for a number of uses before mining, not some low use which may have resulted from mismanagement.

The Office considered deleting Section 826.13(b)(2) and the words "properly managed" in Section 816.133(b). The Act's legislative history makes clear that Congress did not intend for the postmining use of land which had been improperly managed to be limited to its most recent premining use. Congress intended for the postmining use to be based on its "potential utility" for a number of uses before mining, not some low use which may have resulted from mismanagement.

5. A few commenters suggested that the Act's legislative history makes clear that Congress did not intend for the postmining use of land which had been improperly managed to be limited to its most recent premining use. Congress intended for the postmining use to be based on its "potential utility" for a number of uses before mining, not some low use which may have resulted from mismanagement.

6. A few commenters suggested that the Act's legislative history makes clear that Congress did not intend for the postmining use of land which had been improperly managed to be limited to its most recent premining use. Congress intended for the postmining use to be based on its "potential utility" for a number of uses before mining, not some low use which may have resulted from mismanagement.

7. A few commenters suggested that the Act's legislative history makes clear that Congress did not intend for the postmining use of land which had been improperly managed to be limited to its most recent premining use. Congress intended for the postmining use to be based on its "potential utility" for a number of uses before mining, not some low use which may have resulted from mismanagement.
changes, including compatibility, be made by the regulatory authority. These decisions are made after reviewing the information contained in the application, including review of written comments and of any approvals, such as for zoning requirements. Such land use regulations are intended to supplement rather than create existing land planning capabilities.

8. A few commenters objected to the requirement, Section 816.133(c)(1), that a written statement of the view of governmental planning authorities be filed with the regulatory authority prior to mining. One commenter stated that it will be difficult to secure and file a written statement before mining begins and that filing such a statement would preclude the right of the surface owner to change his or her mind. Others suggested that the regulations should place the burden to consent to changes in the postmining land use authorities rather than place the burden on the operator to secure the comment. One commenter suggested limiting the period during which state and local authorities may comment to 60 days. All of these suggested alternatives were considered by OSM.

As to the written statement of views of planning authorities, Section 508.508(c) clearly states that comments of these authorities must be obtained as part of the permit application, i.e., prior to any mining. To ensure timely response by these authorities, the Office has accepted the comment regarding the 60-day period and has added that language to the regulation.

Regardless of whether a written statement of views is received within the 60 days, the regulatory authority is obligated to ensure that any necessary changes in the postmining land use are received prior to approving the alternative land use. The Office believes that subsequent changes in the proposed alternative use, whether as a result of the surface owner's desire or otherwise, can be accommodated under other regulations. (See Section 788.11, which provides that the regulatory authority shall periodically review each permit).

9. A commenter suggested that the written statement of views not be required where changes in agricultural uses are involved because such a statement is not necessary for changes in a type of agricultural use. Section 508(a)(3) requires a written statement without regard to the type of land use proposed to be achieved. The Office believes that an exception for agricultural uses is, therefore, not permitted by the Act. In situations where the use planning agencies do not have provisions for changes in types of agricultural land use, they may so state in their written views.

10. Several commenters thought that the language of Section 816.133(c)(2) was inconsistent with the requirements of the Act. Specifically, it was suggested that the phrase “as related to needs” be deleted. This suggested alternative was accepted as being in accord with the Act. “Needs” has thus been deleted from Paragraph 2.

11. A few commenters suggested that the requirement in Section 816.133(c)(3) that “parties other than the person who conducts the surface mining” supply letters of commitment to provide necessary public services is inappropriate in situations where the operator chooses to incur the costs for such facilities. The Office considered the requirements that the operator supply the letter of commitment to provide public services.

The Office views “public services” as only those services provided to the public generally (e.g., schools, police protection) and not facilities which are traditionally required to be provided by the site developer (e.g., roads and sewer systems). Viewed in this context, a letter of commitment must necessarily come from a public institution or an organization regulated by such an institution. Therefore, no change was made.

A number of commenters objected to the requirement for a letter of commitment in Section 816.133(c)(4) while a few commenters supported the requirement. Several commenters stated that the requirement was unnecessary because parties other than the operator are usually not involved in the planning and attainment of the use.

12. Several commenters suggested that Section 816.133(c)(5)(i) of the Act requires that land use changes must be based on legislative history which demonstrates that commitments and assurances concerning postmining use must be given prior to issuance of a permit. (26 U.S.C. 218, 95th Cong., 1st Sess. 94 (1977)). Congress considered financial capability as a prerequisite for issuance of a permit. (H. Rept. 95-218, 95th Cong., 1st Sess. 124 (1977)). The fifth alternative, qualifying the letter of commitment requirement with the words “if appropriate” is feasible if “appropriate” is well-defined. In the context of this subparagraph, “if appropriate” excludes only those operators who are going to do both the mining and the development of the postmining land use from obtaining a letter of commitment from third parties. Release of the operator bond, in such instances, fulfills the requirement of the postmining land use obligation.

In these cases, the letter of commitment must still be provided as a part of the permit application but it may be supplied by the operator. The Office has determined that the fifth alternative will protect the interests of the public and allow operators the necessary flexibility. Accordingly, the words “if appropriate” have been added to Section 816.133(c)(4).

13. A few commenters suggested deleting Section 816.133(c)(7) (which requires that the proposed land use not involve unreasonable delays in reclamation) on the basis that the postmining land.
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use itself constitutes reclamation. The Office considered two alternatives in response to this comment: (1) delete Section 816.133(c)(7), and (2) revise this Paragraph to to clarify possible differences between reclamation (e.g., final grading and revegetation) and the final land use.

Under some circumstances, there may be a substantial amount of time between completion of mining and the ultimate establishment of the proposed use. This rule is designed to ensure that such circumstances do not result in delaying final grading and revegetation necessary to prevent erosion, though this revegetation may not represent final land use. The Office believes that this is necessary to avoid possible adverse environmental harm. Thus, no change in Section 816.133(c)(7) was made.

14. A number of commenters objected to the requirement in Section 816.450(c)(10) that the operator, landowner or the land manager, whichever is appropriate, be held responsible for crop management, water availability and topsoil quality and depth are necessary to ensure the feasibility of the proposed use as well as to accomplish the Congressional purpose of balancing coal production and protection of agricultural land. The Office believes that the final land use may not be clearly feasible if it cannot be maintained after the operator's responsibility is terminated.

§816.150-816.176 Roads.

These Sections have been developed to implement the permanent environmental protection standards for the design, construction, utilization, maintenance and restoration of roads at surface coal mining and reclamation operations. These regulations are promulgated to ensure that roads at mine operations will not cause adverse environmental effects or damage to public or private property. The Office believes that this is necessary to address environmental concerns related to mine roads, on more specific terms than the version proposed on September 18, 1978, in response to the numerous comments received on this subject.

The permanent road regulations incorporate the development of a three-tier road classification system. The definition of each class of road is found in Section 701.5 and is based on planned volume of traffic, speed limit of the vehicle used outside the pit area. The reader is referred to the preamble discussion for the definitions of roads in Section 701.5 for an analysis of certain issues relevant to Sections 816.150-816.176.

The order of presentation of performance standards for each road class follows closely the sequence in the proposed regulations; including location, design and construction, drainage, surfacing, maintenance and restoration.

The literature, State laws and regulations, and other materials used in preparing these regulations include:

6. West Virginia Department of Natural Resources, 1971, surface mining reclamation regulations—Chapter 20-
9. “Steel Drainage and Highway Construction Products.”
13. AASHTO, T-180.
14. AASHTO, T-91.
15. AASHTO, T-91.

Many comments were received which stated that the proposed road regulations were too rigid and were not sensitive to varying physical conditions, types of equipment used along the road, the manner in which the road would be used and maintained, and what would be done with the road before and after site abandonment. OSM considered these comments extensively in the development of permanent regulations and performance standards. During the comment review period OSM evaluated the various proposed methods which were suggested for classifying the various types of roads used at surface coal mining and reclamation operations.

For example, one alternative proposed by several commenters suggested classifying roads by vehicular use; such as main haulage roads traveled by large-sized tractor-pulled dump trucks and coal hauling trucks and secondary roads used primarily by ancillary equipment for supervising and
serving the mine site equipment and facilities. OSM considered that particular class of roads, and it was determined that many operations throughout the Nation have multiple uses for most roads within the mine plan and permit area, either for access to the mine operation or between various operations and facilities within the total operation, including: exploration areas; mine pit areas; excess spoil disposal sites; preparation plants; coal waste disposal sites; water treatment facilities; office and maintenance areas; and others. Consequently, a larger portion of the roads than necessary would be required to be designed, constructed and maintained to enable usage by the largest hauling trucks in a two category classification system.

One group of comments suggested standards be developed for three classes of roads: haul roads, access roads and ancillary roads. The justification given for the suggestion was that this would reflect differences in uses.

At the other end of the spectrum, many comments were received which emphasized that specific road specifications should not be required because local and unique conditions would be dealt with by the operator. The recommendation was to limit the Federal performance standards to generalized guidelines and suggestions which would then serve as the nucleus for the State regulatory authorities to develop standards unique to local conditions. The underlying thrust of comments was that State regulatory authorities should not impair or restrict free thinking by the mine operator, who would be the best judge to finally recommend the best method for road construction and maintenance. OSM determined that such general standards, incorporating broad interpretation capabilities, would not be consistent with the intent of the Act or the rest of the regulatory scheme. The legislative history discussed the environmental impacts associated with inadequate road construction and reclamation practices (for example, see H.R. No. 95-218, p. 126). General provisions would not ensure that the environmental concerns would be satisfactorily met, including such concerns as stabilization of surface areas affected by mining from water and air erosion (Section 516(b)(4) of the Act), or maintaining, altering or improving the construction, maintenance and postmining conditions of access roads into and across the site of operations which would control or prevent erosion and siltation, pollution of water, damage to fish and wildlife habitat and litter in public or private property (Section 516(b)(17) of the Act). This recommendation was, therefore, not accepted.

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Additional consideration was given by OSM to evaluating the numerous Federal, state, local and private rules, specifications and guidelines for the design, construction, maintenance and reclamation of roads established by Federal agencies, State regulatory authorities and professional construction associations. For example, the U.S. Forest Service and Soil Conservation Service have evaluated erosion problems and stream siltations from logging and farming areas for many years (U.S. Forest Service 1977, and U.S. Soil Conservation Service 1975(a)): MSHA has developed regulations for improving safety on mine roads; State regulatory agencies have developed a wide variety of regulations for the design and use of haul and access roads; and standards for road construction have been developed through ASSHTO. A wide variety of options were available from which to generate a road classification system comprehensive enough to ensure that the environmental mandates of the Act are satisfied, while providing enough flexibility to permit the regulatory authority or the mine operator to consider local conditions and problems. OSM developed a three-tiered classification system by synthesizing concepts, practices and techniques for the design and construction, reconstruction, utilization, maintenance and restoration of roads. The final regulations flow from the proposed regulations, and sources mentioned above including the comments received.

OSM concluded that the structure of the proposed regulations was basically sound. Accordingly, the structure of the presentation has been retained. However, OSM felt it should clarify, within the regulations, the range of standards appropriate for different types of roads, including providing this range in a technical guidance document or in this preamble discussion, but rejected these alternatives on the ground that they would not be as effective as in achieving national similarity of standards or in allowing operators to anticipate regulatory requirements under regulatory programs to be approved under Subchapter C.

The reader should read portions of the preamble of September 18, 1978 which discuss the proposed road rules (43 FEDERAL REGISTER 41739-41740) for a discussion of the bases and purposes of the proposed rules.

A three-class road structure was developed to cover every roadway within the affected mine area with an appropriate set of performance standards and design criteria. The most stringent specifications were established for coal transport. OSM determined that the generally large trucks used to haul coal, the high frequency of trips and the fact that coal hauling exists throughout most of the life of the operation. Associated with these criteria is the fact that competent road design and maintenance must be required to minimize the erosion from the roadway and resultant siltation of adjacent streams, to reduce impact on fish and wildlife habitat and ensure that the stability of the roadway to protect the welfare of the public. In addition to coal haulage, these roads are often utilized by excess spoil haulage trucks and other heavy equipment.

Class II Roads are identified as roads used for purposes other than coal transport, but which will be in service over a six-month period or longer. These roadways experience use similar to Class I Roads except often for different purposes and usually of a lesser volume, weight and frequency of use. These roads would handle such tasks as, but not limited to, haulage to head-of-hollow or valley fills truck disposal of coal processing waste; servicing of major facilities including sedimentation ponds, treatment facilities, office and maintenance buildings; and other uses. These roads require environmental protection standards similar to Class I Roads although modified to reflect that the duration of their use may be shorter and the intensity less. It should be noted that in paragraph 701(28) of the Act a distinction is drawn between roads used for different purposes (there "access" and "haulage")

Class III Roads are roads other than Class I Roads planned to be used less than six-months. These roads would often include those constructed for such uses as exploration.

This classification procedure reflects that variable environmental impacts are to be realized by varying uses of roads and the location of the roadway. OSM believes that flexibility allowed with this three-class road procedure will enable the regulatory authority to consider varying geographic and environmental circumstances, while providing appropriate protection to the surrounding natural resources and restoration of those lands affected by the mining operations.

The organization of the regulations for the three types of roads are as follows:

**Class I Roads—Sections 816.150-816.156.**

**Class II Roads—Sections 816.160-816.166.**

**Class III Roads—Sections 816.170-816.176.**

The correlation between the drafted proposed regulation and the revised permanent regulation is shown in the following chart:
The preamble discussion has been organized to permit a discussion of comments received during the public comment period for the proposed regulations and the resultant decisions made by OSM, including accompanying rationale and technical support. The three road class types are discussed simultaneously for ease of comparison. However, when the comments or changes in the regulations related to a specific road class type, that individual comment or change is identified and singularly addressed.

§§ 816.150, 816.160, 816.170 General

Proposed 30 CFR 816.31(a) would have required that all roads, road rights-of-way, and associated structures be designed, constructed, utilized and maintained and later restored to control and protect against erosion and siltation, air and water pollution and damage to public or private property. This paragraph was modified to reflect the three road classes, Class I Roads, Class II Roads and Class III Roads, and now appears as subsections 816.150(a), 816.160(a) and 816.170(a), respectively. Direct reference to road rights-of-way and associated structures was deleted since they are incorporated in the definition of roads in 30 CFR 701.5, and the use of these terms here would be redundant.

Paragraph (a)(1) of proposed Section 816.31 would have required that the best technology currently available must be applied to reduce damage to fish and wildlife habitat and to prevent contributions of suspended solids to streamflow or to runoff outside the permit area. This provision now appears as paragraphs 816.150(b), 816.160(b), and 816.170(b).

Proposed paragraph 816.31(a)(2) stated that roads must be removed and the land disturbed reclaimed to the approved postmining landuse unless approval for retention after mining was obtained, maintenance assured and drainage controlled. For Class I Roads and Class II Roads these provisions now appear as paragraphs 816.150(c) and 816.160(c), respectively. Under paragraph 816.170(c), Class III Roads must be completely removed in accordance with 30 CFR 816.176, unless the Class III Road is on the location of a proposed Class I or II Road which was abandoned within six months after the Class III Road is built. Since Class III Roads are, by definition, roads in existence for less than six months, there are no provisions for retention of such roads as part of the post-mining land-use. OSM believes that Class III Road design would present environmental risk over the long term if the road is not maintained or removed. Accordingly, the only way may only be permanently retained if it is brought up to Class I or Class II standards.

Many comments were received asserting that the draft permanent regulations for road design and construction were not adequate to ensure environmental protection. Some of the comments argued that certain specific conditions had to be met to ensure that the provisions of 515(b)(4),(10),(17) and (18) of the Act would be met. The only differences provided were dependent on road life expectancy. The permanent regulations have been expanded to more clearly enable road design and construction to be established based on the proposed use of the road and the volume and size of the equipment using the road, which bears more directly on design needs than mere length of useful life.

Class I Roads, Class II Roads and Class III Roads must now be designed in compliance with the criteria set forth in 816.150(a), 816.160(a) and 816.170(a), respectively. The permanent regulations have been expanded to more clearly enable road design and construction to be established based on the proposed use of the road and the volume and size of the equipment using the road, which bears more directly on design needs than mere length of useful life.

Class I Roads, Class II Roads and Class III Roads must now be designed in compliance with the criteria set forth in 816.150(a), 816.160(a) and 816.170(a), respectively. The performance standards are the minimum requirements which must be met to protect the surrounding environmental resource.

Paragraph (d) of Section 816.159 requires the Class I Roads to be designed by registered professional engineers in keeping with the Act's preference for these professionals for design of critical structures and important plans. See Sections 507(b)(14) and 515(b)(10)(B)(ii) of the Act, for example. However, no such requirement is made for Class II and Class III Roads. Since the risks from such roads are less, the added expense may not be justified.

OSM considered various comments which asserted that the rigidity of the proposed regulations would make them unduly burdensome. OSM is convinced that strict compliance with the proposed regulations could, in some cases, have caused more harm to national goals than if no requirement or remedial action were necessary. In the case of existing roads, costs to bring structures immediately into compliance with performance standards (not even design criteria) may be prohibitive. In some cases, and operators might, in the extreme case, abandon their mines before a State program is approved. The reader is referred to the preamble discussions of 701.11(e), 780.12 and 786.21, for a discussion of the general applicability of the requirements of 816.150-816.176 to existing roads. It has been asserted that site-specific terrain may make strict compliance with grade or other requirements result in roads which involve the movement of inordinate amounts of topsoil, soil and rock materials. OSM believes that appropriate expertise and local knowledge exists in the different States. For example, every State has a road or highway department which is familiar with a wide variety of conditions throughout the State demanding special consideration. In unique situations such as areas highly susceptible to landslides, their guidance and knowledge would prove invaluable.

Accordingly OSM has allowed design flexibility for Class I and Class II Roads where two mandatory requirements are satisfied (Sections 816.150(d)(1) and 816.160(d)(1)). First, the burden of proof for requesting alternative design and construction specifications rests with the operator or permit applicant. It must be shown to the satisfaction of the regulatory authority that the proposed alternative will be as environmentally sound and as structurally stable as the criteria required in the permanent Federal regulatory program. Secondly, OSM has required that the request to employ alternative specifications be certified by a registered professional engineer. This requirement is necessary because the minimum performance standards are established on sound technical knowledge, the support for which is presented in the following discussions. Alternative standards and criteria must be established on similar knowledge.

The request for approval of an alternative should include at a minimum, the necessity of the request, a description of the intended use of the road structure, comparison between the minimal requirements and proposed alternative(s), and the technical criteria supporting the reliability of the new specifications in complying with the minimal environmental performance standards. Sections 816.150(d)(1), 816.160(d)(1) and 816.170(d) provide that the design of the road must be based on its anticipated use. This provides a criterion
upon which the regulatory authority, the public and OSM can evaluate the design and determine its appropriateness. This criterion does not constitute a separate variance from the specific performance standards which follow, but merely a means of evaluating the specific designs offered as fulfilling those standards.

In addition, § 816.171(d) specifically focuses on the attention of the operator and the regulatory authority on the fact that Class III standards are designed for low-use roadways, and that heavier traffic is anticipated the designs must be upgraded, as appropriate, from the minimum standards of Sections 816.171-816.176.

§ 816.181, 816.161 and 816.171 Location.

These Sections derive from proposed Section 816.32. For clarity, each sentence in this version is now a separate paragraph.

The first sentence of the proposed version required that all roads be located on ridges or the flattest and most stable slopes to minimize erosion, as in OSM’s interim program, 30 CFR 715.171(1)(c) (42 FR 62688, December 13, 1977). One comment was received which asserted that the flattest slope within a region may not necessarily be the logical location for a road. The reference to flattest slopes incorporated two concepts; namely, traditional flat slopes on surface would be underlain by competent rock, such as river benches, suitable for location of highways and railroads and secondly, the intent was to minimize the necessity of excessive road cuts. However, hazardous results could occur if, for example, a flat slope located on a hillside were potentially slide prone. A region characterized by an undulating surface will also contain areas which could be composed of transported materials, rock and soil, and swamps (USFS, 1972). Obviously, these deposits would not be regarded as the most stable or competent sites for the location of a road. The stability of rock out-crops and unconsolidated deposits is dependent on the characteristics of the rock or other soil including bearing strength, physical and chemical properties, degree of decomposition, presence of water and other properties (Pfieffer, 1968, pp. 773-779). The siting of a road is extremely important because parent or original land surface including excavation down to competent stratum serves as the subgrade or subbase of the road (USFS, 1974, Sec. 21.50). A stable subbase is fundamental to road design (Kaufman and Ault, 1977, p. 19). OSM has rewritten the language and the final rule eliminates the requirement to use the flattest slopes in all cases and now requires only that roads be located on ridges or the most stable available slopes. All classes of roads in 30 CFR 816.151(a), 30 CFR 816.161(a) and 30 CFR 816.171(a) are to be located on the most stable surfaces. Elimination of the requirement to use the flattest slope in the interim program prevents a low hydrologic risk only because of controls in the permit and bond requirements, which are not part of the permanent program. Roads on other than the flattest slope can result in excessive disruption of runoff patterns unless controlled by careful planning and review as required in the permanent program through the permit process.

Paragraph (b) prohibits the location in stream beds or drainage channels to implement Sections 515(b)(18) and 515(c)(10). All of the existing language has been expanded to include intermittent as well as permanent streams, the siting of roads or other travel routes immediately adjacent to or in stream channels may destroy the aquatic life, rutting causes changes in stream channels may destroy the aquatic life, rutting causes changes in the channel and bed material, and construction of roads in stream channels may destroy the aquatic life, and their habitat and to prevent serious alteration of streamflow.

One commenter suggested additional language be included in the proposed rule, to read “101 outer stream cross-
ings shall be made using bridges, culverts, or other structures designed, constructed, and maintained to meet requirements of this Section and other applicable requirements. The rationale offered for the change was that in certain States, other applicable approvals are required and that this Section does not specifically require the State requirements to apply. Section 505(c) of the Act ensures that other, more stringent State requirements to meet environmental parameters, are to be construed as consistent with the Act. Because of these provisions in the Act, the additional language was rejected as unnecessary. However, a State program may include specific requirements for showing of compliance with other applicable State laws, so long as such compliance does not authorize or constitute a lower standard of performance than required by these rules.

One commenter objected to the proposed language which became paragraph (b) of the new proposed rule. He suggested that the rule would have prohibited construction of roads which increased downstream sedimentation or flooding, which, if literally applied, would have made compliance in many instances impossible. To be consistent with Sections 780.12 and 786.21 of these rules; and the reader is referred to the preamble discussion of those provisions for OSM's disposition of this comment.

Paragraph 816.171(g) is intended explicitly to permit temporary roads necessary for the construction of Class I or Class II Roads. Before the roadbed is laid and the major road is used in mining, surveying and construction vehicles must have access to the planned right-of-way. OSM believes this provision is not the same as is covered by the existing structures provision of Sections 701.11(e), 780.12 and 786.21. Accordingly, no change was made here. The reader is referred to the preamble discussion of those other Sections.

Paragraph (d) is concerned with vertical alignment. There are a few coal mining States that allow grades of 20 percent or more for mine roads. The majority of the States, however, have established 15 percent as the maximum grade (Bureau of Mines, 1977). West Virginia does not allow mine haulageways having sustained grades exceeding 10 percent, with maximum grade not to exceed 15 percent for 300 feet. These basically are the gradient requirements for mine roads which were proposed for comment on September 18, 1978, as Section 816.33.

Numerous comments were received suggesting allowance of variances for site-specific conditions on the grade requirements for vertical alignment. Many of these comments were used in developing the new requirements for the three classes of roads which are appropriately based on the volume of traffic and the weight and speed of vehicles using the road. This approach is based, in part, on U. S. Forest Service 1977, Sec. 34; Facker, P. E., 1965, Fig. 1; and Section 816.33 which has the same criteria as proposed in
the regulations because its primary use is for coal haulage. The Class I road standard allows for a 10-percent overall grade with 15-percent pitch for 500 feet within any 1,000 feet. Support for this standard is provided by the U.S. Forest Service Handbook, Section 24.4. OSM's evaluation determined the ability of water to erode soil and transport sediment is an exponential relationship with increases in slope of the road. Rates of erosion are greater on steeper grades than on flatter grades. Overland flow velocities are also greater in steep grade road micro- and macro-erosion is more likely to occur (Linsley, Ray K., 1975, p. 401.) Accordingly, specific grade limits have been included.

One commenter suggested the overall maximum grade be increased from 10 to 12 percent. The rationale was that there would be less disturbed earthwork and reduced discharge of particulate matter into streams. OSM evaluated the two percent difference although the commenter had not provided supportive facts. The proposal was not accepted. OSM recognizes that although less land might be disturbed, the increased erosion and sedimentation potential during major storm events was considered to outweigh the benefit of less disturbed area. OSM believes the three class road system provides environmental protection with the flexibility and economic benefits the commenter requested.

One commenter suggested deleting entirely the specific vertical alignment and overall grade requirements on the grounds that when the required performance standards are met, there is no need for these limitations. Sound engineering design recognizes a balance between vertical and horizontal alignment to enhance erosion control, streamline drainage control and generally provide a more economic location. (U.S. Forest Service, 1977, Section 24.11 and 24.3.) OSM evaluated the standard and noted that the comment included a condition that if specified mine needs are not incorporated in existing State Transportation Department rules and procedures. In part as a result of this analysis, a national three class road system was evolved, with standards for each road class and, when applicable, allowing the regulatory authority site specific exceptions. OSM considered these requirements too restrictive because of the specific mine needs are not incorporated in existing State Transportation Department rules and procedures. In part as a result of this analysis, a national three class road system was evolved, with standards for each road class and, where appropriate, allowing the regulatory authority site specific exceptions. OSM determined that the requested deletion would not be consistent with Section 515(b)(10) and 515(b)(17) of the Act or the rules as enacted.
Several commenters proposed deletion of the entire road construction and vertical alinement Sections on the grounds that they would result in increased length of road, additional cuts, switchbacks, and drainage facilities, with greater environmental impact, "poorer safety potential, and increased costs. The legislative history of the Act recognized the continuing and long standing environmental problems that roads present and mandates a shift from past practices. The legislative history recognized that roads designed and constructed under appropriate standards assure that environmental objectives are met. Therefore, OSM rejected this proposal to delete the road construction and vertical alinement Sections.

Several commenters urged the regulatory authority be granted the right to allow higher road grades. OSM evaluated this proposal and believes that the three class road system fulfills the intent of the statute by assuring that a "loophole" in not created. OSM also believes requiring that the design and construction or reconstruction be certified or approved by professional engineers and the opportunity to use alternative specifications provides flexibility and still provide protection from erosion.

Some commenters recommended different alinement requirements for non-coal haulage vehicles and temporary roads used by four-wheel drive vehicles. OSM evaluated the suggestion in terms of protection from potential erosion and meeting water quality standards in 30 CFR § 816.42 and § 816.43. The commenters wanted to account in developing the alinement standards for Class II Roads 30 CFR § 816.162(a) and § 816.172(a) and Class III Roads 30 CFR § 816.172(a) and § 816.172(c). One commenter recommended substituting the word "profile" for vertical alinement. Both terms are used by engineers and the term "vertical" is more clear. Design standards and elements in U.S. Forest Service 1977, Sections 24.11, 24.2, and 24.3 utilize the term vertical as a national guide for qualified design engineers. OSM considered both terms and selected vertical alinement.

§ § 816.152(b), 816.162(b) Horizontal alinement.

As a result of comments received, OSM evaluated the various proposals for horizontal alinement. One comment suggested concurrently with vertical alinement, that although the required design criteria had no relation to the environmental standards that are to be met. They argued the criteria would result in a higher cost road that might reduce maintenance cost but would provide no environmental protection. OSM believes that assurance that the performance standards will be met is best provided by requiring minimum designed criteria, and therefore the comments suggestions were rejected. (U.S. Forest Service, 1977 and Pflieger on S.W., 1968, Chapter 9, 12 and 13.1-3 on p. 830.)

The Office does not agree that the proposed design criteria of these Sections are not related to erosion and sediment control. These requirements are provided to ensure embankment stability in general, thus reducing erosion or mass wasting of fills and subsequent sedimentation of nearby streams. The Office further believes that although the required design criteria requirements provide sufficient flexibility for the regulatory authority to meet local, unique or unusual situation, it may permit the operator to further "tailor" the road construction to local environmental conditions.

Some commenters suggested explicitly providing that the embankment requirements apply unless a different requirement is approved by the regulatory authority. Other commenters advocated that each State use design criteria consistent with that required by their respective transportation departments. Because of the need for general
national performance standards, OSM has responded to these commenters' concerns by development of a three-class road standards system for each class, and allowing the regulatory authority for site specific exception where equal results are demonstrated by a qualified engineer. Many stringent statewide criteria will be allowed under Subchapter C relating to approval of State programs.

Several comments were received with respect to the proposed limitation of road cut and embankment standards to roads which would be in place and in use for more than five years. The States of Kentucky and North Dakota proposed changes to this limitation, to provide the regulatory authority the ability to enforce these requirements on roads that are to be maintained for a period of less than five years. These two States argued that by having the requirement for roads in place less than 5 years will ensure stabilized and maintainable roads; and thus better protect the existing hydrologic balance.

One commenter recommended that the road embankment rules should apply in all instances where the regulatory authority considers it advisable or necessary. This commenter stated that simply applying the proposed duration of use standard would be too inflexible. The commenter recommended the regulatory authority should be given more discretion to determine the need for applying construction criteria.

OSM considered these comments and determined that volume of traffic, designed speed, and weight of vehicles provide a more sensitive index to control erosion. OSM's assessment is that the ability of water to erode soil and transport sediment sharply increases with the slope of the road and this, together with the volume of traffic and the addition of design flexibility in the revised road regulations, provided the basis for altering the 5 year criteria (Packer, P.E. 1985, Fig. 1). The ability to allow site-specific exceptions and the addition of design flexibility in the revised road regulations, provided the basis for altering the 5 year criteria (Packer, P.E. 1985, Fig. 1).

A maximum time limit of six months was established on a Class III Road because adverse environmental impact of temporary roads has been shown to be controllable with minimal design criteria. The criteria is based upon the limited traffic volume during the period. All longer-term roads, with their anticipated heavier traffic volume, must meet design criteria established under paragraphs (b) and (d), or have alternative designs approved under the strict standards of 816.150 and 816.160.

Some comments were received questioning the requirements for keying all embankments to be placed on side-slopes greater than 1v: 5h (20 percent). The technique of keying was primarily intended for embankment in rock, so the phrase “or in rock” was added to clarify intention in Class I and II Roads. OSM recognizes this is a stringent requirement for Class II than for Class I roads, based on anticipated usage of the roads.

A comment on the same Section stating proper foundation preparation does not ensure stability but increases it, OSM agrees with the observation and has substituted “increases” for “ensure”.

OSM considered these comments and determined that volume of traffic, designed speed, and weight of vehicles provide a more sensitive index to control erosion. OSM's assessment is that the ability of water to erode soil and transport sediment sharply increases with the slope of the road and this, together with the volume of traffic and the addition of design flexibility in the revised road regulations, provided the basis for altering the 5 year criteria (Packer, P.E. 1985, Fig. 1). The ability to allow site-specific exceptions and the addition of design flexibility in the revised road regulations, provided the basis for altering the 5 year criteria (Packer, P.E. 1985, Fig. 1).

There were several comments objecting to the requirements of proposed 816.33(c)(5) specifying a method for compacting material in an embankment. OSM believes that in the majority of mine roads being constructed, the compaction provided would be with the hauling and leveling equipment used in the actual construction, and therefore retained the basic terminology as proposed. However, OSM recognizes that there should be flexibility to allow for alternative methods and took this into account in 816.150(d) and 816.160(d). Where the design engineer demonstrates an alternative method of compaction resulting in equal or better performance, the method may be allowed by the regulatory authority.

Some commenters objected to the word “horizontal” in reference to lifts, stating it is an unworkable condition to require a horizontal lift placement on a vertical road grade. OSM recognizes that it would be impossible to have a horizontal lift on grades greater than 3 percent and has changed the language to read for Class I and II Roads “spread in successive uniform layers”.

Some commenters recommended total deletion of provisions of the proposed regulations which specified that successive lifts not be placed upon the previous lift until that lift achieved a maximum density of 90 percent of maximum dry density according to ASSHTO requirements. The majority of the concerns centered on the variability of the soil or rock type which would be available for use as an embankment fill. It was asserted that fill material consisting of large, blocky rock such as a competent sandstone or limestone could not be tested by the proposed ASSHTO T-99 procedures. OSM believes that it was essential that embankment material be placed at near maximum density to ensure stability and to minimize erosion and run-off regardless of proposed road use. Many embankments will be constructed on marginal fills along adjacent road cuts. However, some large fills will be built of overburden...
removed at the mine site. Material from road cuts downstream from the depth of cut, availability and quantity of water and the rock type will, in part, be decomposed and the overburden material may consist of a shale or friable sandstone.

The presence of water may serve as a catalyst to decompose the fill material to a clay, or sand-sized, unconsolidated collection of particles. Excess water and the application of additional weight or vibration by moving equipment have aggravated the soil pressure within the fill causing structural failure. (U.S. Dept. of Transportation, Public Roads, March 1978, Vol. 41 No. 4, Albert Demillo). It is the intention of OSM to reduce the advent of embankment failure. Several commenters suggested that OSM consider the ramifications of applying the ASSHTO T-99 procedures for density determinations on bulky material such as sandstone. These procedures would not be applicable in these situations. Because additional requirements are necessary to provide appropriate and reasonable evaluation of fill density, OSM has modified this subsection to address fill density requirements for each class of road. The compaction of each embankment layer for Class I Roads must be adequate to support the project volume and weight of the traffic. Specific density requirements have been deleted. The soil operator, however, must give appropriate consideration to the listed design and construction factors and must apply the appropriate density tests for the predominant rock material used during construction. (Kaufman, 1977, and USFS, 1977, Sections 33.63(1)(c), 33.63(1)(d) and 203.13 for comparable requirements). Compaction of Class II Roads is required until no visible horizontal movement of the material is apparent. Class III Roads embankment must be competent to control erosion.

Many commenters objected to the proposed provision limiting the placing of material in an embankment only when its moisture content is within four percent of the optimum. OSM recognized that it is possible to achieve maximum compaction and be outside the four percent optimum range. Section 816.152(d)(7) was modified to ensure embankment material be placed only when its moisture content is within acceptable levels, to meet the designed compaction standards. (U.S. Forest Service, 1977, Sections 203.13 and 25.31(1)).

Some commenters objected to proposed 816.33(c)(3), stating embankments could be constructed with slopes steeper than those permitted. OSM has maintained the required factor of safety. (U.S. Forest Service, 1977, Sections 24.26, and 33.63(1)(c)). Section 816.152(d)(9) has been revised to reflect OSM's agreement with these comments for Class I and II Roads. Stability is still required, although unjustified rigidity of the standard has been relaxed. No embankment slope limitations are proposed for Class III Roads because of permitted side-casting, low volume of embankment material and low traffic-volume ratios. (U.S. Forest Service, 1977, Sections 203.13).

Crowning is necessary to prevent surface ponding, to provide erosion control, and road surface and embankment stability, to minimize the need for ditches and cross drains, and to simplify maintenance.

Some comments objected to crowning or insloping a road to a drainage ditch. Others objected to a 1/2-inch per foot for crowning or insloping and proposed a 4/2-inch standard. OSM evaluated the various proposals and considered having different requirements for volume of traffic speed and weight of vehicle. The company requirements, Road Class I, which utilize the large hauling vehicles, retains the inslope and crown requirement. This principle is consistent with proven standards established by Federal agencies such as U.S. Forest Service, U.S. Department of Transportation and State agencies and professional road construction associations. The insloping is needed to keep surface drainage functioning and the road surface stable. OSM has charged for Class I Roads from 1/2-inch per foot to 1/4-inch per foot in response to comments which led to OSM's recognition of problems with a 1/2-inch standard during icy, rainy or snowy conditions, when vehicles might slide off the road. (Pfleider, 1988, Chap. 13.1, page 830, and Kaufman, W. K., 1977, p. 33). OSM's evaluation of Road Class II suggested no rigid slope requirements to keep surface drainage functional on these smoothly graded roads. However, there is need for sufficient slope so that water does not pond on the road surface and penetrate into the subgrades. (Kaufman, W. W., 1977, p. 39). It is not the intention of OSM to impose costly, time consuming grade controls or equipment requirements, by incorporation of the cross slope requirement, as some commenters suggested would be the case. The intent is to insure that water flow would not be allowed to pond on or infiltrate the road surface, thereby increasing erosion and potential for reduced water quality. Use of a ruler and level, which is standard practice in the highway industry, provides satisfactory cross slope grades, at no great additional time or costs.

Several commenters objected to the complete exclusion of toxic-forming material in all road embankments. The commenters cited a site-specific case where the road is located over a large existing refuse site and all runoff water is treated. OSM agrees that results of toxicity tests on toxic material to construct a road on a toxic-producing refuse pile would be too burdensome. (U.S. Forest Service, 1977, Section 205. Accordingly, Section 816.152(d)(13) was revised to reflect the site-specific condition for Class I Roads on waste banks.

Several commenters suggested deleting specific design criteria requirements and including their provisions in an introductory paragraphs of 816.152(d) and 816.152(d). Commenters provided the following recommended language revision:

"Embankment sections shall not be constructed until all vegetative material has been removed from the embankment foundations to ensure stability and no vegetative materials shall be placed beneath or in any road embankment. The embankment slopes shall not be steeper than 12 percent and the embankment shall have a minimum safety factor of 1.5 or such higher safety factor as the regulatory authority may specify."
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promulgate specific road construction requirements designed to prevent or control erosion and siltation, pollution of water, etc. The effectiveness of such requirements are well documented in various studies (e.g., Parker, Paul E., 1968, Criteria for Designing and Locating Logging Roads to Control Sedimentation). Further, the Office does not believe that the commenters' suggested language revision would provide adequate minimum standards for mine roads. The commenters' language, for example, excludes specific requirements for "keying" embankments, spreading materials in successive layers, and compacting each layer of embankment before spreading the next layer. These requirements, the Office believes, are essential in maintaining road stability and possible damage to water and aquatic habitats caused by unnecessary erosion and siltation.

Under the new road classification scheme and structuring of the regulations, the Office has adopted the commenters second alternative of wording the specific design criteria to more accurately reflect road construction needs as they relate to mine access and haul roads. Since the commenter did not provide specific language, however, a basis for comparison is not available.

With regard to the commenters concerns relating to the rules being predicated on "rigid type" State and Federal highway engineering standards, the Office would like to point out that the revised rules permit sufficient flexibility.

Some commenters wanted the road cut and embankment requirements only to apply to roads approved for permanent retention as part of the postmining land use. OSM did not accept this because it recognizes erosional and sedimentation problems from non-permanent roads are precisely the kinds of problems the standards of Section 515(b) were intended to solve.

Sections 816.152(d)(1), 816.162(d)(1), and 816.172(d) establish requirements that vegetative materials be removed from the embankment foundation to ensure stability and no vegetative materials on embankment shall be placed beneath or in any road embankment. The purpose of this requirement is to ensure that vegetative materials will not subsequently decompose, thus causing failure of the embankment. The reason for prohibiting the placement of topsoil in embankments is to ensure that topsoil is properly stockpiled and available for respraying during the reclamation phase.

Several commenters objected to the blanket requirement that topsoil could not be placed beneath or in any road embankment. Under certain circumstances, they indicate, this is unjustified and could be counter-productive, particularly not be affected. Therefore the road to be constructed will remain as part of the post-mining land use. In such situations, the commenters state "disposal of topsoil would require disturbing additional land that would, in particular, not be affected." They further cite that use of topsoil in embankments does not jeopardize the stability of the embankment.

The Office agrees with the commenters that placement of topsoil in the embankments should not always impair the structure's durability. The Office believes, however, that topsoil is a valuable resource, generally in limited supply. Even in those situations where road areas are approved as part of the post-mining land use and will not be restored in accordance with 30 CFR 816.156 and 816.166, topsoil removed from these roads during the construction phase may be needed elsewhere or in a productive state. For this reason, the Office believes that it is necessary to give special attention to the collection and stockpiling of topsoil.

Another commenter recommended including language which would exempt operators from the requirements to remove vegetative materials and topsoil from low-lying, wet areas, especially if embankments are to be constructed. The commenter alleges that, as written, this paragraph would limit or prevent access to some possible mine areas. No further rationale is provided. The commenter further indicates that the proposed language revision would not sacrifice stability because it would only apply to flat areas. This comment must be evaluated in the context of the earlier discussion relating to topsoil removal in the context of the construction of exploration or temporary roads. (paragraph 816.152(d)(1)).

The proposed or final rules do not specifically address construction across low-lying wet areas. As required by Section 515(b)(6) of the Act, the Office must assume that regulatory authorities will require practices using the best technology currently available. This may include removal of unstable materials and replacing with ballast, embankment, surfacing materials, and drainage structures. Furthermore, the Office believes that the language as written will preclude access to some potential mine areas. The provisions of paragraph (d) are primarily directed toward the construction of embankments on stable slopes of 20 percent to 50 percent. Nevertheless, sufficient flexibility is provided through the alternative spec-
ffication provision of 816.150(d) and 816.160(d), to accommodate unique or unusual situations. For these reasons, the Office did not adopt the commenters' suggested language revisions.

A final comment on these Sections suggested that if the road is not for post-mining use or ground no steeper than 1:5h (20 percent), the removal of vegetative materials should be at the discretion of the person mining, since their only effect is increased maintenance costs.

The Office recognizes that temporary roads (used less than six months) will not need to meet strict standards and that vegetative removal requirements because buried vegetative materials will not decompose to the extent it will jeopardize road stability. For these reasons, the Office partially adopted the commenters' recommendation by not requiring vegetative removal in the construction of Class III roads. However, for roads of longer duration, or for any coal haul roads, vegetation must be removed to assure stability, since failures of these structures may result from significant adverse environmental effects.

\[\text{Section 816.153, 816.163 and 816.173 Drainage.}\]

These Sections contain drainage requirements derived from proposed Section 816.33 (43 Federal Register 41882, September 18, 1978). An introductory paragraph (a) on general drainage requirements is followed, for Class I and Class II Roads, by separate paragraphs for additional requirements for temporary roads, or other roadbed erosion controls, (c) culverts and bridges, (d) protection of natural drainage and (e) stream crossings. For Class III Roads (Section 816.173), the organization is the same except that specific requirements for ditches or other surface erosion control measures because of the temporary nature of these roads. This results in a slightly different number of the paragraphs. The Class III Road standards implement OSM policy to evaluate these temporary roads more on the basis of performance than design. Such an approach was suggested, in part, by comments on this Section.

One commenter on the proposed version of these Sections requested that OSM only allow alternative designs pursuant to strict OSM guidelines. Technical guidance papers were suggested in one memorandum for assisting control. No alternatives would be allowed except pursuant to federally approved alternative design criteria. This suggestion has been rejected as overly restrictive and denying the States some of the initiative role Congress intended for them. Accordingly, Sections 816.153, 816.163 and 816.173 allow for alternatives to be evaluated by regulatory authorities after demonstrations by professional engineers, with approval only granted to these alternatives which demonstrate equal performance. Sections 816.153(a), 816.153(a) and 816.173(a) contain general requirements for drainage flow control measures on roads. For Class III Roads the only requirement is for temporary culverts where necessary. Class I and Class II Roads must have drainage structures capable of safely passing the 10 year, 24 hour precipitation event.

\[\text{Paragraphs 816.153(a)(1), 816.153(a)(1) and 816.173(a)(1).}\]

Several commenters objected that the operator should have to prepare hydraulic designs for each road to establish that the 10 year, 24 hour event can be safely passed. These commenters suggested that if the State regulatory authority had established road building design criteria based on such an event, the operator should be able to meet them rather than satisfying requirements by following those criteria. OSM agrees, and believes that these comments were based on too narrow a reading of the proposed rule. In their State program submissions under Subchapter C, States may present for approval those alternative design criteria which they are willing to allow operators to follow in order to be relieved from the requirement to submit hydraulic studies for the drainage system.

Various commenters suggested that the 10 year, 24 hour precipitation event is too stringent a standard for roadway cross drainage. They suggested reduction to the 10 year, 6-hour storm, based on a 6-mile event volume. This event was selected as a reasonable balance between overdesign and insufficient standards, and is found in many State and Federal design codes. In addition, the single standard will facilitate regulatory authority review of permits, State, Federal and citizen inspections and enforcement.

Paragraphs 816.153(a)(2), 816.153(a)(2) and 816.173(a)(2) apply the minimum sediment standards of 816.42 and 816.45 to roads. The reader is referred to the preamble discussion of these Sections for an understanding of their bases and purposes. One commenter suggested that a minimum sediment storage volume of 125 cubic feet/acre disturbed should be specifically required along haul roads. For reasons explained or referenced in the preamble discussion of 816.42 and 816.45, sediment ponds will not always be required for roads. Where they are required, the minimum sediment storage volume is specified in Section 816.46.

Paragraph 816.153(a)(3) requires listing on maximum vegetation clearance around coal haul roads. This provision had appeared in proposed section 816.35 and is intended to minimize erosion and destruction of animal habitat created as haul road rights-of-way. Paragraph 816.153(b) and 816.163(b) contain provisions originally proposed as 816.34(b). The requirements are mandatory for all Class I, and shall be used wherever necessary on Class II roads. Ditches are required to carry...
water that has drained off the road sections and to intercept water draining from cut-slopes. Intercepting this roadway drainage, and disposing of it through appropriate cross drains will ensure that the road is maintained without cause sedimentation problems and help ensure proper function of the road. Water must be conveyed in a manner which will not saturate fills, or cause excessive ditch erosion. Undulation of the road is retained if not necessary to facilitate flow in ditches. On Class II Roads ditches are only required in wet areas. Because of the lower traffic volume the Class II road will handle either ditches or road dips are required in other areas. The drainage system handled by these ditches or ditches must be controlled to minimize erosion or saturation. No analogous requirements are promulgated for Class III roads.

Sections 816.153(c), 816.153(c) and 816.173(b) derive from proposed Section 816.34(c). For Class I and Class II roads, subsection (c) is divided into two paragraphs: (c)(1) relates general to design and (c)(2) relates to spacing and location.

Under (c)(1), the requirements are identical for Class I and Class II roads, except that trash racks and debris basins are required in some instances for Class I Roads. Culverts and bridges on both Class I and Class II roads must be designed safely to pass large storm events, to remain in good functioning order given the weights they will bear and the volume of water they will pass, and culverts must be covered to a depth of one foot. For Class III roads a lower storm event must be safely passed.

Paragraph (c)(1) requires for Class I and Class II Roads, that minor culverts, as defined in U.S. Forest Service Handbook Chapter 7721.05e pg. 8, must pass the 10 year 24 hour event. Major culverts and small bridges with spans of 30 feet or less must pass the 20 year 24 hour event. Bridges with spans of more than 30 feet shall pass the 100 year, 24 hour event. (U.S. Forest Service handbook Chapter 7721.81a 3, pg 55). The justification is based upon the degree of risk if failure should occur in these structures. The selection of these recurrence intervals involves consideration of many factors, among them the expected flood damage upstream and downstream, the loss of the use of the road, and damage to adjacent property. Paragraph 816.173(b) requires culverts and bridges to pass the one year, six hour event which is deemed appropriate given the lower risk of a larger event since the structure will be in place less than six months.

The standard for bridges derives from proposed Section 816.34(d), which had required the standard be met for all structures crossing streams which drain more than 100 acres. The standard now only applies to major bridges, those with spans over 30 feet, in accordance with U.S. Forest Service Handbook Chapter 7721.05e pg. 8. One commenter objected to uniform design storm standards, and suggested a sliding scale of design storms of decreasing frequency as the expected life of the facility increased. The underlying principle was that this would more closely tie the likelihood of the event to the applicable design. The standard was accepted insofar as a temporary Class III Road has a lower standard. However, for long term structures a standard independent of facility life (although dependent on facility size) was adopted for the reasons discussed above in the context of the similar comment related to the proposed one foot standard.

Paragraph (c)(1)(i) assure that culverts will have adequate bearing strength so that collapse from vehicle weight is minimized. Selection of the proper gauge of pipe will ensure the proper function of the culvert and the road structure.

One commenter suggested a specific standard of culvert cover geared to weight of vehicles: two feet for vehicles under 100,000 pounds and three feet for vehicles over 100,000 pounds. This standard is suggested by U.S. Bureau of Mines Circular No. 8758, 1971. (Kaufman, W. W. and Ault, J., 1971). While OSM agrees this is a reasonable and loss of use of the road if the culvert fails. Accordingly, OSM believes both standards are necessary and has retained them.

For Class I and Class II Roads, paragraph (c)(2)(v) relates to spacing of drainage dips. The maximum spacing is somewhat greater for Class I Roads than for Class II Roads because Class I Roads are crowned so there should be less concentration of runoff, and because Class I surfacing requirements will reduce the likelihood of erosion.

The spacing requirements are somewhat stricter for Class II Roads than for Class I Roads, because they also apply to dips. However, the spacing can be increased if the regulatory authority finds, under paragraph (c)(2)(iii), that erosion will not be increased. OSM suggests that the appropriate means of utilizing the provisions of (c)(2)(iii) will be for the operator to present a hydraulics study to the regulatory authority for evaluation, as contemplated by many commenters.
The standard spacing requirement of the proposed rule was written in a way which had no standards for grades of less than two percent, between five and six percent or 10 and 11 percent, or greater than 15 percent. In the final rule there is a standard for all grades.

The culvert spacing standard for Class I roads is that recommended by the U.S. Bureau of Mines (Kaufman and Ault, Design of Surface Mine Haulage Roads Manual, 1977). Several commenters objected that fixed culvert spacing would defeat the goal of the regulations to minimize altering natural channel locations. This was not the intention of OSM, and paragraph (c)(2) has been clarified to indicate that it applies to spacing of road surface drainage culverts and ditches, not other structures.

One commenter requested that a minimum standard be specified, but gave no technical backup for the request. When the specified design storm is used in selecting culvert size, OSM could not give any technical support to larger culverts designed to handle a natural low point where it was inappropriate in so:qle cases where natural low points where it might be in a steeper natural channel. The culvert might be in a steeper natural channel. Paragraph (c)(2) has been revised to implement this restriction from buildup in the culverts. The capacity of water to carry sediment varies with its velocity. The 30 degree angle down grade represents the best design and economics of pipe length. A larger angle, up to 60 degrees, would carry the water better from a ditch section with less sediment retention, but would also result in much larger pipe length. Therefore OSM has used the 30 degree angle as many State programs already in effect. This will lead to less culvert failure due to sediment plugging and erode stable road structures. Paragraph (c)(3) has been designed to protect the inlet end of the culvert from erosion of the headwall and to assure that culvert discharges do not saturate fills. These were proposed as separate paragraphs, but several commenters believed that the requirements to protect the inlet end should only apply if necessary to prevent erosion. OSM believes that the velocity and amount of water involved, and the importance of the culvert in erosion protection require mandatory measures to assure inlet-end soundness. Variances will only be available if the operator makes the showing referred to in 816.150(d) and 816.150(d). Several commenters objected to the requirement, as they perceived it in the proposed rules, that culvert flow would have to pass through the fill in a pipe and then be discharged below the toe. These commenters believed that such a requirement would lead to excessive velocity of water which would invariably increase erosion, especially in steep slope areas. OSM intends that the flow be conveyed in the best way to prevent saturation of fills. A riprap channel on the fill face may, in some circumstances, be appropriate, although it should not be favored where the fill slope is gentle enough that pipe flow presents little risk. The language of the last paragraph of (c)(2) has been revised to implement this view.

With regard to this same paragraph, several comments were received questioning the requirement that the outlet end of a pipe be placed below the toe of a fill. This provision has been reworded to clarify that the water shall be discharged below the toe of the fill, using a conduit or rock riprap. It is not intended that a pipe must always extend from the ditch line to below the toe of a fill. The revised wording recognizes that water may be conducted through the pipe at a normal gradient, and then down the fill using either riprap or other conduits to prevent damage to the fill or saturation (Kaufman W.W. 1977, pg. 45-47, U.S. Forest Service 1977, Section 206A, 24.45, 26.21, 26.25, 603.05 and 621).

Two commenters suggested that rock riprap should only be required when needed to minimize erosion. OSM believes that to minimize damage to the environment, measures such as riprap protection must be provided to prevent scouring by water discharges (U.S. Forest Service 1977, Section 619, 25.27; Kaufman W.W. 1977, p. 45). Accordingly, these comments have been rejected.

§§ 816.153(d), 816.153(d), and 816.173(c)

Natural drainage.

These Sections derive from proposed Sections 816.153(b) and are intended to preserve, to the extent possible, natural drainage flows.

Many commenters were concerned with the relocation or altering of natural drainage ageways are not to be relocated or altered by routing the water courses into and down a ditch to an outlet in another drainage course unless the alternative of relocation is approved by the regulatory authority. The objective is to leave the natural drainage patterns intact as far as practical.

Relocation of the natural drainage is permissible when the drainage is not blocked, no significant degradation occurs. The hydrologic balance, and there is no adverse impact on adjoining landowners (U.S. Forest Service 1977, Sections 50.4; 100.42; 71.33). The term "significant" as used in paragraph (c)(2) is intended to require that the operator demonstrate and ensure that the altering or relocation of the natural drainage does not result in degradation of water quality in the receiving waters to the extent that applicable water quality standards are not violated (U.S. Forest Service 1977, Sections 206.06, 71.31, 71.33 (4) and 71.33 (F i gur e 1)). However, without the word "significant," a literal reading of the paragraph might lead one to believe that natural drainageways can never be relocated, which is not the intent of the provision. The addition of the word significant is in no way intended to change the requirements under Section 615(b)(10) of the Act for minimization of disturbance to the hydrologic balance.

One commenter felt that it was unclear whether the natural drainage included streams and, if it did, whether this paragraph or the following one is to control. OSM believes this paragraph and the one on stream crossings which follows are consistent. While this para...
graph applies to all diversions or alterations of perennial, intermittent or ephemeral stream, or other drainways which occasionally convey flow from precipitation, snow melt or overflow of other water-holding features. The paragraph continues to add additional restrictions for streams.

One commenter felt the proposed version of the natural drainage rules was too broad, in that it might be read to apply to natural drainage around sediment ponds or at other locations unrelated to roads. Accordingly, the language has been clarified to be limited in scope to drainageways which might be affected by road construction or reconstruction. Many comments were received questioning a proposed 15-foot height limitation on embankments over stream crossings. The comments correctly pointed out that if the culverts or other drainage structures are adequately designed to pass the proper precipitation event, a 15-foot embankment limit adds no environmental protection. Both MSHA and some States have a 15-foot limitation. These comments have been accepted and the 15-foot limit has been deleted from the regulations. § 816.153(e), 816.163(e), and 816.173(e) Stream crossings.

These Sections are designed to protect streams crossed by roads. They derive from proposed Sections 816.31(d). For Class I and Class II roads, all stream crossings must be over drainage structures. For Class III roads, structures are only needed at permanent streams. All structures must be constructed so as not to affect normal stream profiles or adversely affect aquatic life. Several commenters suggested a sliding scale of storm design criteria based on the expected life of the stream crossing. A sliding scale was not adopted for the reasons discussed above in the discussion relating to comments requesting such a scale for drainage structures.

One commenter requested this regulation specifically address potential damage to fish migration. For the reasons discussed or referenced in the preamble to Section 816.97 and the Section of OSM's EIS related to aquatic life, OSM believes the potential damage to fish habitats to be serious. The purpose of the requirement here is to assure that both the regulatory authority, in approving plans, and the operator, in designing and implementing them, fulfill the requirements of Section 515(b)(24) of the Act to use best technology currently available to protect fish and related environmental values.

§ 816.154, 816.164, 816.174 Surfacing. The road surfacing sections derive from proposed Section 816.35. OSM has adopted some language changes for clarity.

Durable material is required on the surface of Class I and Class II roads. For all three Classes, the surface must be non-toxic and vegetation to be removed shall be kept to the minimum necessary. For Class I Roads this requirement appears in § 816.154(a)(6) to emphasize its importance in drainage structure planning.

Language relating the durability of road surfacing material to volume of traffic and weight and speed of vehicles was added to be consistent with the scheme for three classes of roads. Failure to construct a good, durable road surface will result in increased vehicle and maintenance cost, and cause excessive erosion. Fugitive dust also becomes a problem with improper road surfacing during dust storms (Kaufman, W.W. 1977, pg. 23-30).

For all three Classes these requirements are intended to minimize road surfaces erosion, sedimentation, surface failures and adverse effects on wildlife and their habitat.

One comment recommended that durability of road surfacing material should be an economic consideration left to the operator. OSM has not revised the regulation in response to this comment because the Office believes durability must be a function of volume of traffic, weight and speed of the vehicles using the roads, so that stability is assured.

Failure to establish a good haulage road surface will result in increased vehicle and road maintenance, and could severely hamper the ability of a vehicle to safely negotiate the route. Dust problems are frequent, and can be severe if not controlled. Unsurfaced roads will cause severe sedimentation problems if allowed to go unchecked. Kaufman W.W. 1977, pages 23-30, U.S. Forest Service, 1977, Sections 300, 400, 701, 702, 703, 21.11-1-.~ § 816.155, 816.165, 816.175 Maintenance. These Sections were established to complete the logical format of this group of regulations. In proposed Sections 816.31 through 816.34, maintenance requirements were interwoven within each of the subsections. Based on the requirement of Section 513(b)(17) of the Act to assure that "maintenance * * * will control or prevent erosion and pollution, sedimentation, pollution of water, damage to fish or wildlife and their habitats or damage to public or private property," these regulations for maintenance, as reorganized and elaborated for clarity, are appropriate. (Weigle W.K. 1965, pg. 10, 19; Kaufman W.W. 1977, p. 50).

These Sections require that Class I and Class II Roads be maintained at design level throughout their life, and the maintenance program be implemented to preserve the integrity of the road and associated structures. Class I Roads also must be promptly reconstructed before they can be used after damage by flooding or other catastrophic events. This will prevent environmental harm from the ruined road system or from coal haulage over inadequate roadways. The general requirements for Class III Roads require attention to conditions which might lead to erosion or degradation of water quality.

Regardless of how well a road is planned and constructed, lack of a complete maintenance program will lead to failure of the road to function as it was planned, and can cause severe downstream sedimentation. Dust, potholes, rutting, water infiltration and other conditions, if left unchecked, may impede vehicular control as well as cause environmental problems. Road maintenance failure could be perpetive in nature, rather than corrective. (Kaufman 1977 pp. 50).

Maintenance work is expected to include maintaining the original cross-section configuration and proper drainage of the roadway. OSM's assessment of the need to meet water quality standards is that road maintenance and condition should always be checked closely, or continuously. (U.S. Forest Service, 1977, Section 30).

§ 816.156, 816.166 and 816.176 Restoration of roads.

These Sections derive from proposed Section 816.36 and establish the requirements for restoring the areas in which roads are located following mining, reclamation, and monitoring operations. The requirements for all three road classes are identical, except that no reclamation or disposal of surfacing material is made for Class III Roads, since they do not require durable surfaces. For Class I and Class II Roads, removal is required unless the road is approved for retention as part of the postmining land use.

The nine specific requirements of these Sections are intended to achieve the purpose of the Act as follows:

(a) Closing the road to vehicular traffic will eliminate further wear on the road, protect the public from dangers associated with a road that is not being maintained and allow restoration to proceed with minimal risk to property or human safety;
(b) Restoring natural drainage and removing bridges and culverts will help restore the original hydrologic balance;
(c) Rippling, plowing, scarifying and terracing methods will prepare the site for revegetation;

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(d) Rounding and blending will restore the approximate original contour; and
(e) Installation of cross-drains, dikes and water bars, terraces and the like will minimize long-term erosion after reclamation.

Several commenters suggested that roads constructed as part of the mining operation or incident to exploration may be needed for access to remote and isolated areas. They contend that such roads are important in the protection and control of forest fires and provide access for hunting and fishing. In view of this, the commenters felt that the roads should be left in place rather than restored to the approximate original contour, as would have been required by the proposed rules. Class I and Class II Roads constructed for mining and exploration operations and which will be required and specified pursuant to Sections 816.156 and 816.166(a), if the post mining land use requires a road network for fire control and prevention, for private or public access or other purposes, Class III Roads, temporary passageways, generally used for exploration activities. Though many of these roads could be used as fire roads or for hunting or recreation access, they would generally be limited to off-road-vehicle use. Poor horizontal and vertical alignment and lack of permanent drainage structures, surfaceing, and maintenance will make these roads virtually impassable by conventional vehicles. Off-road-vehicle use, particularly during wet periods, would cause rutting, channeling of water, puddling, erosion, and increased sedimentation in nearby streams. For these reasons, the restoration of Class III Roads by methods provided in Section 816.38C(a)(4) and C(a)(5), the Office recognized that the sequence or restoration listed could lead to confusion and misunderstanding. The Office agreed with the commenter and has revised these requirements to reflect that redistribution of topsoil and revegetation are the final steps in the restoration process. The commenter is referred to the preamble discussion above, relating to the suggested deletion of Sections 816.151(a)(7) and (a)(9), and other Sections.

Numerous comments were received suggesting that the paragraph requiring cross-drains, dikes and water bars (816.156(a)(7), 816.166(a)(7) and 816.176(g)) be changed to read, "If needed to minimize erosion, cross-drains, dikes and water bars shall be constructed". The commenters contended that if such structures are not needed, to prevent erosion, they should not be constructed. They further contended that erosion can be adequately controlled by revegetation and mulching.

The Office concurs with the commenters that revegetation and mulching can control erosion. Such measures will be used extensively where they prove effective in reclamation efforts and in minimizing erosion. The Office would further point out that the requirements of Sections 816.156 and 816.165, are not inflexible. Where the operator includes in his reclamation plan alternative means of reducing erosion from mine roads undergoing reclamation processes, the regulatory authority has the flexibility to evaluate and approve such measures if they meet the purposes of the regulations promulgated thereunder. Since structures are not required in all cases, the Office did not accept the commenters' alternative language.

Several commenters suggested that the proposed paragraph, which would have explicitly required restoration to approximate original contour, could cause excessive environmental damage. The commenters indicated that requiring fill materials to be moved back to cut sections would require an additional disturbance equal to or exceeding the original construction phase. This, the commenters allege, would mean increased erosion damage and disturbance of established vegetation, particularly if the material replaced in original cuts could not be stabilized. The com-

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menters did not provide any alternative.

As discussed above, to the extent that road cuts and embankments are consistent with approximate original contour, they may be retained and blended rather than obliterated. However, the Act provides no variance from the requirement to restore approximate original contour for road-related structures and none is provided in these rules.

Another commenter suggested rewriting the contour provision to require that, "the area shall be regraded to control erosion and support revegetation. Fill areas shall remain as is with adequate natural drainage being provided." The commenter's alternative language is based on assertions that the proposed rules are not supported by research data in the references listed for this Section. The commenter further points out that "one reference states that removal of fills is impractical and road beds must be re-vegetated and slopes rounded." The commenter concludes that reclamation efforts and activities will, initially, cause adverse environmental impacts. Removal of culverts, bridges, regrading and redistribution of topsoil will likely result in short-term adverse impacts, particularly to aquatic life and aquatic habitats and air resources. Upon completion of reclamation activities and following revegetation, reclaimed areas will, however, gradually return to a new natural condition (i.e., water quality and quantity, sediment discharge rates and air quality condition will return to approximate "background" levels). Additionally, deletion of the language "the area affected shall be returned to approximate original contour . . .", and substituting a requirement in Sections 816.156(a) (5) and (6), 816.166(a) (5) and (6), and 816.176 (e) and (f) for rounding, reduction, shaping, blending, or matching terrain and to meet natural drainage and to blend with the natural contour, provides sufficient flexibility to eliminate the need for backfilling all road cuts, except for topsoil redistribution requirements while meeting the requirements of Section 515(b)(2) of the Act. In making these revisions, the Office has partially adopted the alternative language suggested by the commenter.

Sections 816.156(a)(9) and 816.166(a)(9) specify that road surface shall be covered with topsoil. Commenters suggested that this provision be modified by deleting the reference to topsoil and adding "unless otherwise determined by Section 816.32(c)". The commenters did not provide any rationale for the recommendation. In reviewing the provisions of Section 816.32(c), the Office determined the commenters' intent was to provide for the represencing of topsoil substitutes and supplements when restoring roadbeds. Paragraph (9) requires that road surfaces be covered with topsoil in accordance with 30 CFR 816.24(b) (2). Paragraph (10), refers to topsoil removed in accordance with Section 816.22. These requirements provide for represending of topsoil substitutes and supplements. The Office believes the commenters' concerns are accommodated within the language of existing regulations. The commenters' recommended change of language is not necessary and was not adopted.

Numerous comments suggested adding a new Section to read: "The regulatory authority shall grant variances for the reclamation of pre-existing roads, constructed prior to May 3, 1978, in areas where fill material is not available for backfilling to original contour. The quantities to meet the standard is not available." Commenters cite the proposed rules preamble discussion which recognized that relief from the prohibition of the removal of fill within a specified period was intended to accommodate natural drainage or water quality. Following review and analysis of the comments, the Office agrees that reclamation of pre-existing roads may require special consideration by the regulatory authority. The Office has recognized that "fill slopes shall be rounded or reduced and shaped to conform the site to adjacent terrain and to meet natural 'contours'" and that "cut slopes shall be shaped to blend with the natural 'contours'." These requirements, the Office believes, should be responsive to the reclamation needs for pre-existing roads. In addition, special provisions for existing, non-conforming structures have been added to these rules as Sections 701.11(e), 780.12 and 786.21. The reader is referred to the preamble discussion of these Sections.

Sections 816.156(b) and 816.166(b) explain the requirements for removal, handling, conveyance, and disposal of road surfacing materials following cessation of operations. Several commenters suggested deleting this Section in its entirety. The commenters indicated that disposal of all road surfacing materials in accordance with Section 817.99 assumes that the road surfacing materials will be disposed of in accordance with 30 CFR 816.51(b) and 701 of the Act. The Office believes that the requirements of Sections 816.156(b) and 816.166(b) provide sufficient latitude to permit the regulatory authority to select other satisfactory means of reclamation, removal and/or disposal of road surfacing materials. The regulatory authority may elect to permit operators to scarify and leave surfacing materials in place, provided such practices meet the requirements of the approved State program and the intent of the Office's recommended change of language is not to prevent reclamation, removal, and disposal. The Office believes that the requirements of Sections 816.156(b) and 816.166(b) provide sufficient latitude to permit the regulatory authority to select other satisfactory means of reclamation, removal and disposal. For these reasons, the Office did not accept the commenters' recommendation to delete this provision.

Several other commenters also recommend deleting this Section on the grounds that since the rules prohibit surfacing of roads with toxic or acid-forming substances, there is no need to remove and dispose of surfacing materials as prescribed in Section 816.89. Commenters further indicate that since the proposed rule scarification of the road and covering with topsoil, that road surfacing materials left in place should not cause any problems.

The Office believes that the requirements of Sections 816.156(b) and 816.166(b) provide sufficient latitude to permit the regulatory authority to select other satisfactory means of reclamation, removal and disposal of road surfacing materials. The regulatory authority may elect to permit operators to scarify and leave surfacing materials in place, provided such practices meet the requirements of the approved State program and the intent of the Office's recommended change of language is not to prevent reclamation, removal, and disposal.

§ 816.189 Other transportation facilities.

Authority for this Section is found in Sections 102, 201, 501(b), 503, 504, 507(b), 515(b) and 701 of the Act. Movement of coal, equipment and personnel within the mine plan area may require roads, railroad loops, spurs, sidings, surface conveyor systems, chutes and aerial tramways. The general standards set forth in this Section are intended to ensure the minimization of the adverse effects to hydrology, fish, and wildlife and their habitats, and public and private property and roads. The standards are designed to protect areas and water bodies from excess sedimentation or sedimentation that might otherwise be expected from the activities of the mine. The standards are intended to provide for the control, monitoring and evaluation of transportation facilities other than roads.

The Office agrees that water quality standards are necessary to protect aquatic life. The literature, State laws, and regulations used in preparing the State standard included those works as well as others that the Office believes are necessary to protect aquatic life. The standards are intended to provide for the control, monitoring and evaluation of transportation facilities other than roads.
ambly discussion of Sections 816.150-816.176.

This Section was numbered 816.36 in the proposed regulations and has been renumbered Section 816.180 in the final regulations to follow immediately after the rules for roads, so that all regulations relating to transportation facilities incident to the mining operation are together.

In preparing this Section, some editorial changes were made for clarification only. In addition, the words “or reconstruction” have been added in the introductory paragraph to require these standards to be met in the context of major overhaul of the facility in the same manner as if a new facility were being constructed. The reader should review the preamble to Sections 701.9, 708.12 and 708.21 for further elaboration.

Section 816.180(c) addresses the potential environmental problems associated with the construction and use of transportation facilities incident to the mining operation when these facilities are located in or pass through wildlife habitats. Environmental problems including fugitive dust and damage to wildlife habitats such as destruction or diminution of all or part of the habitat, pollution of or disturbance of feeding areas or water sources may result. This Section further restricts the limits of suspended solids which may be introduced into streams or other water bodies to those allowed by existing State and Federal laws. This Section will assist the operator in bringing other transportation facilities in compliance with Section 816.97 of the regulations.

Section 816.180(b) deals with the problems of pollution of water bodies and the impedance of flow of water sources resulting from coal mine transportation facilities. This Section specifically prohibits the introduction into the environment of silt or water from overbank or runoff or air transport, pollutants from transportation facilities and the impediment of flow of any water body as a result of construction or use of transportation facilities incident to coal mining operations. This Section will assist the operator and the regulatory authority to assure compliance with Sections 816.42, 816.44, and 816.45 of the regulations when constructing or using transportation facilities other than roads.

Section 816.180(c) requires the permitte to control or minimize erosion or siltation resulting directly from the construction or use of transportation facilities incident to the mining operation, other than roads. These facilities must be constructed in such a manner so as to control erosion of the roadbed or support foundation and to prevent them from deforming and eroding. Control of erosion and fugitive dust resulting from use of these facilities will assist in controlling or minimizing siltation in compliance with Section 516(b)(4) of the Act.

Section 816.180(d) of the regulations will assist the permittee in complying with Section 816.95 of the regulations and Sections 516(b)(4) and 506(a)(9) of the Act with respect to air pollution or dust resulting from use of transportation facilities other than roads. The Section relates specifically to fugitive dust arising from the use of these facilities and from the transportation of the mined material. Section 816.180 identifies general guidelines and goals to be achieved with respect to the construction, use and maintenance of other transportation facilities. These goals become meaningful only when they are applied to specific mining operations identified by the operator and regulatory authority. Regional differences exist in the potential problems which may be encountered. It is expected that State programs will more specifically address these regional problems.

Several commenters argued that Paragraph (d) of Section 816.180 should be modified to explicitly require all facilities to comply with Section 816.95 regarding air resources protection. Sections 730.15 (Air pollution control plan) and 816.95 (Air pollution performance standards) do apply to these transportation facilities, and Sections 816.95 (a) and (b)(1)-(19) specifically address the fugitive dust problem these facilities can create. The Office believes that the additional reference here would just be redundant, or perhaps even misleading, since the Office does not at this time wish to foreclose the applicability of this Section to air quality problems in addition to those from fugitive dust.

One commenter recommended deletion of paragraph (d), relating to air quality. This recommendation has not been accepted because Sections 816.94 and 818(c)(4) of the Act provide measures and requirements for complying with applicable air quality laws and regulations, applicable health and safety standards, and mandate the reduction of air pollution. The reader is referred to the preamble discussion of Sections 730.15 and 816.95 for a further discussion of this issue.

§ 816.181 Support facilities and utility installations.

This Section pertains to facilities that support the mining operation or other public facilities such as pipelines, electric or telephone lines which cross the mine plan area.

This Section was renumbered as Section 816.181 from Section 816.39 of the proposed regulations to maintain its position after the transportation facilities rules in Part 816.
serving mines may not be subject to this Section, because the operators could not reasonably be expected to influence underground activities. If the commenters’ suggestions were accepted, the regulations under the Act could too easily be avoided by separating ownership of the facilities.

Two commenters on proposed Section 818.181(b) suggested that the word “prevent” be changed to “minimize.” Their reason is that in the normal course of mining activity, absolute prevention of damage cannot be assured. Some resources will be affected and attempts must be made to minimize this damage, destruction or disruption. This proposal was accepted and the language revised accordingly.

Several comments on Subsection (b) indicated that utility services other than those listed should also be protected. The Act refers to protection of public property which may not be limited to the examples cited. This suggestion has been accepted and Section 816.181(b) was revised to recognize water and sewage utility services in addition to those examples cited.

Some commenters suggested the addition of the phrase “such as, but not limited to” to reinforce the idea that the listing was only examples. The Office believes that those listed are the most common public utilities and States are encouraged, while in the development of their regulatory programs, to add to this list. However, these are considered the minimum types of facilities requiring national protection.

One commenter argued that this Section should explicitly provide that it does not attempt to adjudicate relative property rights if a health or safety hazard is not involved. The Office believes that the Act requires minimization of the effects of mining, and the words “unless otherwise approved by the owner and regulatory authority” at end of Section 816.181(b) provides for determinations, at least in part, by the mineral owners. Therefore, the language has been retained by the Office because State laws adequately provide for the relative rights of owners of utilities and mineral grants and the proposed language is unnecessary as repetitive of the self-executing provision in Section 510(b)(6)(C) of the Act. However, it should be emphasized that attempts to avoid the requirements of the Act or these rules based on past or future agreements between private parties will not prove successful, except to the extent Congress has mandated their acceptance.

Two comments were received recommending the elimination of environmental requirements for small mine operators utilizing mobile offices and support facilities. This recommendation has not been accepted because Section 515(b) of the Act provides for performance standards applicable to mining, and for the protection of public property and maintenance of land values. The Act does not authorize any blanket exemption for small operators in the permanent program.

**PART 817—PERMANENT PROGRAM PERFORMANCE STANDARDS—UNDERGROUND MINING ACTIVITIES**

Part 817 contains the minimum performance standards and design criteria which would be applicable under a State or Federal program for underground mining activities. The organization of this Part parallels that of Part 816, the standards for surface mining, although some modifications were needed to reflect the distinct differences between surface and underground coal mining, including entirely new Sections for subsidence (Sections 817.121-817.126).

§ 817.1. Scope.

Two commenters felt that Section 817.1 should be revised to encompass only surface operations and surface impacts incident to an underground coal mine. Section 509(b)(11) of the Act specifically authorizes concern for groundwater systems, and the Act is explicitly concerned about subsidence which requires underground mining techniques. Accordingly, the language of the regulations as proposed has been retained for complete scope of coverage.

§ 817.2. Objectives.

The objectives are derived from Sections 102 and 516 of the Act.

§ 817.11. Signs and markers.

This Section is substantially identical to Section 816.11, the corresponding Section of Part 816. The reader is referred to the portions of this preamble which discuss Section 816.11 for information concerning the technical basis and statutory authority for this Section. In addition to the Sections of the Act cited in those portions of the preamble, this Section is based on Section 516 of the Act. All comments and issues addressed in regard to Section 816.11, were also considered and similarly disposed of in preparing Section 817.11. Comments received on specific Paragraphs of Section 817.11 are addressed below:

- Paragraph (d). Several commenters felt that the requirement for perimeter markers should be deleted in its entirety. The requirement for the use of perimeter markers is found in Section 701(17) of the Act. Several other commenters felt that Paragraph (d) should be amended. Surface perimeter markers above underground workings will not aid underground operations to stay within their permit areas, except for the protection of the health, safety, and general welfare of the public, the quality of the environment, and potential land uses.

§ 817.13-817.15 Casing and sealing of drilled holes.

These Sections are intended to ensure that boreholes, shafts, wells, and other accesses to underground mines are sealed, filled, cased, lined, or protected so as to ensure and protect the health, safety, and general welfare of the public, the quality of the environment, and potential land uses.

Authorities for these Sections are found in Sections 102, 201, 501, 503.